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Windows 95

The Truth

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REVIEW

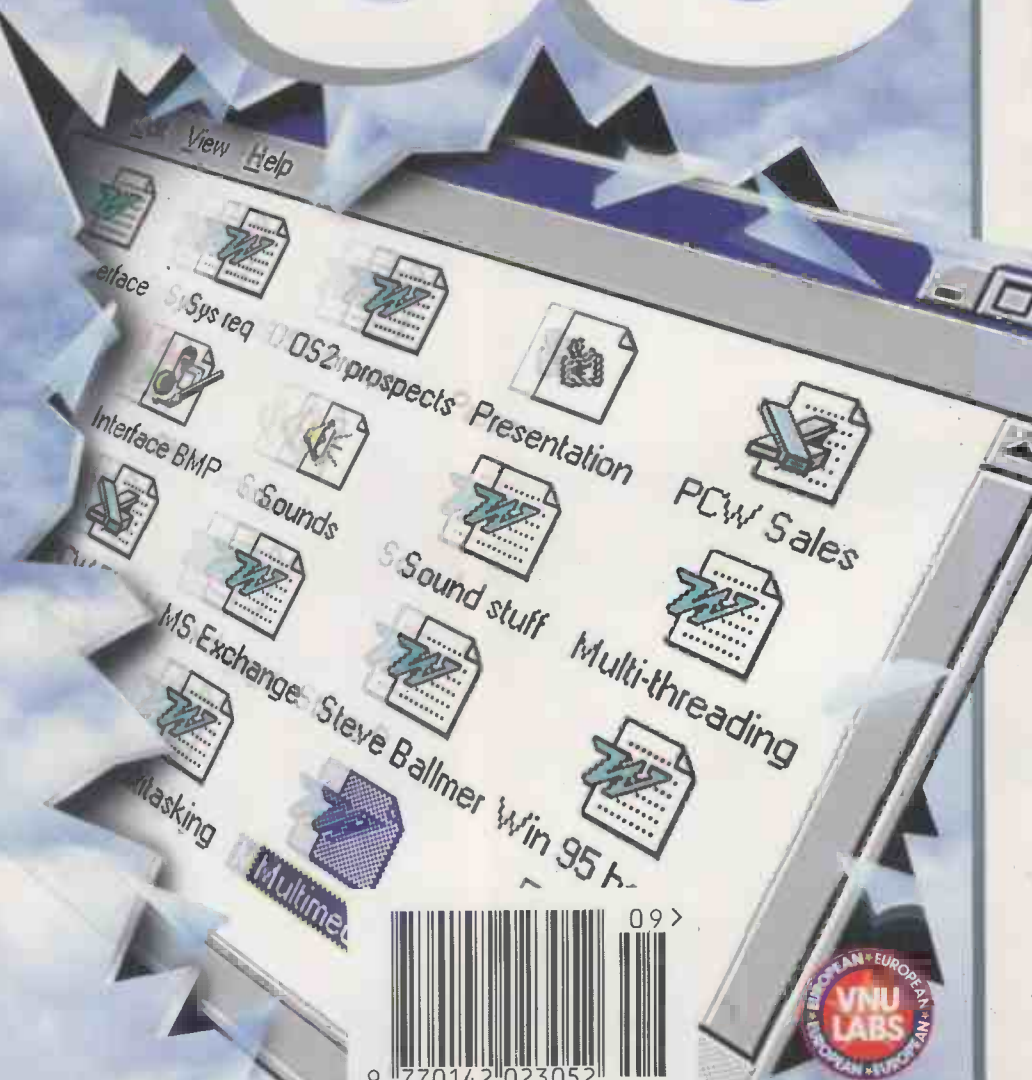
All you need
to know about
Win95

On Test

23 90MHz
Pentiums

Playstation
vs Saturn

The games
console
showdown



ALL HARDWARE TESTED BY THE VNU LABS

DIMENSION DESKTOP PCs



pentium
PROCESSOR

POWER PLATFORMS

DELL DIMENSION 466DL

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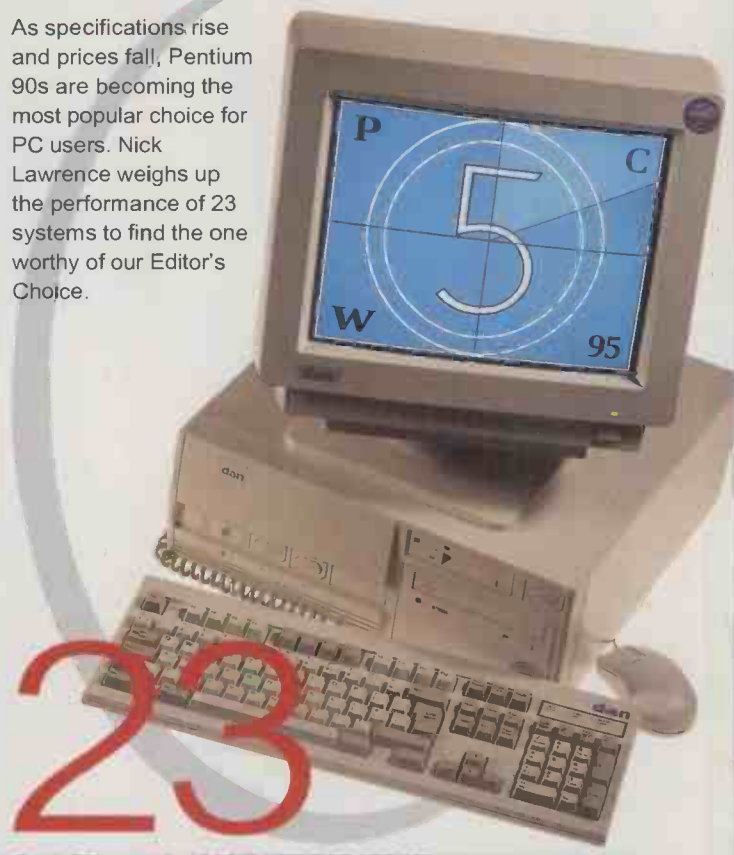


PCW Cover Illustration by Stephen Caplin

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Disk with every issue

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Includes Crossword Construction Kit, Medi8or, a full multimedia authoring package, and examples from Hands On Multimedia.

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650Mb+ of software, demos, animations, video and music. This month includes the virtual reality Visualiser from Superscape.

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Screenplay: Full Throttle

CD-ROM for Windows
EYEWITNESS

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Microsoft has wheeled out Windows 95, and if nothing unforeseen happens it will ignite the blue touch-paper on 24th August.

Microsoft has played down some of the implications for other vendors of the Win95 marketing miracle. To take full advantage of Windows 95, or in some cases even to run under it, your application software will need to be upgraded. For Microsoft, this is a glittering opportunity to increase Office 95's market share. Street prices for Win95 versions of Word and Excel are expected to be around £50, and as *PC Week's* Mole succinctly put it, that "should be sufficient to kill off what's left of the broken and bleeding opposition."

With the office application market sewn up, Microsoft can turn its attention to improving its share of the operating system market. And what better way to do that than to force the hardware manufacturers to sign a draconian licensing agreement before they can pre-install Windows 95. Its two main clauses prevent them from suing Microsoft, other manufacturers, distributors and users over any patent infringement by Windows 95, and require them to distribute the Microsoft Network with Windows 95 whether or not customers want it. After recent legal battles, Microsoft is understandably cagey about laying itself open to more.

Insidious though the patent infringement clause is, the second condition is even more sinister. If Microsoft hadn't insisted on it, it probably would have happened anyway, but this insistence suggests an unhealthy compulsion to grab as big a share of the online market as it currently holds in office applications and operating systems.

• Email has been around for years but it wasn't until recently that it became ubiquitous. We didn't start printing an email address on our letters page until the March '94 issue. Yet its growth has been such, that this month, for the first time, every letter we've published has been received electronically.

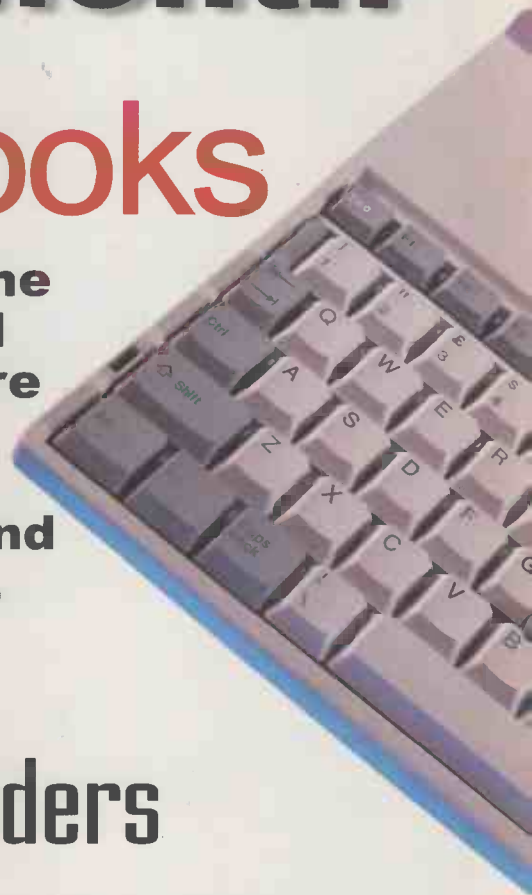
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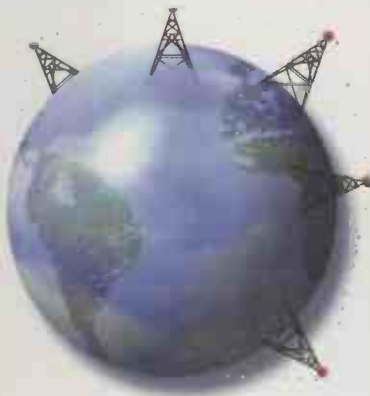
Next Month

Notebooks

PCW compares the latest in high-end portable hardware with fast processors, TFT colour screens and docking stations.



Internet Service Providers



Who can do you the best Internet access deal? **PCW** compares the features on offer from the top service providers.

Visual Basic 4

Microsoft's intuitive programming language gets Windows 95 and OLE 2.0 support.

October issue

— On Sale Thursday 7th September

November issue

— On Sale Thursday 5th October

- Windows 95 databases
- Laser printers



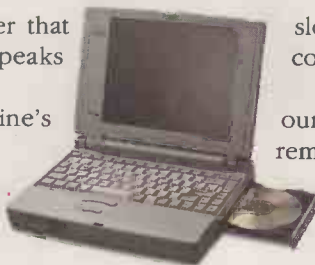


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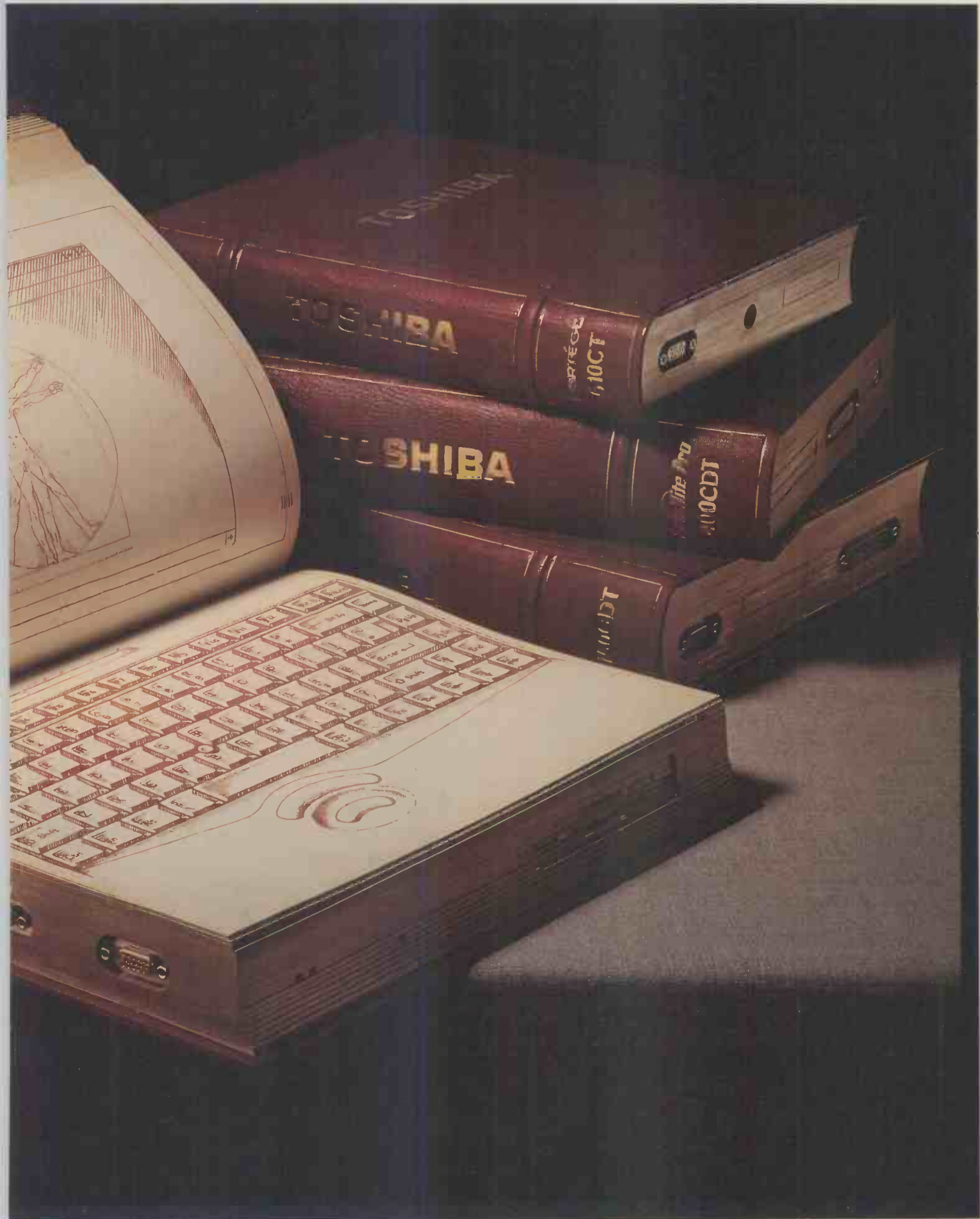
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slots and because we use mainly Toshiba built components the reliability is tried and tested.

Why do we put so much into making all our notebooks bestsellers? Because we want to remain the world leader in portables.

Gartner Group research shows that while you may have to spend a bit more on portables than on desktops, people spend



more time working on them. They become notebookworms.

Toshiba's latest edition is the Satellite Pro 400CDT/810 with an interchangeable CD-ROM and floppy disk drive, plus up to four PCMCIA slots, including two on a Card Station. Capable of displaying over sixteen million colours, this makes for a good read.

If you'd like more reading on Toshiba give us a call on 01932 828 828. We'll leave you to reach your own conclusion

but we're sure you'll agree, anything else just doesn't compute.

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PCW Cover Disk

Chris Nixon introduces this month's Windows Shareware special, which features a fantastic new spreadsheet, a powerful clean-up utility for purging those unwanted DLLs and VBXs, a handy connection time monitoring system for modems, and an indispensable drag-and-drop printing utility.

Installing and running the PCW Cover Disk

To install the programs, insert the disk in drive A: or B:, and from Windows or DOS (as long as Windows is installed on your PC) run the file PCW.EXE in the root directory of that drive.

Crossword Construction Kit

[Minimum requirements: 286 processor, Windows 3.1]

If you enjoy doing the crossword in your daily paper and have ever fancied trying your hand at designing your own, then Crossword Construction Kit gives you everything you need to produce professional-looking puzzles in next to no time.

Not only can you choose the words to use and how to place them in the grid, you can even design your own crossword layouts, including the actual shape of the grid itself.

Boats, planes, trees, whatever takes your fancy.

There are quite a few ready-made puzzles supplied with this Shareware version (more than enough to be going on with), all of which can be modified.

Medi8or

[Minimum requirements: 386 processor, Windows 3.1, 4Mb RAM]

Medi8or is a powerful multimedia authoring package that allows you to create complete multimedia products of up to 12 pages (or screens).

It allows full control over all types of multimedia objects such as digital movies and sound files. Adding one to your publication is as simple as drawing a box on the page, double-clicking on it, selecting the media type from

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Click in and have fun with our cover disk

Personal Computer World

PCW Cover Disk
September 1995

Please note that while we have taken every care in the production of this disk we will not accept responsibility for any problems you may encounter from using it. Installing and/or running any of the programs indicates your agreement to this.





Create your own multimedia products with Medi8or

Important details

If you have problems with the Cover Disk such as receiving a "Cannot read from drive A:" error, please return the disk to the duplicator: TIB PLC (PCW), TIB House, 11 Edward Street, Bradford BD4 7BH (who may be contacted on 01274 736990) together with a stamped addressed envelope and two 25p stamps. Where it is a duplication fault, the postage will be returned along with the replacement disk.

However, you should note that if your problem is not due to a faulty disk, and a phone number is shown for the publisher of the program in question, then it will probably be quicker for you to call them first as they will be able to provide direct assistance on their own programs faster than might otherwise be possible. Alternatively, ring our hotline on week days between 10:30 and 4.30pm on 0891 715929. Calls are charged at 39p per minute cheap rate and 49p at all other times.

The PCW cover disk is virus checked at every stage of production. However, neither VNU nor PCW will accept liability for any problems arising from the use of the disk. Installing or running any of the programs on the disk indicates your agreement to this condition.

You are advised not to install any software on a networked PC before checking the disk. While PCW maintains a high standard of quality control, disks may be damaged in transportation. Check the disk's shutter before inserting it in the drive by sliding it to the left and allowing it to spring back.

If you have received the cover disk but would prefer the CD-ROM, please write to KP Mailing, Block D, Unit 15, Barwell Business Park, Leatherhead Road, Chessington, Surrey KT9 2NY, enclosing a cheque for 80p made payable to VNU Business Publications to cover postage and packing. Please allow up to 14 days for the receipt of your CD-ROM.

required size and position, and assign it an event to perform when clicked.

Hands On Multimedia Demos

[Minimum requirements: 286 processor, DOS 3.3]

To accompany this month's *Hands On Multimedia* column, here is a stunning collection of graphical demo programs written for a yearly get-together of programming whizzkids, called Assembly. This is a yearly platform for bright assembly-language pro-

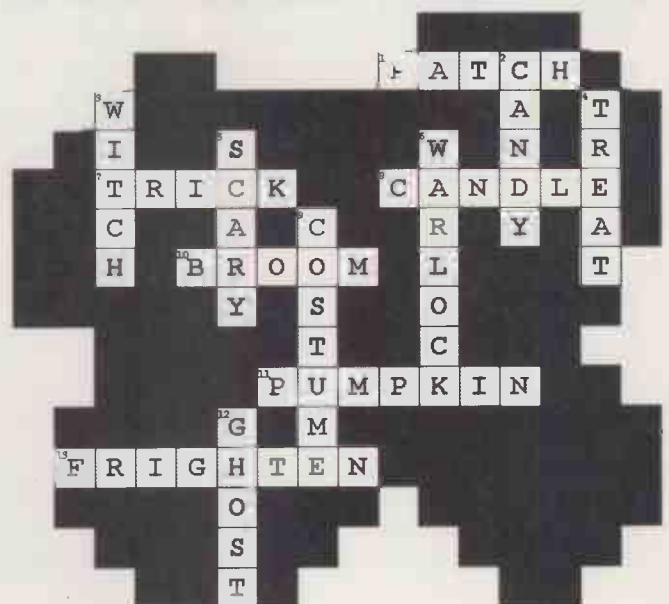
grammers from all over the world to demonstrate their talents in open competition, and some of the most stunning entries from Assembly '94 are included on this month's cover disk.

The competition itself falls into categories: there's one for the best program written in under 64Kb, and another for offerings under 4Kb in size. The programs included on the cover disk are all from the under 4Kb category, and you're sure to be amazed at just what these programmers can pack into 4Kb.

In order to try them you should run them from DOS, as some of them may not necessarily work from inside Windows or your PC.

Shareware

Some of the programs on this month's cover disk are released as Shareware. This means that you are free to evaluate the software for a certain period, normally 30 days. If you wish to continue using the software after this time you must pay the author a registration fee, normally a modest amount, in return for which you will normally receive a copy of the latest full release, and often a printed manual too, as well as other benefits such as software support.



PCW Interactive CD-ROM

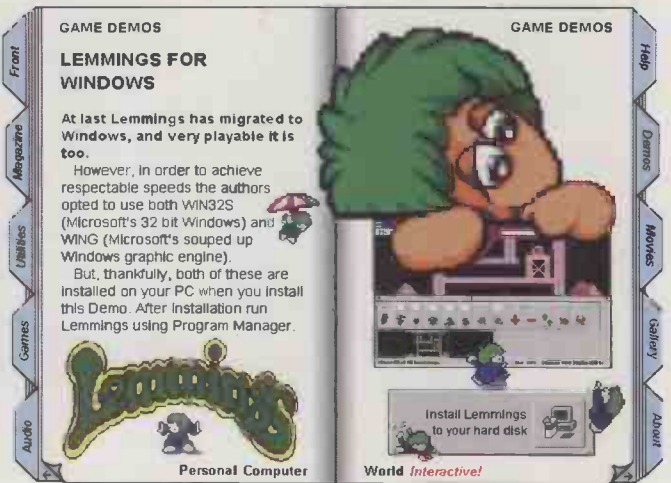
Chris Nixon introduces this month's new-look CD-ROM, which features more pages than ever before, including the very best of the latest demos, utilities, games, animations, videos, music, and a whole lot more. There's even a new option that allows you to play the videos on this CD-ROM at full screen resolution.

Installing and running PCW Interactive

Minimum requirements: 4Mb free RAM (swapfile acceptable), 386 SX-33 processor, Windows 3.1. Users with less than this should still be able to run all the DOS pro-

grams on the CD-ROM using the program DOSMENU.COM, though you may have to boot "clean" with no unnecessary TSRs or device drivers. Recommended for best performance: 8Mb installed RAM, 486 DX-50 processor, Windows 3.11.

To run PCW Interactive you no longer need to install any part



Aren't they cute? The Lemmings are here

of it to your PC (other than Video for Windows if you wish to view the movies, or possibly Microsoft's new SuperVGA drivers for increased performance). All you need to do is select your CD-ROM drive and run the file PCWI.EXE in the root directory for PCW Interactive to run.

Using the CD-ROM from DOS

If you don't have Windows, or

if you experience any problems running some of the DOS software from Windows, exit to DOS and run the program DOSMENU.COM which you'll find in the root directory of the CD-ROM. DOSMENU displays a simple menu, from which you can select any of the DOS programs and demos using either the cursor keys and Return, or a mouse.

Although DOSMENU will run all the CD-ROM DOS programs in most cases, you

In this month's PCW Interactive

From the magazine: Access Tutorial Files, Cover Disk programs, Internet column files, Hands On Multimedia demos, PCW Reviews Index, Visual Basic Low Level source code Upgrades & test software: CD Test Utility, Microsoft SuperVGA Drivers, MSCDEX 2.23 Upgrade, Video for Windows Runtime 1.1e, Win32s (Within Lemmings for Windows), WinG (Within Lemmings for Windows)

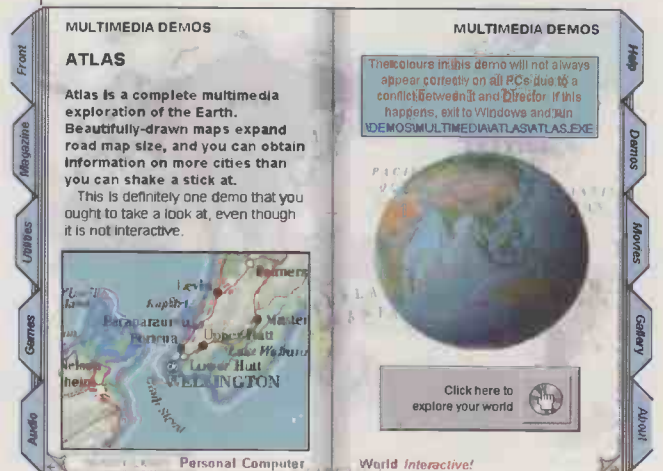
Features: Graphic Gallery, Intel P6, Sound Samples, Super-escape VRT, Windows 95

Demos: A Christmas Story, Atlas, BC Racers, Circle Elements, GPSS, Lemmings for Windows, PB Bear's Birthday Party, Provoice, Reflex, Stardust, Stress, Simply 3D, The Fish Who Could Wish

Shareware: Chaos, Crossword Construction Kit, Fuzzy's World of Miniature Golf, Homecraft Collection, HTMLed, Medi8or, Professional Bartender, Shihdao, Sparta, Surf for Windows, WebSpinner, Zorro

Digital videos: Cool cartoon, Elastic Reality morphs, GPSS in action, Intel Pentium advert, Music videos from Canyon, Primal Fear (9 clips)

Atlas, one of the demos on this month's PCW Interactive



may still need to perform a "clean" boot first to ensure you have the maximum possible amount of memory available. SMARTDRV in particular can steal huge amounts of RAM, and you may find that by removing it from memory the resultant slow-down in performance is acceptable for the duration of a particular game.

Using PCW Interactive

The magazine has been designed to look and feel as though you're reading a printed publication. For example, at the bottom left and right of each page you'll find a page turn icon for turning backwards or forwards a page. In addition, there is a set of ten tabs which appear down the left- and right-hand side of each page. Clicking on any of these will take you directly to the page in the magazine where the indicated section begins.

Throughout PCW Interactive you'll have the opportunity to run or install programs, get further details on a particular program, try out demonstrations of programs, play videos, listen to audio files and much more. When any of these options is available, an icon will be displayed indicating the fact. All you need to do is click once on it to activate the choice.

Video for Windows enhanced setup

On the first page of PCW Interactive you'll have the opportunity to install the latest version of Video for Windows runtime, so that you can view the digital movies on the CD. If you haven't installed Video for Windows from a PCW Interactive CD before, then you should install this new version, as it contains the latest drivers which deliver higher quality, a larger size and a faster playback rate. If you don't install the new version, some videos will display the message "Cannot display

this video", or similar warnings.

New to this issue of PCW Interactive are some extra buttons on the Video for Windows page, which allow you to fine-tune your PC's performance without having to leave PCW Interactive or restart Windows. In particular, you can now choose to have digital movies played back on your PC at full-screen resolution! That's right, without having recourse to hardware add-ons such as MPEG cards, you can have full-screen digital videos when you run the PCW Interactive CD-ROM.

Please remember that when you exit from PCW Interactive, if you leave the option for full screen video selected, then all video in other applications will also be full-screen. If you don't want this, then re-run PCW Interactive, select the "Windowed" option and quit again.

Microsoft's SuperVGA drivers

Also new to this month's PCW Interactive is a page dedicated to Microsoft's fast SuperVGA graphics drivers. It follows immediately after the Video for Windows page, and offers you the chance to upgrade from your existing Windows graphics driver(s) for possible increased performance. Upgrading to these drivers may also remove any General Protection faults or other errors you experience when running PCW Interactive.

MSCDEX

Microsoft's CD-ROM extensions (called MSCDEX.EXE) provide the interface between your PC and your CD-ROM drive. There are two versions in common use, 2.22 and 2.23. If you are using 2.22 you'll find that data is pulled off your CD-ROMs much more slowly than with version 2.23. Also, slightly faulty discs can be read using version 2.23, which 2.22 (with less sophisticated error correction) often

CD-ROM advice & contacts

The PCW CD-ROM is virus checked at every stage of production. However, neither VNU nor Silver Disc Interactive can be deemed liable for any problems arising from its use. You are advised not to install software on a networked PC before checking the disc.

For technical support on the CD and the programs on it, call Silver Disc Interactive on 01233 665800. Initially this is a voice service manned by technical support staff, but it will progress to also include touch-tone selection of pre-recorded free advice and hints on a range of topics, a fax-back service, and an answerphone outside office hours. It is *not* a premium rate service and all calls are charged at the standard rate. You can also email rnixon@cix.compulink.co.uk, or on CompuServe: 70007,5547.

can't read.

There are two ways you can upgrade to the new driver using this CD-ROM. If you have Windows, run the PCW Interactive front-end, and step through the on-screen magazine until you reach the MSCDEX page. Then click on the Run button and follow the simple instructions.

Alternatively, from the DOS prompt you can change to the MSCDEX directory of the CD-ROM and run the file RUNME.COM. This is in fact the program executed when you click the MSCDEX Run button from within PCW Interactive.

Whatever method you use will automatically install the new driver on your hard disk in the directory MSCDEX_2.23. Your AUTOEXEC.BAT file will also be modified. However, the old MSCDEX driver will remain on your hard disk should you wish to return to it, while a backup copy of your AUTOEXEC.BAT file will be saved as AUTOEXEC.SAV.

We recommend you upgrade to the new driver as it will enable you to run most CD-ROM programs you may have had trouble with. And as an added bonus, you should find that most digital videos are less jerky, while loading data and running programs will be much quicker.

Testing your CD-ROM

If you suspect your CD-ROM may actually be faulty or damaged, you can run the file CDTEST.EXE in the SYSTEM

directory of the CD-ROM (or from its page in PCW Interactive). The program will then examine every byte of data on the disc to see if it can be correctly read. The process lasts up to 35 minutes and generates a verification code if the disc passes the test. If the CD-ROM fails this test, try cleaning it with a light solution of washing-up liquid and dry it with a lint-free cloth, and run the test again. If it still fails, return your CD-ROM to the magazine for a free replacement.

You are free to copy the CDTEST.EXE program to your hard disk in order to test other CD-ROMs, as long as it is not distributed in any way. If you are running CDTEST from your hard drive, you need to specify the CD-ROM drive to test, as follows:

```
CDTEST d:
```

Note: We offer this tool "as is" purely as an aid to diagnosing possible faults, some of which may occur because an older version of MSCDEX.EXE is in use and not because of a faulty CD-ROM, and disclaim any responsibility for any erroneous error reports that it may generate.

Getting help

Detailed help on most of the programs is available when you run them. For further details on using the magazine itself, click on the Help side tab at the top right of any page.

Superscape

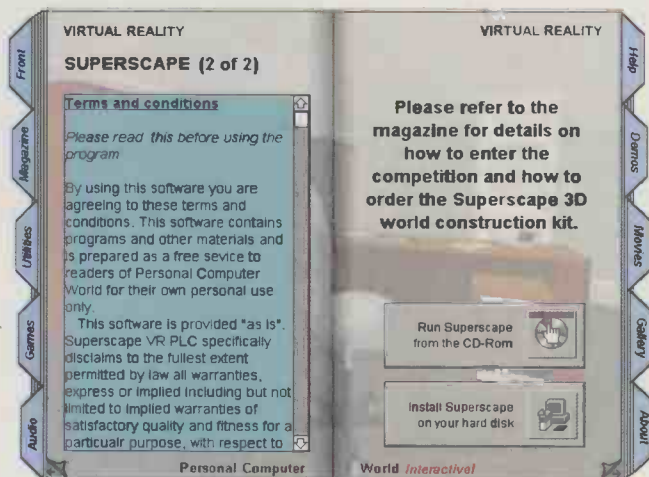
Minimum requirements: 8Mb RAM, 486 or Pentium processor with SVGA capable graphics card and monitor.

On this and the next two month's CD-ROMs there will be a total of six stunning virtual worlds for you to explore, all created by Superscape's VRT system, a virtual reality authoring package.

This month there are two virtual worlds, and a program called a Visualiser, which you need in order to explore these worlds or any virtual world created in Superscape's VRT.

To use the Superscape system, you will need to exit from Windows (if it is running) and change to the SUPERSCP directory on the PCW CD-ROM. Then run the program INSTALL.EXE which will copy the visualiser and virtual worlds to your hard disk.

Please note that this will require a modification to your AUTOEXEC.BAT file where a line similar to SET VIS=D:\SUPERSCP\PROGRAMS is added, which sets the environment variable VIS to point to the Superscape directory on the CD-ROM. However, this means that you will need to restart your PC in order for this change to take place, before you can run the visualiser. The installation



program will update your AUTOEXEC.BAT file at the end of the installation procedure, if you request it to do so when prompted.

If the visualiser fails to run, it is likely that you do not have enough environment space free for the SET VIS= to work. Check that the directory containing the SuperScape Visualiser program is in your path statement within the AUTOEXEC.BAT file. You may need to edit your CONFIG.SYS file and find the line that begins SHELL=, and look along it until you find an option such as /E:512. When you have found it, change it to E:/1024 (or a number that is 512 bigger than the previous setting).

If you don't have a SHELL= command or there is

no /E: option, you should add the following line to the end of your CONFIG.SYS file: SHELL=C:\COMMAND.COM

C:\DOS /P /E:1024 The /E:1024 tells DOS to hand over 1024 bytes of space to the environment, and the /P command tells DOS to make this new setting permanent for this session.

Remember to replace the two C:s with the correct letter if your boot drive is not C:, also replace \COMMAND.COM with the correct command if your shell program is not there, and replace the \DOS with the correct directory if you do not have DOS installed in \DOS.

The virtual office

The virtual office demonstrates the advantages of Virtual Reality over conventional means of presentation and modelling, and provides you with opportunities to interact with many objects in the virtual office, including the chair, pencil, telephone, calculator or the doors.

The AIGUA virtual world

This virtual world demonstrates rain filling a reservoir which is used to create electricity and provide

water which is cleaned before it arrives in your home.

About Superscape

Superscape is a leading software publisher specialising in real-time 3D visualisation and virtual creation. Products include: the Visualiser which provides real-time visualisation and interaction of any virtual world application created in VRT; VRT, the complete authoring software for rapid application development; Networks, for shared virtual world experience; and SDK, the developer's toolkit and plug-in architecture to connect to devices and programs. Virtual Reality can be used for a wide variety of applications across a variety of industries. It can be used as a sales and marketing aid, a training aid, a design aid or even as an entertainment medium.

Further information

If you would like to explore more Superscape Virtual Worlds, access their home page at <http://www.superscape.com> or contact Superscape on 01256 745745.

Your chance to win a 3D Space Mouse

This month Superscape are offering a special prize of a 3D Space Mouse (worth £595) that allows you to "fly" through your virtual world and provides up to six axis of movement so that you can reach any position and orientation in your virtual world. For a chance to win it, enter the prize draw by filling in the competition form and send it to the address shown.

The questions

1) In the Virtual Office, how many different images are you able to select in the picture frame on the office wall?
(a) 1 (b) 3 (c) 5?

2) In the AIGUA demonstration, how many blinds are in the kitchen?
(a) 1 (b) 2 (c) 3?

SUPERSCAPE COMPETITION ENTRY FORM: SEPTEMBER PCW INTERACTIVE

Answer 1 _____ Answer 2 _____

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Return To: PCWI Competition (September), Superscape Ltd, Cromwell House, Bartley Wood Business Park, Hook, Hampshire RG27 9XA.

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dan Ultimate PC RECOMMENDED

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New PCW format

Starting this issue, the bulk of the adverts we run each month have moved to the back of the magazine. This should make the editorial easier to find your way around. News now starts on page 20, over three hundred pages earlier than the August issue, and our dealer ads now start on page 356.



Win95 cliffhanger as Gates fights over net

The launch of Windows 95 looked definite for 24th August as we went to press, but exactly what form it would take was something of a cliffhanger. Anti-monopoly investigators at the US Department of Justice (DoJ) were questioning the bundling, with the Win95 desktop, of a sign-on button for the new Microsoft Network (MSN).

Critics pointed out that an expected tens of millions will be just a click away from presenting Microsoft chairman, Bill Gates, with a lucrative domination of international networks which are moving rapidly into the age of electronic commerce.

Microsoft protested that both IBM and Apple have linked similar network services with their operating systems, OS/2 Warp and Mac OS. IBM is the biggest Internet provider in Europe.

Gates was reported as saying

he had no intention of unbundling the MSN, but Microsoft officials in the US admitted that they were looking at how it could be done.

They claimed that the Network is so tightly integrated into the Win95 architecture that pulling it would affect the base code. One solution would be to deactivate the MSN icon, leaving users to apply for a sign-on disk as they would for any other on-line service. But the disk would merely activate code already in the operating system.

In London, Microsoft officials were predicting that Win95 would launch with MSN unless the DoJ intervened before the code was finalised in mid-July. But that would risk legal moves by the DoJ which could force a costly withdrawal.

But even if Win95 ships on time, many PC vendors may not



be able to ship it with machines until September, and some dealers fear it will be slow to reach the shelves.

But the new operating system will generate £1.6 billion worth of business in Britain alone over the next two years, according to the DS Group, a Microsoft specialist dealer.

Microsoft was set to list up to 200 Windows 3.x products that would not work with Win95 because of allegedly non-standard code.

Clive Akass (London);
Tim Bajarin (Los Angeles)

We've lost the battle for the desktop, admits IBM man

A top IBM executive astonished journalists last month by admitting that the company has lost the battle for the desktop interface.

The statement by John Whiteside (left), worldwide head of the IBM Global Network (IGN), followed a year-long campaign by IBM to win market acceptance for its OS/2 Warp operating system by capitalising on delays in Microsoft's Windows 95.

It has been an article of faith for IBM officials that Warp should, and could, win out over Win95. Their campaign won

respect for IBM's 32-bit operating system, which has been selling respectably if not spectacularly. But it has hardly dented Microsoft's market share, even though competing with Windows 3.x.

Whiteside was in Britain to raise awareness of IBM's network, which claims to have 25,000 users in more than 100 countries. Asked how the IGN would compete if a sign-on button for the new Microsoft Network is bundled with Win95, (see above), he replied: "I may be a bit of a heretic within IBM but I say we have lost the battle

for the desktop graphical interface and we have to learn to live with that."

IBM's response will be to support all operating systems, and services like Microsoft Exchange which stem from Win95, Whiteside said.

His visit gave some insight into why IBM bought Lotus and appeared to signal a change of tack by the company. See *News Analysis*, page 43.

Clive Akass
IBM Global Network freephone
0800 973000

Love me, love my PC...

The "computer widow" syndrome has been blamed for many a divorce. But now it seems that you can get your PC or Mac to help save your marriage. Harper Collins is selling a £39.95 CD version of John Gray's book *Men are from Mars, Women are from Venus*; a bestseller in the US, where books on "relationships" are an industry in themselves. The CD, being interactive, acts more like a real therapist, which seems dangerous when you consider the phenomenon called transference — the tendency for people to form strong bonds with their therapists. Perish the thought: you might fall in love with your computer.

Clive Akass

Harper Collins 0181 741 7070



Syquest fights back as Zip jams

Syquest has come up with a stunning riposte to Iomega's Zip drive, for which demand is currently outrunning supply.

Syquest's new EZ135 drive takes removable 135Mb cartridges costing as little as £12.50, compared with the Zip's 100Mb diskettes costing around £15. Moreover, the EZ135 has a claimed mean access time of 13.5ms — twice as fast as the Zip and about the same as a fast hard disk — and a data transfer rate of up to 2.4Mb/sec.

The Zip we tested could only manage a fraction of that transfer rate, but it was using the slower parallel port. We'll give a better comparison next month, if Syquest supplies us with an



to appear here in any number until September.

Iomega has an ace up its sleeve with the new Jaz drive, announced last

month in the US, which uses 1Gb diskettes. It has a claimed access time of 12ms and a transfer rate of up to 6.77Mb/sec. It will sell for about £375.

But Andrew Graham, Syquest's sales director for Northern Europe said: "We have a road map for going forward. We have been working on drives of up to 1.3Gb. It's our market. We have been in it for a long time. Watch this space."

Iomega 0800 898563; Syquest 01264 362266

EZ135 soon enough.

The internal version of the EX135, which can be daisy-chained from a IDE hard drive, will cost just £149 — exactly the same as the Zip. External parallel-port and SCSI (PC or Mac) models will be more expensive at £179.

The Zip sold so fast in the US that Iomega limited shipments to the UK. Iomega is talking to both Seiko and Epson about manufacturing Zips to meet the demand. They are not expected

The highs and lows of British IT

A mixed view of Britain's use of information technology has emerged from two market research organisations over the past month.

Banner reported that fewer than one in two of Britain's businesses own a single computer, and of those more than six in ten are still using dot-matrix printers. A large proportion of staff are technophobic. Nearly eight in ten make no attempt to back up vital files, and 90 percent have never been to a computer show, Banner says.

The good news is that this end of the market has a huge potential for growth. But Banner warns: "It is

very difficult to reach these people."

The picture is rather different in large companies, where Britain is Europe's fastest growing market in three out of four key areas, according to Computer Intelligence Europe.

Overall demand for IT products has increased here by 28 percent since January, 1994: 13 percent more than in Germany, and six percent more than in France. British market growth was also highest in networks and server product sectors (equalled only by Germany's in the PC market).

Computer Intelligence 01344 710021

Short Stories



Silicon makes the Pentium look slow

● Silicon Graphics put Intel in its place last month with a new graphics workstation with a claimed performance on some tasks equivalent to that of 300 Pentiums.

The Indigo2 Impact is said to have 100 times the visualisation power if its stablemate, the Indigo2 Extreme. Silicon Graphics demonstrated it mapping complex textures to virtual-reality buildings in real time. Prices start at £29,100.

Silicon Graphics 01734 257500



Sticky fingers

● The £85 Big-Keys keyboard, with its letters arranged in alphabetical order, is aimed at introducing. It might also help keep their sticky fingers off your own keyboard.

KCS 01703 584314

AMD coup

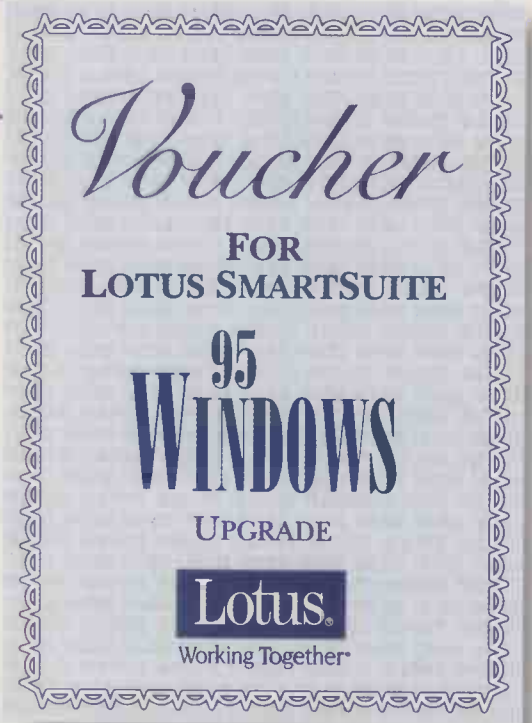
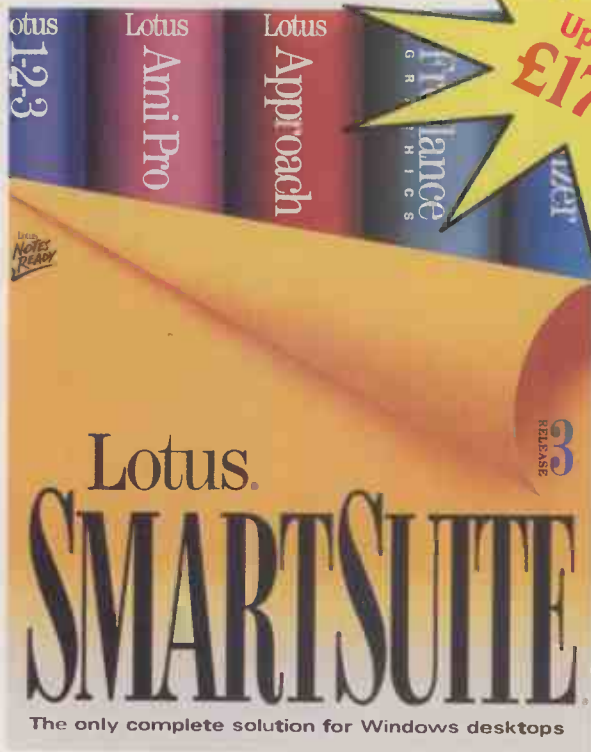
● ICL is to use Advanced Micro Devices Am486 DX4/100 chips in its PCs.

AMD 01483 740440

It's a date

● Calendar Manager 5.0 for Banyan VINES lets you schedule meetings, conference rooms and resources across the network. It costs from £660.

Russell Information Sciences
001 617 467 1509



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Microsoft Plus! packs a punch

Microsoft last month gave UK journalists their first chance to try out the Microsoft Plus! utility pack, an add-on to Windows 95.

It includes some, but by no means all, of the kind of utilities traditionally offered by third-party suppliers (see page 159). The main features are:

- System Agent — monitors your PC as you work, optimising disk usage and warning of potential problems such as a shortage of space.
- DriveSpace 3.0 — supports drives of up to 2Gb, with greater compression ratios than are offered by the version shipping with Win95.
- Desktop Themes — offers a selection of screen décors, with different sounds, wallpaper, fonts, colour, and animated icons. They vary from the elegant to the execrable.
- Multimedia Pinball — a rather good arcade game (see top right).
- The Internet Jumpstart Kit — provides an easy way to set up for the Internet, and includes Internet Explorer, Microsoft's browser. This looks good but lacks any startling innovations.

Plus! is reasonably priced at less than £40 but offers nothing that you could not live without, except perhaps System Agent, which should



surely have been part of Windows 95 itself — what is an operating system for, if not to use your system as efficiently as possible?

Don't even think of getting Plus! if your machine has less than 8Mb RAM, and be warned that it takes between 25Mb and 40Mb of disk space.

Clive Akass

Microsoft 01734 270001

Big-name merger mania continues

Last month saw two more major IT takeovers in the wake of the IBM-Lotus deal. Utilities specialist Symantec paid \$415 million for Canadian software house Delrina, and Adobe paid \$500m for Frame Technology, best known for the desktop-publishing package FrameMaker.

The Adobe deal promises some interesting synergy for Web users. FrameMaker is geared to publishing technical documentation, and to using SGML, a versatile superset of the Web-page formatting language, HTML. Adobe's "portable document"



language, Acrobat, has been suggested as a rival Web *lingua franca*.

Adobe also owns the

PageMaker DTP package. Adobe chief Joe Warnock said: "Our products are complementary, not competitive."

The Delrina deal broadens the comms base of Symantec, which publishes the remote-control package, PC AnyWhere. Delrina's WinFax package has sold a claimed 10 million copies in five years.

Symantec chairman Gordon Eubanks said the merged companies would be able to offer "a complete solution for managing, sending and receiving information."

Clive Akass

Short Stories



**Tim Bjarin
in the US**

Take my wireless business card...

● Ex Machina has some great software that allows PC or Mac users to send text messages to pagers. It allows you to create a wireless business card in the form of a runtime version of the connect program.

This can then be used with any modem-equipped PC to send you a message. The company will do the Reach Me disks for you in \$149 packs of 50. The will be available in the UK by the end of the year.

NEC backs Sony on MMCD

● Sony and Phillips got a boost last month when Japan's major PC vendor, NEC, announced that it would support the Multimedia CD (MMCD) standard.

Sony fears getting burned in another battle over the rival VHS-Beta video-recording standards, with Time Warner and Toshiba putting up a rival format.

Sony and Phillips are being very aggressive with computer vendors, hoping to put MMCD drives in all consumer PCs soon.

NEC is significant because it has just paid \$140 million for a 20 percent stake in Packard Bell.

Gateway has also committed to MMCD, which defines a 3.7Gb single-sided and 7.4Gb dual-layered disk.

Dinky pinky can do your mousework

● A keyboard with a built-in fingerpad is being sold by Cirque Corporation, original developer of the pad.

The pad is placed between the qwerty keys and the numeric pad, enabling you to move the cursor even with your little finger.

It should be available in Britain this autumn for about \$150.

Cirque • 801 467 1100



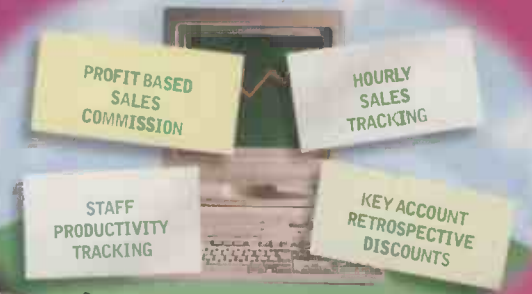
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their accounting needs, making us the UK's number one in accounting software.

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Sage Sovereign at a glance

- 1 Sovereign is the flagship product from Sage, the UK's number one in accounting software.
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- 6 Accredited by the Institute of Chartered Accountants in England and Wales*.

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Short Stories

Orange launches Data service

● Users of Orange's new mobile data service will be charged exactly the same as for voice calls. A one-off support fee of £50 is waived if you buy the Orange version of the Nokia adaptor. Cell networks usually charge more for data because of extra equipment. Orange charges less than Cellnet or Vodafone. Mercury One2One doesn't yet offer a data service.

But it will cost you nearly £700 to connect to the Orange data service - £199 for the phone and a hefty £499 for a card adaptor.

Orange 0973 201911

Simon Rockman

New Internetsuite from Quarterdeck

● Quarterdeck's new Internetsuite tackles the most daunting aspect of getting wired - signing on. It provides software for easy registration with more than 70 Internet providers.

The suite consists of five tools, including telnet and ftp clients, a message centre, the company's own Mosaic browser, and a location manager which allows you dial in from several locations. It will sell for less than £100.

Quarterdeck 01245 496699

Star turn

● CompuServe now offers full timetables for all Eurostar Channel Tunnel services. The European Railway Timetables service (GO RAILWAY), provided by Deutsche Bahn AG, has info on connections throughout Europe.

Modem bundle

● Elonex is bundling its PCs with Dynanet modems and free registration with Internet service provider Easynet, plus 45 days' free access.

Elonex 0181 452 4444

Get wasted

● MoDo Paper has released an information pack on how to cut down on waste paper.

MoDo 01959 561999

NetWare to join Unix in battle against NT

Novell is merging its NetWare and Unix operations in a bid to stave off the threat from NT, the heavy-duty version of Windows. The move, announced in the run-up to last month's Networks Show, also reflects the increasing convergence of local and wide-area networks.

NetWare dominates local nets as much as Unix (in its various flavours) dominates large corporate systems, but faces a growing threat from Microsoft. NT has barely 10 percent of the corporate market but it has been gaining credibility as it matures.

The latest version (3.51) of NT is shortly to get the Win95

user interface, which will allow companies to put the same graphical front-end on every computer on a network. A beta version of the interface is available on the net, and is reported to be very stable, leading to speculation that Microsoft delayed its release to clear the field for Win95. The same front-end will be put on Cairo, the next major release of NT which is due out late next year.

In Novell's favour in this battle is its huge installed base and the fact that many companies will be reluctant to put all their eggs in the Microsoft basket.



Novell says it plans to merge the best of Netware and Unix into a single network operating system. Chairman Bob Frankenberg said: "This will be the network computing platform our industry partners and customers worldwide will rely on well into the next century."

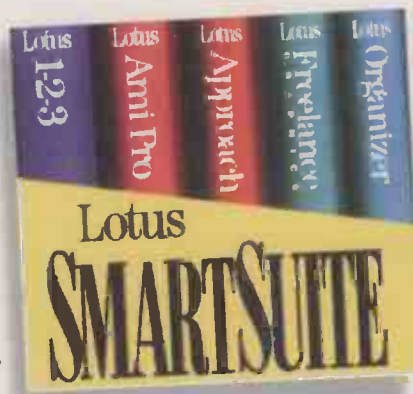
Novell 01344 724460

An early start to the Office

The new 32-bit Microsoft Office application suite, which is set to ship more or less at the same time as Win95, will have a clear run for most of the year.

Lotus does not plan to launch its rival SmartSuite until November and Novell will not launch PerfectOffice for Windows 95 until the year's end.

Both Lotus and Novell



are placing a big emphasis of co-operative working. Novell's strategy, codenamed storm, also includes making applications smarter.

Meanwhile, Lotus has launched LotusScript 3.0, a Basic-like object-oriented programming language which will be packaged with all its next-generation products, including the forthcoming Notes 4.0.

Lotus 01784 455445; Novell 01344 724460

Remote control and file transfer rush in to the Networks Show

A rush of remote control and file-transfer programs was announced in the run-up to the Networks Show.

Home-grown software included Dial, from London-based Opus One, which provides email and dial-out communications from within any Windows application. It costs £99 and is available now. Stac Electronics is offering a free evaluation kit of the new version 5.0 of its ReachOut file-transfer and remote-control package.

Microcom introduced Carbon Copy for Windows 3.0, which is said to have more than 100 new features, including the ability to control PCs running

DOS, Windows or or Windows 95. It is available now for £110.

Traveling Software's Laplink for Windows, which now includes remote control, is available for £149.95 (see page 121).

PictureTel's LiveShare is rather different, allowing users of remote PC's to work together on the same screen. It costs £199.

Farallon's Timbuktu for Windows allows remote users to access networks over the Internet as well as by direct dial. It costs £125 for a twin pack.

Microcom 01483 740763; Stac 01344 302900; Traveling Software 01753 818282; PictureTel 01753 673000; Farallon 0181 758 7546

Notebook makers abandon low-featured lightweights

Major notebook makers have virtually abandoned the idea of lightweight models which sacrifice features for portability. They are making either handhelds, or powerful notebooks that are hardly more portable than a bag of shopping.

Toshiba and Hewlett-Packard have partly bucked the trend by offering full-featured models, the Portégé and the Omnibook 600CT, which are honed for portability. But they still weigh an appreciable 4lb or so.

Light, low-featured models have proved a disaster in the market, according to several vendors who have visited *Personal Computer World*. They claim true portables cannot be produced cheaply enough with the features now expected, apparently, by just about every-

one except journalists (who are crying out for an ultralight word processor with good comms).

But Christopher Morgan, HP's mobile products marketing manager, said: "There is a market in between, which is the 'work on the go' market. This is what the Omnibook 600CT is aimed at," he said.

And very nice the 600CT is, too, if you can run to £2,780. The 3.8lb 600CT has a 9.5in TFT colour screen, a new Lithium-ion battery with a life of up to four hours, and 16-bit sound, as well as all the features of the old 600.



Also very desirable is Toshiba's Portégé, which weighs about 1lb more, but at 9.8in x 7.9in is smaller than an A4 portable. It uses the new low-voltage 90MHz Pentium chip, which draws what Toshiba claims is a genuine 4.5 hours of normal working use from the Lithium-ion battery. The entry-level price is £3550.

Toshiba has also introduced the Satellite Pro, which has an interchangeable floppy and CD drive. It costs £2,850 with a dual-scan colour screen, or £3,695 with a TFT true-colour.

And there are three new T2100 models using a 75MHz DX4 chip and costing from £1795.

Toshiba 01932 841600; Hewlett-Packard 01344 360000

Short Stories



● MicroTouch Systems is offering a 14in add-on touch screen for £395 — a claimed 25 percent less than rival products. The resistive screen will take input from a finger, pen or stylus. The company also markets VDUs with the touch-sensitive surface bonded to the display.

MicroTouch Systems 0184 426 0123

Maplin move

● Maplin has published a first ever computer version of its famous electronics catalogue. It costs £1.

Maplin 0800 136 156

AS you like it

● Visual Control lets you control any number of AS/400 machines from a Windows PC. It costs \$995 per AS/400.

Tango/04 (+34 3) 273 45 95 (Spain)

Hot stuff

● Viatic has been appointed UK distributor of HoTMetal Pro 2.0, latest £169 version of the hypertext editor.

Viatic 01276 684506

Xara deals

● Xara is seeking dealers for Xara Studio, its £199 32-bit "Corel killer" package.

Xara 01442 350000

Net bundle

● Voss Net Communications is offering £144 of Internet time with itsr £163.99 14.4Kbps and £253.99 28.8Kbps fax/modems.

Voss Net 01753 737900

Dongle card

● Data Encryption Systems has launched a PC Card version of its DESKey dongle.

DES 01823 352357

There is a strong move in the US to get PC vendors to create a sub-3lb "portable email" machine, writes *Tim Bajarin from Los Angeles*. It would need a real keyboard and a decent screen and could be done with today's technology. At least three vendors are working on a system about the size of a paper organiser — one design fits into a portable binder and even includes paper pages. Software is likely to be based on Daytimer 2.0, the PC version of America's leading paper organiser.

Daytimer 0181 370 7030

HP offers cheap all-rounder

Recent combination office machines from the likes of Xerox and Konica are facing stiff competition from a low-cost offering from Hewlett-Packard. Epson has come up with scanner bundle targeting the same market.

HP's OfficeJet LX is said to be selling in tens of thousands in the US and will be very competitively priced here.

It combines the functions of a fax machine, copier, and inkjet printer; the engine is basically that of the DeskJet, with an effective 600 x 300dpi resolution. It can be used from the PC or as an ordinary fax machine. Oddly, Hewlett-Packard has not included data-modem facilities even though the necessary hardware must already be in the



machine for faxing.

Epson's £299 Lapcat package (left) bundles a scanner with Xerox document-management and OCR software.

The company says it can be used as a scanner in conjunction with a printer, or as a fax machine via a suitable modem.

● Hewlett-Packard is launching in the UK a near-photographic colour printer priced for the home market. Prices for the DeskJet 600 and its Mac equivalent, the DeskWriter 600, and the OfficeJet LX will be announced when they are launched.

Hewlett-Packard 01344 360000; Epson 01442 61144



A fully animated, interactive multimedia science adventure for children aged 6-10. Children can drive the bus, allowing them to explore areas of the body at their own pace. With more than 200 'clickables' this software will engage children and encourage exploration.



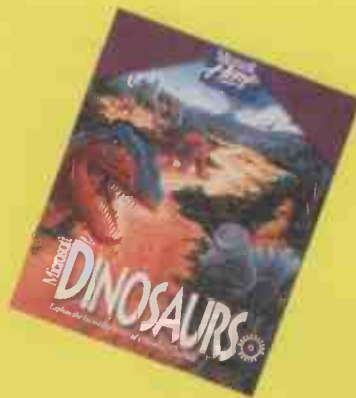
With its large trackball and single large button, EasyBall is a new and fun way to make a PC easier to use for children aged 2-6. The EasyBall driver allows both the mouse and EasyBall to be connected at the same time. What's more it also comes with Explorapedia: World of Nature. Available mid-October.



A complete writing program for children aged 6-12. It includes over 8,000 story starters to spark a child's imagination and gives them the tools to create fun projects like newspapers, banners and cards. Plus 500 new stickers and 300 new sounds!



Children aged 4-10 can learn about the world of nature through this new interactive encyclopedia. Microsoft Explorapedia™ is the ultimate reference library for children, with over 200 topics, 50 video clips, 44 animations and 9 original songs. In addition there's 18 hours of sound from every source imaginable so there's never a dull moment!



Children can learn about the 150 million year period in which the dinosaurs dominated our planet. There are over 1,000 high quality colour illustrations and photographs and nearly 200 articles about the lives and breeding habits of 80 dinosaurs and dozens of other prehistoric creatures.

PLAYS



A fascinating exploration of the solar system for children aged 6-10. Children can drive the bus and explore areas of interest at their own pace, while also exploring concepts such as gravity and planetary information with incredible 3D animations.

Danny Glover narrates this classic children's Rudyard Kipling tale which tells the story of how animals get their protective camouflage colouring. It is a beautifully illustrated, interactive story-telling adventure for 4-9 year olds. Children can listen, read, learn and play by using multimedia elements such as video, photographs, animation and sound.

Discover the mysteries of the world's oceans. The whole family will learn all about the creatures that live there, how people are discovering its secrets, and the impact humans have on it with 600 articles, 1,000 detailed photographs, 100 narrated videos and 1,000 sound clips.†

An interactive, educational and fascinating journey into the animal kingdom and its disappearing habitat. This CD-ROM includes 1,000 articles with high quality colour illustrations and over 100 narrated video clips, featuring 250 of nature's most colourful and dangerous inhabitants.†

Children aged 6-12 can express their creativity by creating step-by-step animated pictures, comic strips, badges, stickers and multimedia picture shows. There are over 72 paintbrush styles, 100 pieces of clip art and animations, plus 300 wacky sounds, and 600 unusual stickers, including 50 new animated ones.†

An interactive tour through the life and times of various ancient Egyptian, Greek and Roman civilisations. You can learn about the monuments, the mysteries, and the people, at work and at play. There are over 1,000 interactive articles, over 25 animated and video sequences with hours of narration and sound effects.†

An entertaining and fun game for children aged 8-12 that lets them find their way out of a 3-storey haunted house. This exciting multimedia game encourages children to use their logic while they experience scary sounds, animations and video clips.

Childhood

What better way to make learning fun than to introduce your children to our home software range. All provide an interesting and stimulating environment to learn and play. The Microsoft® children's range. It's learning in disguise. For more information or the stockist nearest you, call the Microsoft Connection on 0345 002000.

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Short Stories



PCI price bonus for Mac cards

● Monitor maker Taxan is to market graphics cards from ATI under a new partnership agreement between the two companies. Among their new joint products will be the Xclaim GA graphics card for PCI machines, including PowerMacs.

Some PowerMacs come equipped with a version of this card, but the standalone GA differs in having both Apple and VGA display ports, allowing a cheaper PC monitor to be used.

It comes in £329 2Mb and £429 4Mb VRAM versions supporting resolutions up to 1600 x 1200.

The GA uses ATI's new mach64 graphics controller, which is also sold direct to PC makers to install 64-bit graphics acceleration direct on the motherboard.

The chip is optimised to work with Win95's new fast-draw facilities.

Taxan 01344 779000; ATI 01235 833666



● HotDocs 2.0 claims to automate the formatting and writing of routine documents such as contracts and business letters within Windows word processors. It costs £99.

Quintec 01268 270601

Pool of ideas

● The two-day Merseyside Computer and Technology show will be held at Liverpool's St George's Hall from 31 October. Details on 0151 709 8979.

3D walkthroughs could give home buyers a better view

Research aimed at getting 3D pictures of nuclear plants may provide a cheap way to construct walkthrough virtual-reality images of buildings for architects and even home buyers.

The Euro-funded research at University College, London, led to a way of mapping complex spaces using a remote-controlled video camera.

A venture company called As-Built Solutions was founded to exploit the research, and its system has been merged with plant-design software from UK CAD specialist CADCentre to produce a package excitingly called PDMS DIGI-AB.

The basic hardware is adapted from two ordinary video cameras, one narrow focus for accuracy and the other giving a broad view for indexing. These are fitted onto a PC-controlled theodolite that swivels in all directions to take images that have a known relationship to each other.

View sets are taken from at least three sites to provide distance information, but the device does not have to be aligned and sited accurately because the software works out where it is.



DIGI-AB's library of calibrated images allows zoom views from several angles

It produces a library of calibrated images which can be used in themselves, or to build up

accurate virtual reality images of complex installations such as oil platforms. The latter process requires some human input, relating pictured objects such as pipes and pumps to a library of stored models. It can be used to visualise a plant for a major refit, or to map installations as they are constructed.

David Wheeldon, general manager of the CADCentre's visual systems division, said: "This is an alternative way of conveying information, rather than the usual methods of drawings and reports."

The company uses Silicon Graphics machines for 3D walkthroughs, but technical manager Andy Deacon said he could foresee cheaper systems running on PCs which might find a wider market.

CADCentre 01223 314848

Clive Akass

Old anti-virus kits won't work with Windows 95

Anti-virus protection will be one of the hidden costs of upgrading to Windows 95, according to Dr Alan Solomon, of Anti-VirusToolkit fame.

Most current anti-virus software uses some form of Terminate and Stay Resident (TSR) program, which sits ready for action in memory.

TSRs are a relic of DOS days and Win95 does not sit on a DOS substratum like Windows 3.x. The result is that TSR scanners will not work with Win95, Solomon said at the Networks Show. "Our programmers have had some fun writing a 32-bit VxD [virtual device driver] called WinGuard to do the same thing."

WinGuard is part of version

7.5 of his toolkit, which he launched at the show. The kit includes a new tool for detecting previously unknown viruses, and on-access scanning for Netware. It is a 32-bit application and is available now (£125 Windows and Dos, £99 DOS only), but a fully Win95-compliant version will be out by October after the new OS code is finalised.

The rival Norton Anti-Virus package is set to launch simultaneously with Win95 (see page 161). Windows 95 lacks any anti-virus software, apparently because Microsoft thought third-party companies are best left to keep up with new forms.



Dr Solomon's virus killer

No Win95-specific virus has yet been detected, according to Ian Whalley, editor of the *Anti-Virus Bulletin*, who was at the launch. Solomon also announced version 2.0 of his Audit package, which allows administrators to monitor hardware and software, on a network.

S&S International 01296 318700

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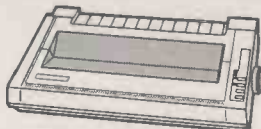
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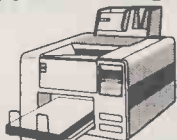
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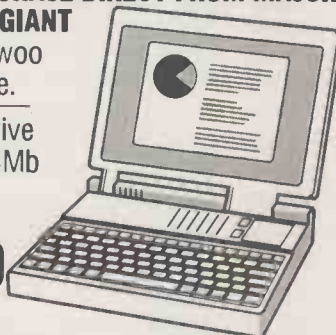
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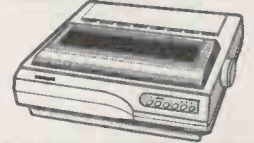
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Short Stories

Elonex offers dual Pentiums

● PC maker Elonex is to launch a range of dual Pentium minitower servers. The new MT 500/DP range features RAID capability through a five-drive configuration, as well as four PCI and four EISA slots.

The Pentiums, clocking between 75MHz and 133MHz, are equipped with pipeline burst synchronous cache and sockets allowing P6 Overdrive upgrades.

Elonex has previously confined itself to desktop models in the PC market. The new models will be available from September, from £2000.

Nick Lawrence

Elonex 0181 4524444



Plug-in sound

● Orchid's £129 NuSound PnP sound card is the first to combine wavetable synthesis and three dimensional surround sound with Plug and Play compatibility, the company claims.

Orchid 01256 479898

VR viewer

● Superscape has launched Visualiser, a £99 viewer for virtual-reality files created by its £3,950 package, Superscape VRT. (See page 16.) A Win95 version will be available later this year.

Superscape 01256 745745

Gardening world

● Europress Software has released a new £29.99 Windows version of Gardener's World 3D Designer.

Europress 01625 859333

Star Trek

● The Star Trek Omnipedia for £59.95 including VAT it is said to contain virtually every known Star Trek fact.

ABLAC 01626 332233

Multimedia standard hits the Pentium age

The Multimedia PC (MPC) standard has been radically upgraded to include the Pentium processor, MPEG video and wavetable sound cards. The new standard has been set by the Multimedia PC Working Group, part of the Software Publishers Association, which represents over 1,500 software companies. MPC Working Group members include AT&T, Creative Labs, Dell, Gateway 2000, IBM and Philips Consumer Electronics.

The MPC2 standard, set in 1993, specifies a minimum of a 486SX running at 25MHz, 4Mb RAM, 160Mb hard drive, 16-bit sound card and double-speed CD-ROM drive. The MPC3 standard specifies a P75 Pentium chip, 8Mb RAM, 540 Mbyte hard drive, and Windows 3.11 and DOS 6.0 or a binary compatible system. Sound cards should now offer wavetable functionality.

The graphics performance calls for colour space conversion and scaling capability. MPC3 machines should also be able to playback hardware and software-based MPEG-1 video. The CD-ROM drive should be quad-speed and capable of reading CD audio, CD-



ROM, CD-ROM-XA, Photo CD, CD-R, VideoCD and CD-i discs.

The working group stresses that the specifications define a minimum system and are not a recommendation for a particular system. Indeed, some members do not believe the standard has been set high enough, particularly with regard to RAM. MPC3 machines will be backward compatible with MPC 1 & 2 software.

Complete specifications are at <http://www.spa.org> and from the MPC Working Group: mpcinfo@spa.org.

George Cole

Kahn breezes in to promote Starfish

Philippe Kahn has had a hard time over the past few months, what with being edged sideways at Borland, and persistent rumours that the company is about to be taken over, and tactless stories in the press about his lavish spending,

But the big, fast-talking Frenchman has lost none of his style. He breezed into London last month, as always with a minion in tow to tap at keyboards, receive instructions, and act as straight-person for his jokes.

Kahn was not saying much about Borland, which he still heads, except to trot out the official line that after an unhappy flirtation with the suites market, the company is concentrating on what it does best: creating friendly development environments and fast compilers.

In DOS days, Borland was famous for Sidekick, which provided a near-indispensable suite of pop-up utilities. Kahn somehow hived off Sidekick



into a new company he set up, called Starfish. He also got a Windows front-end called Dashboard, originally developed by Hewlett-Packard.

Starfish has developed Win95 versions of both products. Sidekick has evolved into an elegant organiser suite with an emphasis on contact management. Dashboard offers an easy way to navigate both Win95 and Win 3.x; Kahn says it offers a standard front-end for PCs in companies

with mixed environments.

Starfish is setting up in Britain, in conjunction with the Roderick Manhattan group, and Kahn was here to promote both the company and its new products.

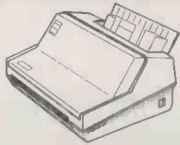
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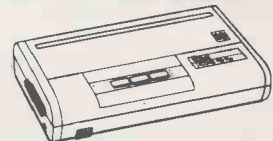
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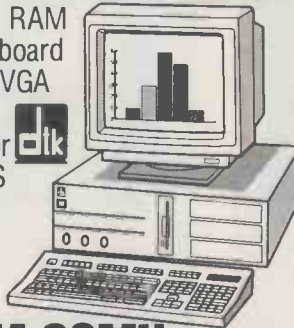
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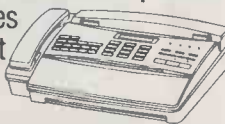
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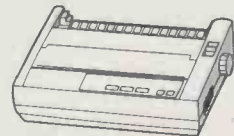
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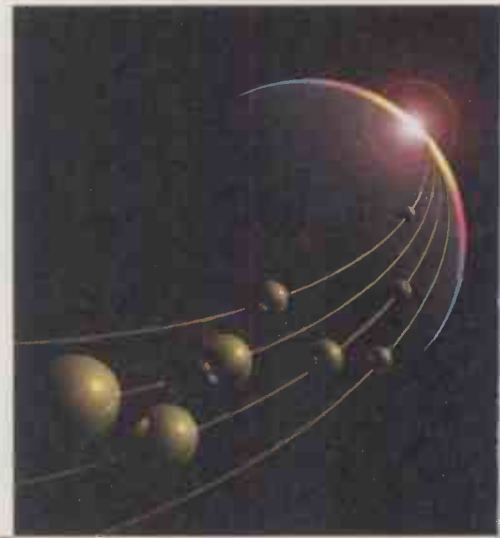
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Libel threat to Net news

Legislation governing libel on the Internet will be considered by MPs after the summer recess. The issues are covered in a draft Bill, drawn up by the Lord Chancellor's Department over the past six months, which was due to be given to MPs late last month — though the department said it might be delayed until the next parliamentary session.

Even with a following wind, the Bill is unlikely to become law for many months. Crucial for UK Internet users will be a section covering publishers, as opposed to writers, of libellous material.

Britain has some of the most draconian libel laws in the world. Even newsagents are liable under the current law if they sell material which is found to be libellous.

This may mean that Internet service providers could be responsible for libels in news postings, which could render the Usenet system inoperable. There has been no test case to establish the law in Britain, but

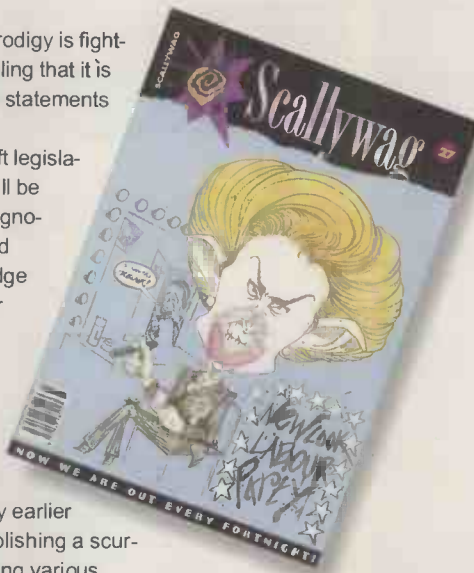
the US service Prodigy is fighting a landmark ruling that it is liable for libellous statements by users.

Under the draft legislation, purveyors will be allowed to plead ignorance of published libel, leaving a judge to decide whether they are at fault.

The problem for legislators is neatly illustrated by *Scallywag* magazine, which closed temporarily earlier this year after publishing a scurrilous article naming various politicians. The magazine boasted it had no money, so its distributors were sued.

However, the offending article appeared on an American Web site, apparently out of reach of British law. A spokesman for the Law Chancellor's Department said: "The Internet raises some very interesting issues."

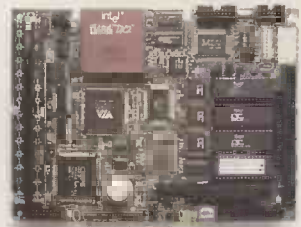
Scallywag is likely to ensure



that MPs do not ignore the issue: it has set up shop on a UK server (at <http://demon.co.uk/xyz/scallywag>) and it is not backward in slugging off politicians. The magazine may not make itself popular with Web users if it provokes repressive legislation of the kind mooted to curb tabloid excesses.

Clive Akass

Short Stories



Fair deal

● Fairchild's PCM-4860 packs a 486 computer complete with Ethernet interface, VGA controller, serial and parallel ports, and enhanced IDE controller, into the size of a 5.25in disk drive. All main configuration can be done through software, and clock speeds up to 66MHz are supported. The company also does a 486 computer on an AT-bus slot, clocking speeds up to 100MHz.

Fairchild 01703 559090

Online comms mag launched

● A comms-orientated online magazine called d.Comm has been launched by The Economist's special magazine division. The address is <http://www.d-comm.com>.

A lot of publishers view unsolicited manuscripts as extended hate mail, according to Ringpull, publisher of cyberpunk writer Jeff Noon. It is inviting writers to submit work by email (up@ringpull.demon.co.uk), starting with a brief synopsis of their novel and the first twenty pages.

Net fortune

● The Playboy Web site, which boasts 800,000 callers a day, is proving that a Net presence can be very profitable indeed. It is charging advertisers \$50,000 a quarter, or \$30,000 for a hyper-text link, according to a US report.

Primax updates pen scanner

● Primax has updated its £260 DataPen pen scanner to include a brightness control that optimises low-contrast scans.

Primax 01865 744346

Power to the online people

An experiment in electronic democracy has been launched by Charter 88, which campaigns for reform of the political system.

It is launching on the Web a project called Citizens' Enquiry, which is an attempt to canvass opinion on subjects such as freedom of information and constitutional

reform.

The subjects are wide-ranging enough to include topics such as the electronic town hall, and the idea is to draw up a report which will be presented to MPs next year.

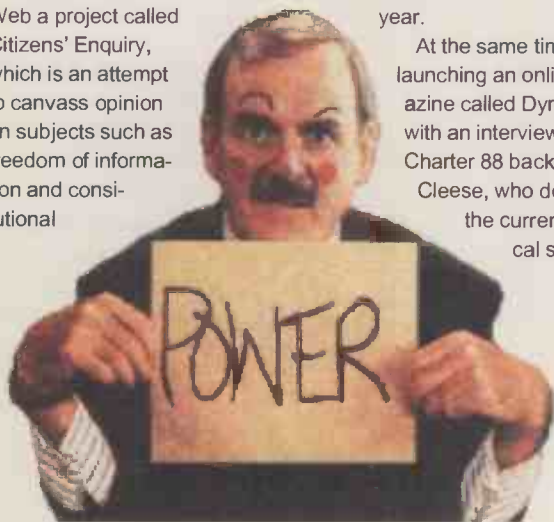
At the same time it is launching an online magazine called Dynamo, with an interview by Charter 88 backer John Cleese, who describes the current political system as

"two groups of people sitting opposite each other in a fundamentally paranoid confrontation."

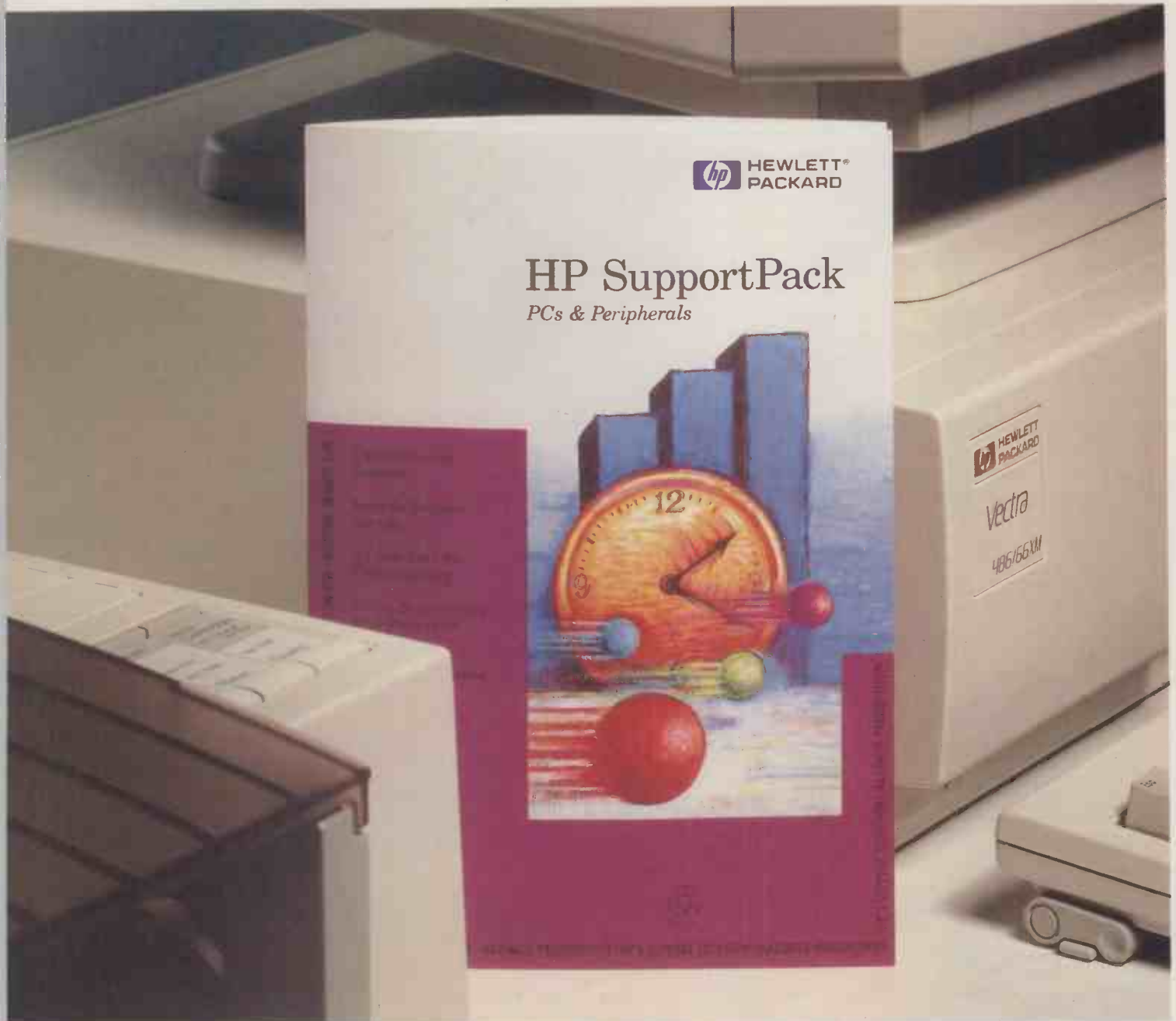
Greg Power, who is running the Citizens' Enquiry campaign, said: "We are trying to see if the Internet is a place where people can engage in the political process."

The government has also been investigating the online issues, and encouraging a debate with Internet users. Ironically, it held a colloquium on the subject on the same day the Charter 88 initiative was launched.

The Citizen's Enquiry page is at <http://www.gn.apc.org/charter88/index.html>; the government's is at <http://www.open.gov.uk>.



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Short Stories

Stylewriter goes walkies

● A new Apple StyleWriter colour inkjet for portables was launched last month. The 2200 weighs 3lb and measures just 12in by 2.2in. It costs £299.

Also, the 2400 inkjet has been enhanced, and now includes provision for drag-and-drop printing and Watermarks. It costs £349.

Apple 0800 127753

Radius launches PCI cards

● Five new PCI-based graphics cards for professional PowerMac users are on offer from Radius UK. All offer 1600 x 1200 resolution, colour matching, and quick pans and zooms.

Prices range from £599 for PrecisionColour with a maximum full-colour resolution of 1152 x 870, to £2,499 for a ThunderColour giving a maximum 1600 x 1200.

Radius 01483 772773

eWorld gets a birthday upgrade

● eWorld, Apple's online service, celebrated its first birthday last month with a free software upgrade that improves Internet access and multimedia facilities.

The service, which boasts 90,000 subscribers, is currently available only to Mac users, but Windows access is expected to be launched this year.

CD Macdrive

● Apple is offering the 600e quad-speed CD drive, which is double the speed of its previous CD players. It costs £299, ex VAT.

Apple 0800 127753

Newsprint welcomes your news, views, Web sites and graphics. Send them to clive_akass@pcw.cmail.compuserve.com or cakass@dial.pipex.com

Taligent delivers OS

The Win95 bandwagon has overshadowed the debut of an operating system technology once tipped as a time-bomb under Microsoft.

The prosaically named Commonpoint 1.0 reference release is the result of seven years' work by Taligent, which delivered it last month to its three backers: Apple, IBM and Hewlett-Packard.

The idea was for Taligent to develop an efficient object-orientated framework that could provide a common programming interface for all hardware platforms.

Ideally, the base operating system would be stripped to a microkernel and topped by a layer of software objects that perform tasks in response to messages from applications.

Applications could thus be smaller and cheaper, because they could share code for common tasks such as text editing, and developers would need to write only one set of code for all platforms.

Commonpoint applications are also more naturally task orientated than Win95: you take tools to a document, rather than



open a document within an application. They could make today's massive, feature-laden applications a thing of the past, enthusiasts say.

Sadly for Taligent, the Commonpoint application system, consisting of some 400 task objects, currently has to sit on top of massive operating systems and thus represents an overhead rather than a saving of resources. But Stratton Sclavos, Taligent's vice-president of marketing and sales, believes the advantages will still be sufficient for it to succeed.

IBM was due to deliver a Commonpoint system and development kit for AIX, its version of Unix, late last month. It has also pledged to deliver an OS/2 version. Apple and HP will provide versions for the Mac OS and HP-Ux respectively, and Taligent will write one for Windows 95.

Taligent has also released

cpConstructor, a kit for helping Commonpoint developers write user interfaces. Full details are at <http://www.taligent.com>.

Taligent 001 408 255 2525



Pen scanner
Belgian-based IRIS is offering a \$595 Mac and PowerMac version of its datapen scanner, with recognition software that translates printed phone numbers and other text into computer data.

IRIS ++32-10-45.13.64

Top 10 Windows and DOS		
Product	Manufacturer	Last month
1 Corel Gallery	Corel	1
2 Quicken v3	Intuit	4
3 QEMM 386	Quarterdeck	11
4 WordStar v2	Softkey	-
5 Family Tree Maker	RMG	10
6 MS Encarta	Microsoft	9
7 BodyWorks	Guildsoft	5
8 Turbo CAD	IMSI	19
9 WordPerfect Works	WordPerfect	-
10 MS Office 4.2 U/G	Microsoft	15
Top 10 DOS		
1 QEMM	Quarterdeck	1
2 Stacker U/G	Stac	-
3 DOS 6.22	Microsoft	-
4 PC Anywhere	Symantec	9
5 Stacker	Stac	-
6 MS Space Simulator	Microsoft	4
7 Xtree Gold v3	Symantec	6
8 Solo Accounts	Pegasus	5
9 LetterPerfect	WordPerfect	10
10 MS Flight Simulator	Microsoft	3

Top 20 Windows		
Product	Manufacturer	Last month
1 Corel Gallery	Corel	1
2 Quicken v3	Intuit	4
3 WordStar v2	Softkey	-
4 Family Tree Maker	RMG	10
5 MS Encarta	Microsoft	9
6 BodyWorks	Guildsoft	5
7 Turbo CAD	IMSI	17
8 WordPerfect Works	WordPerfect	18
9 MS Office 4.2 U/G	Microsoft	13
10 Lotus Smartsuite	Lotus	3
11 Windelete	IMSI	8
12 Uninstaller	MicroHelp	-
13 Visio v3	Shapeware	14
14 Shakespeare Interactive	Andromeda	16
15 Procomm	Datastorm	-
16 Photo Library	Softkey 7	-
17 MS Works	Microsoft	6
18 Quicken Home Inventory	Intuit	-
19 First Incredible Dictionary	DK	-
20 Paradox U/G	Borland	-

Figures, supplied by Software Warehouse, relate to bestsellers for June, 1995.

Commerce in cyberspace

As the prospect of Internet commerce edges ever closer to reality, considerations of security, international law and currency fluctuations come into play. *PCW* reviews the elements involved and the progress made so far.

The battle for electronic commerce is hotting up. Microsoft has shrugged off regulatory problems to sign up a fifth bank to provide on-line services, and major players have agreed to bury the hatchet over security standards.

Microsoft's banking partners, which include Chase Manhattan and First National Bank of Chicago, will allow customers to use Microsoft's Money software to access balances, pay bills and transfer funds.

This is good news for the banks, who are eager to min-



Borenstein: Off-shore accounts are a problem at present

imise costs — the First National Bank of Chicago now charges customers \$3 to use its counter services.

Despite having backed out of a \$2.3 billion deal with Intuit, following the US Justice Department's ruling last May, Microsoft's plans seem unaffected. It is working with Visa International on a Secure Transaction Transfer protocol.

Earlier this year, IBM, Netscape, America Online, Compuserve and Prodigy Services all took up equity investments in startup firm, Terisa Systems. The company will develop an integrated transaction security protocol based on the two leading standards: Netscape's Secure Sockets Layer (SSL), and Enterprise Integration Technology's Secure Hyper-

text Transfer Protocol.

Data providers still differ in how they encrypt and at what point in a transaction. This has discouraged many potential users from using electronic commerce services, fearing they will be locked into a particular system. The integrated security protocol is due this autumn.

But analysts point to a bigger problem. "Security issues are being talked about because they are easier to get a grip on, but the technology is basically there," says Andy Bond, senior research scientist at the Distributed Systems Technology Centre (DSTC), a technology research facility in Brisbane. "A harder problem is how international law handles Internet commerce. There is no global information law."

Legal obstacles are already in place. InterPay Nederland, an Internet payment clearing service which is to start operations across Europe this autumn, was initially denied Dutch government approval. Legislation did not allow for non-banking organisations to produce money.

Many Internet commerce providers like CommerceNet, CyberCash and First Virtual are based in the US. Few have considered how to deal with currency fluctuations, or how to make purchase orders legally binding, according to Jason Bluming, chief technology officer at NetMarket Company, a Massachusetts electronic commerce provider.

First Virtual currently requires buyers and merchants to hold chequing accounts. US banks make it difficult to obtain off-shore checking accounts.

"We really didn't think it would be a problem at first," says Nathaniel Borenstein, chief scientist at First Virtual, based in San Diego. The company plans to sign international banking partners to

attract more customers outside the US.

Electronic Data Interchange (EDI) standards may provide some answers for Internet commerce providers, says Cathy Medich, executive director of the CommerceNet consortium in Menlo Park, California. The consortium, which includes more than 100 technology vendors and large corporations, is testing several Internet commerce schemes, including the use of EDI standards which govern the exchange of electronic documents such as purchase orders and invoices.

But there may yet be another catch if EDI standards can be adapted to the Internet and commercial on-line services.

"Some have characterised the Internet as a poor man's EDI. But I expect Internet pricing will go up when one allows for security and administration," says Maria Mandler, vice president of global cash management services at Citicorp (a CommerceNet member).

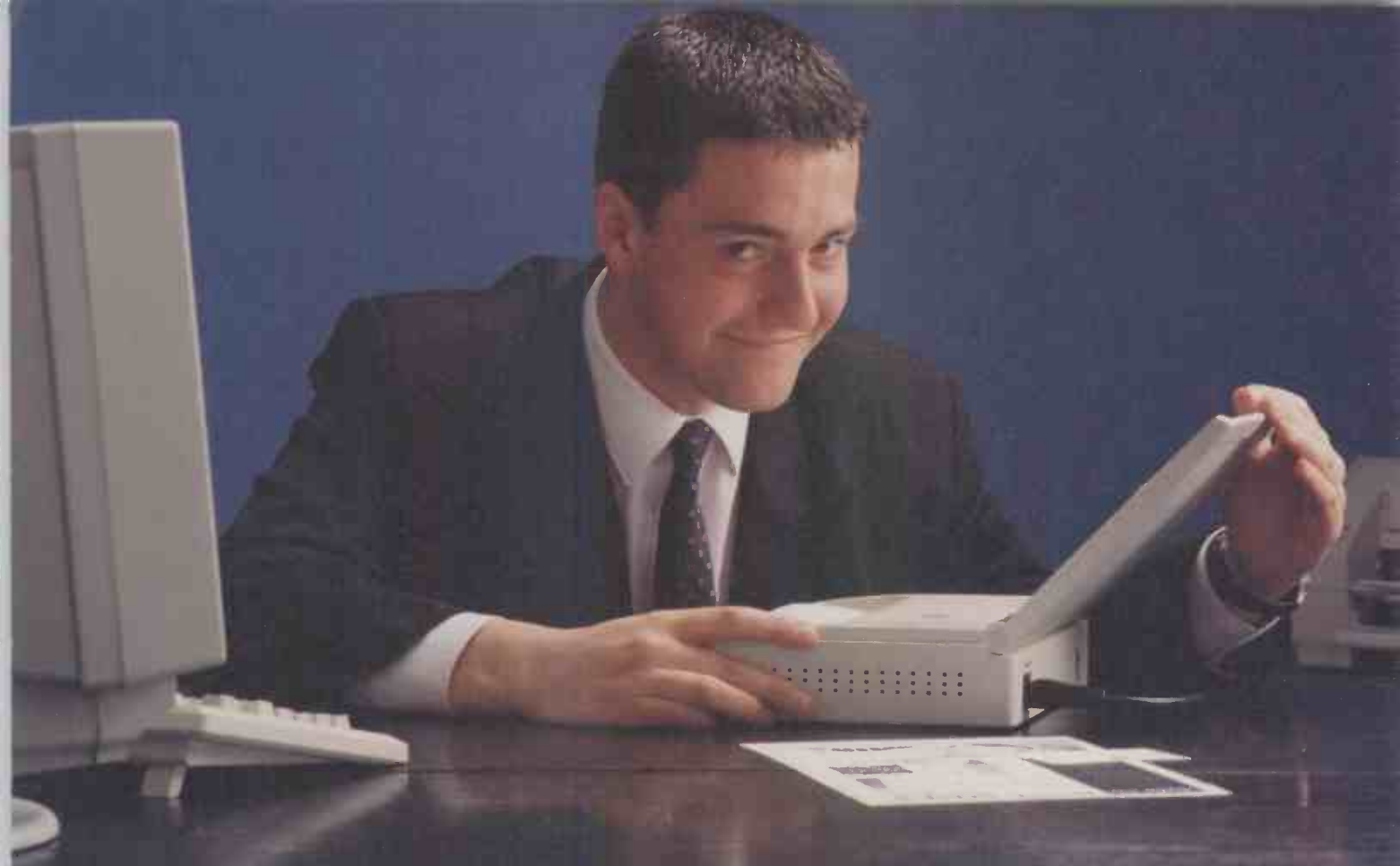
A partial answer to looming international problems may lie in doing away with known currencies altogether. Dutch electronic commerce provider, Digidash, has developed "ecash", a secure electronic currency offering purchase anonymity, says David Chaum, chairman and chief executive. Goods prices, purchases, and users' account balances will all be in ecash.

Such a digital currency could make the Internet a parallel financial system and exclude banking institutions altogether, says Jon Matonis, president of Secure Payment Systems, a US Internet commerce consultancy.

If UK banks now follow their American counterparts' lead by charging for branch visits, this must beg the question, "who needs them?" Roll on the virtual overdraft.

Camille Mendler

ANALYSIS



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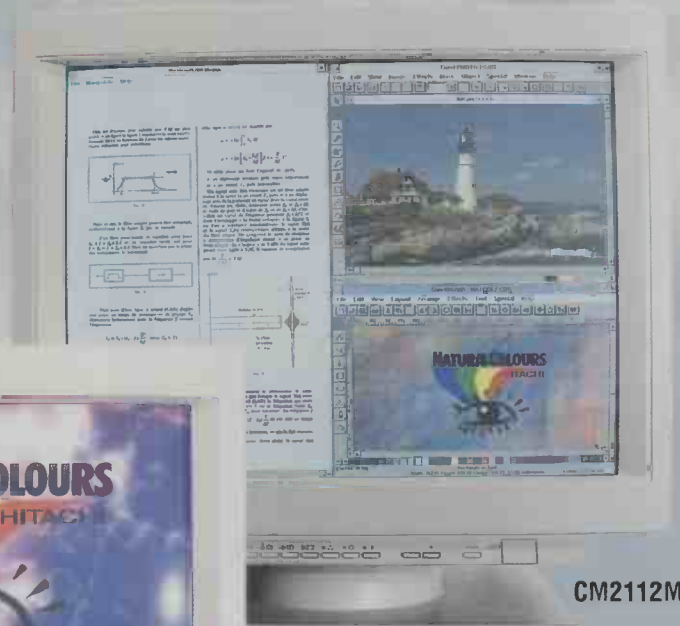
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CM1711M

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CM2111M	1600 x 1200 (75Hz)
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IBM has made two famous mistakes over the past 15 years. One was to give too much rein to a certain young William Gates when it hired his company to produce the first PC operating system; the other was to become bogged down in mainframes while the rest of the world moved towards desktops.

At the time of that drift, IBM people had seemed genuinely unconcerned about the rising power of the PC — so much so, in fact, that I concluded they must know something I didn't. Months later, IBM posted a \$3 billion loss: in financial terms, the biggest cock-up in history, caused by what in retrospect seems like some sort of collective dementia.

Yet just a few years later, the company is looking as strong as ever, posting quarterly profits by the billion. True, the boy Gates is running amok with his sparkling new graphical interface, but that is almost incidental to the industry's latest tectonic shift.

The earth is moving towards pervasive networks and this time IBM is determined to move with it. So evangelised John Whiteside, worldwide head of the IBM Global Network (IGN), on a visit to Britain last month. He indicated that it was the thinking behind IBM's sensational \$3.3 billion purchase of Lotus, owner of Notes, which facilitates the shared use of information across networks. "We are very serious about networking. We think networking is the future of IBM," said Whiteside.

That Notes, rather than other Lotus products, was the main attraction for IBM was borne out by the fact that only days after the deal, there were stories that the company would base its future applications strategy around a German object-orientated office suite called StarOffice, rather than Lotus SmartSuite.

IBM is by no means new to

networks. The IBM Global Network is one of the largest in the world, with a claimed 25,000 users throughout 100 countries. Clients range from city corporations to individuals, and IBM has recently been making a big play for the home and small-business user.

Whiteside painted a picture of a cosy partnership in which IBM would provide and maintain a robust networking infrastructure, with secure Internet gateways for purposes such as news and email, leaving customers free to concentrate on both developing and using network applications.

Any similarity between this picture and the IBM of old (the kind farmer IBM with the milking machine called a mainframe) was purely coincidental. IBM had learned its lesson according to Whiteside.

Gone are the days when it would try to lock clients into expensive proprietary technology. It had learned to love open systems. And everyone would learn to love Notes. "Notes will allow collaborative computing. Basically, it is the underpinning of applications. I expect to see many enhancements to enable that to happen at all levels. This will be evolutionary but I expect to see jump shifts as often as once a month."

He foresaw networks as transforming lives (even in the short term) with online banking, insurance and commerce developing as part of a process of "disintermediation" — that is, the sidelining of those middlemen who take a rake-off but add little or no value to a transaction.

"Home banking will cut out the traditional high street banks. If you are getting your banking online, that service can be provided as easily by insurance companies, say, as by banks."

IGN's UK director, Jeff Ace, said the age of the

IBM looking forward to net gains

"virtual corporation" consisting of a presence on a network, had already arrived. "You don't need a big office any more. We have clients who own nothing but contracts."

Of course, IBM is not the only player in this huge emerging market. "The difference between us and other value-added networks (like Compuserve and America Online) is that we will not attempt to muscle in on the content," said Whiteside.

So what about the little button called Microsoft Network that will appear — anti-monopoly watchdogs permitting — on millions of Win95 screens over the next few months? So simple for users to click; so simple for them to sign on.

Whiteside said this was something with which IBM had to live. "We have lost the battle for the desktop graphical interface," he admitted, with an honesty that spoke as loud as three billion dollars that IBM is back in the real world.

Clive Akass



Ace: "The virtual corporation has arrived"

The world is moving towards pervasive networks and Big Blue is determined to move with it, says the worldwide head of IBM Global Network, John Whiteside, and its UK director, Jeff Ace.

ANALYSIS

An ear to the ground

New trends and hot gossip from PC Expo: the "universal PC", touchpad pointing, news, views and speculation about Windows 97, the IBM-Lotus deal, and whether Intuit could become IBM's next buyout target.

The premier show at this time of the year for IT professionals is PC Expo, which last month drew more than 130,000 to a hot and muggy New York.

The show was used as a forum by IBM and Apple to introduce new products based on their PowerPC chip. Both rolled out some powerful desktop systems based on the new Motorola 604 chip, running at 100MHz and higher. That made the IBM booth a popular place, because this was the first time that any audience had been offered a chance to see these systems.

Also introduced was the Archistrat Computer from Panda Project, a company set up by former IBM employees. The firm calls the sleek-looking Archistrat a universal PC because it is claimed to be the ultimate in future-proofing. The machine can be equipped with different micro-processors in addition to different operating software.

The idea is that companies

who fear that their machines may become obsolete in less than two years, or who want a mix of PowerPC and Intel machines, can buy Pandas and insert whichever chips are needed. Thus, they need contend with only one type of machine; one that can easily be changed and upgraded whenever necessary.

Panda claims to have created a new type of packaging process for the chips that takes up less space, so they can fit onto a smaller circuit card that can be snapped in or out.

The Panda machines will cost about 20 percent more than traditional computers, starting at around \$10,000 for a server powered by a 100MHz Pentium. Panda officials contend that the premium is justified by the benefits.

An interesting trend at Expo was the move towards touchpad pointing devices in portable computers. Epson, Acer, Twinhead, Apple and Sharp were all showing next-generation portables with touchpads in them. And sources say that Compaq, Dell and Toshiba are all looking at placing a touchpad in some new models.

Cirque Corporation, the people behind the touchpad in most portables today, showed two models with one built right into the keyboard — the first of this type I have seen.

Pentium-based portables were also hot items. Dell, Toshiba, IBM and AST were all showing new models using the Pentium 90MHz.

Windows 95 was a big talking point at the show, with Microsoft sources saying that all is set for a 24th August launch in Seattle. It looks like there will be about 100 Win95 applications shown at the launch, with another 250 ready for the market in the first quarter of 1996.

As for the next version of Windows, sources say that it

is codenamed Memphis and will be called Win 97. In 1996, the graphical user interface of Win 95 will be put on Windows NT. This probably means that Win97 will be a fully-fledged, expanded version of NT with the Windows 95 GUI and more modularity built in.

But of course, the major topic of conversation was the IBM-Lotus deal. Everyone had an opinion, with most being in favour of it. Interestingly, the majority of my fellow analysts believed that Bill Gates does not feel threatened by it.

The view was that IBM and Lotus may be able to expand their presence in the business market, but that the track record of either in marketing to the PC world was less than stellar. More importantly, they felt that IBM and Lotus will not be able to move their key products into the home arena, which represents the biggest growth potential.

To make their mark, IBM and Lotus will have to find a way to make Notes and Lotus 1-2-3 consumer items. This is highly improbable, given the current approach of the companies. Clearly, Notes could be a big hit as a communications layer for interactive TV. Lotus 1-2-3 has been beaten to the home market by Intuit's Quicken.

Actually, Intuit could become a buyout target for IBM if the company understood this. An IBM/Lotus/Intuit attack on the home with a combined home-finance and interactive TV package could do serious damage to Microsoft's quest for dominance on this front.

But Microsoft is a formidable competitor in the operating-system and applications markets. And this means that any ground IBM and Lotus may gain will not come without a fight: something that Bill Gates and Microsoft are more than ready to take on.

Tim Bajarin

ANALYSIS



The Acer Note Pro notebook is one of several new models with a built-in touchpad



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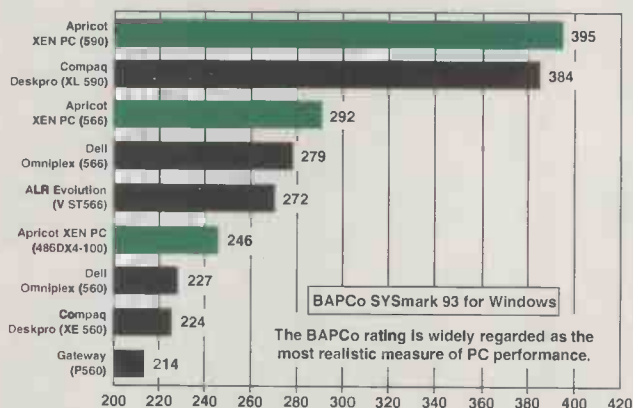
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- PC Direct, May 1995



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InfoWorld, September 19, 1994

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J. Steinburg, Business Geographics, October 1994

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A few weeks ago, my interior design adviser visited my flat for yet another consultation session. "This place is just not me, luv," I complained. "Ideally, I would prefer to harmoniously integrate my domestic and professional milieux into an ergonomic synthesis that manifests facets both of my personality and my aspirations."

"So you want a computer desk that matches your existing colour scheme and living room furniture," she said. "Exactly," I replied, "and I don't want to pay much over 80 quid for it, either."

Why was it, I asked her, that some 15 years into the so-called computer revolution, no furniture manufacturer had yet got his arse sufficiently into gear to devise a good-looking, functional design for a computer desk: one that didn't look like the illegitimate spawn of an amorous liaison between a Hostess trolley and a filing cabinet?

Everything I'd seen thus far was garbage, I said — expensive, ugly and impractical. To my mind, the best piece of working furniture ever conceived is the old-fashioned writing bureau, especially those rosewood ones with the slatted, pull-down covers. When not in use, they simply blend in alongside everything else in the room. But when the creative urge strikes, you just slide open the cover, pull out the integral writing table, and you're ready for action. Everything: the inkwell, pens, blotting paper, is right there to hand. And when you've finished it folds away again equally as fast, and once more becomes a stylishly anonymous cabinet. Where, then, is the equivalent for a PC and its peripherals?

My main problem in life is space, or rather the lack thereof. I'm stuck with a one-bedroom flat in which I both live and work. Yes, I could convert either the living room or the bedroom into a full-blown office, but I'd rather not. Come 5pm I don't want to be surrounded by the tools of my trade. I'd rather they were all folded away discreetly into a single unit, as in the case of the aforementioned bureau.

None of my previous solutions to the problem really worked. At one time, I used a conventional two-drawer desk. There was enough room on top (just) for the monitor, printer, keyboard and telephone, but the CPU had to go on the floor — likewise, any cups of coffee and cans of lager. So next, I tried my B&Q folding butterfly table. The cupboard in the middle, normally used for

storing its four foldaway chairs, proved ideal for housing the tower unit. And with both wings opened out, there was more than enough room for all the peripherals, as well as a generous amount of working space — so generous that it rather took over the whole room. Nor could I eat off it any more, unless I wanted to risk getting curry in the keyboard.

So having failed there, and with my Interior Design Adviser in tow, I set off in search of better alternatives.

Looking at some of the stuff the stores were trying to flog made me wonder whether the people who'd designed it had ever seriously used a computer themselves. There was one that appeared to have been adapted from a Zimmer frame. Maybe it would have supported the weight of a CPU and monitor without falling over, but I doubt it. There wasn't really much room for a printer either, and the keyboard shelf wasn't even wide enough to accommodate a keyboard and mouse (£60 ex VAT to you, John).

Then, to a Swedish furniture warehouse where we found a garishly-coloured, disturbingly abstract "ergonomic work station" that Salvador Dali might have conceived during one of his more manic moments. There was a price-tag to match. You'd have to be put on a course of Thorazine to be able to use it for any length of time.

Of the so-called "self-assembly" computer desks sold by the catalogue shops I'll say little, except that it's nice to know there is something around that makes my MFI veneered wall-units look classy. At this stage, we gave up. Downcast, we decided to go into a kitchen supply shop and buy a chopping board and some earthenware jars.

You don't really expect to find computer peripherals in such a place, but there it was — a latticed pine, self-assembly computer desk, 850mm x 750mm x 550mm. There was an integral keyboard shelf, with shelves for the printer, the CPU and the monitor — yours for only £29.99. Okay, it looks



Michael Hewitt

Off Sounding

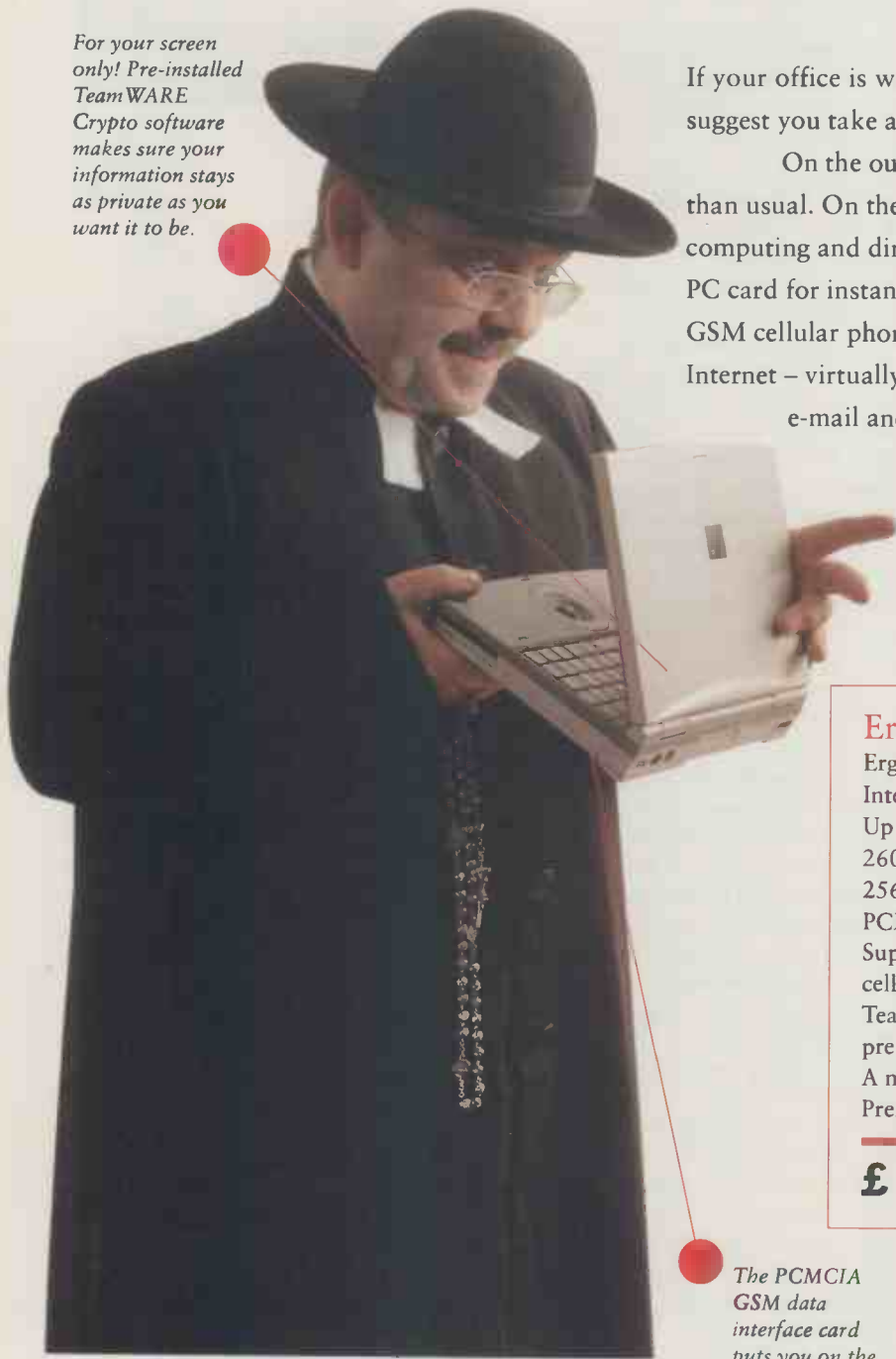
a bit like a spice rack on steroids — it wouldn't surprise me if it came off the same assembly line — but it's solid. There's space for the PC and all its bits and pieces, it's relatively compact, it matches most of the rest of my furniture, and it's cheap.

Yes, I'm sure there's a chance that it will fall apart within 12 months. I doubt it, though. In any case, meanwhile I've got something that does the job and looks quite respectable. It fits nicely between my cupboards and the bookshelves where I keep all my software. I'm only hoping now that this is the start of some new trend and that computer stores are going to come to reciprocal arrangements. Maybe in the near future, I'll be able to go into PC World and buy a heavily discounted non-stick frying pan or pepper-mill.

PCW

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information stays
as private as you
want it to be.



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I am lucky enough to have one of the most pleasant working environments possible. Thanks to the wonders of electronic mail, I can file my copy for PCW from my home in France. The room in which I work is spacious, airy and comfortably untidy, and I've got a large, eyeball-friendly monitor which is a joy to use.

When I'm tired of staring at Windows I can swivel 90 degrees right and gaze through windows, over the picturesque muddle of old tiled rooftops at the hills beyond. Or I can nosy-parker at the comings and goings in the courtyard below, watch bands of screeching swifts circle and dip dementedly like a chapter of aerial bikers, and observe furtive lizards darting from crevices in the old stone walls. In fact, it's quite surprising anything at all ever gets written.

The only trouble is, I can't think what to call the place — which makes communication a bit difficult. "Study" is far too pretentious. "Office" sounds too boring, with overtones of bureaucratic self-importance, and "Computer room" is depressingly anorak-ish. So I usually end up saying: "I'll be in my, erm... room," which sounds as if I'm sneaking off for a crafty kip. It is surprising that the inventive subculture which brought us such terms as "teleworking", "email" and "upload" has yet to coin a term for the place where you do it.

Anyway, to drag things back to the point: after eight months of sitting amid cardboard boxes, and teetering piles of books and software, I decided to do something about it and spent most of last summer in a frenzy of carpentry, at the end of which the Ermroom had 50 linear metres of shelving. This, I decided after a quick bout of actuarial modelling in Excel, would see me out. Well, a year later it looks as if I got my sums slightly wrong. PCW alone has encroached on a third of a metre length of shelving, and review software boxes continue to arrive.

Major software releases used to come in huge boxes packed with dozens of floppy disks arranged in attractive wallets, with a handsome set of intimidatingly heavy manuals. CD-ROM with its on-line multimedia tutorials has changed all that, and new versions of familiar software consist of a slim manual, a CD jewel case, and enough cleverly folded cardboard to

keep them from rattling around in the same size box, because dealer-shelf credibility must be maintained. I mean, would you pay £300 for a software package that was only one centimetre thick? Still, there's always some reason not to throw the box away: It's somewhere safe to keep the card with the 18-digit registration code, and often the only place where the system requirements are stated.

Then there's the problem of what should I do with this stuff when I've finished with it? Book reviewers have an easy solution: it's a traditional perk to flog them to a dealer. The system of licensing (rather than owning) software, combined with professional ethics, prevents me from selling or even giving away review software. Besides, some snooper might trace the serial number back to me.

And then there's all the stuff I've actually bought. And the boxes it came in — always keep the box, because if anything goes wrong you will be able to return it to the vendor securely packed in the manufacturer's carton. I'm good at this. I've got boxes for obsolete modems, 286 co-processors and long-dead mice. Of course, the only box I can't lay my hands on is the one in which my new but ailing CD-ROM drive arrived.

So why do I keep all this junk? Why are there three identical copies of a well-known budget drawing application nestling together on my nice new shelves? Why do I keep the three-year old DTP package that comes in two breeze-block sized boxes, stops installing at disk 17 (out of 24) and is reputedly so slow that users have to save each page as a separate document? What is Amstrad Accounts Master, how did I come by it, and why is it still shrink-wrapped after five years? It's rather like the story of the relatives of a deceased old lady, who found among her effects a box labelled "Pieces of string too short to keep".

Technology changes quickly, and computer enthusiasts are natural



Tim Nott

Homefront

hoarders. You only have to read some of the threads on CIX that start "I found my old Sinclair Spectrum in the attic the other day..." and end with "...an early beta of Pac Man." Like them, I simply can't bear to throw any of it away. It seems shockingly wasteful, somehow, to consign all that meticulously documented, attractively packaged but totally useless technology to the bin.

Perhaps one day some kind museum, or even a burglar, will relieve me of some of this valuable land-fill. Until that day, I'll just have to keep putting up more shelves in my Ermroom. Cut from renewable forests, of course.

PCW

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Twenty years too late, an electronics engineer has just solved a nagging problem. His calculations for a student research project had thrown up odd errors, but now, at last, he knows why.

He had been using log tables in the days before calculators became the norm. By chance, a publisher had laughingly recalled how his company used to pepper their log-table books with deliberate errors in the last decimal places. The company lawyers used these errors to trap pirate publishers who stole log tables. The same thing happens today with dictionaries, collated lists of pop music recordings, and the like.

A sobering thought: those deliberate log-table glitches probably caused more calculation errors than the fault in the first generation of Intel's Pentium chips. The difference is that no-one ever found out about the log tables. What hurt Intel was the company's failure to own up until put on the rack of public exposure by people who had found out.

Intel is certainly not alone in trying to cover up defects in their products. I first began asking Microsoft about possible bugs in Windows 3.11 last November. The very useful diagnostic tool, MSD, and the equally useful watchdog tool, Dr. Watson, no longer seemed to work.

So I asked Microsoft's PR company, Text 100... I asked Pattie Stonseifer, of Microsoft's Consumer Division in Redmond... I asked Microsoft's internal PR, Lise Olsen... But no-one replied, so I tried nagging John Leftwich, Microsoft's Deputy General Manager: I thought that he might remember my irritating persistence from previous encounters.

John Leftwich "confirmed" that the matter was being "dealt with" and that I would hear "shortly" — but three months later, I am still waiting. And we now realise that Microsoft knew there were bugs.

Consider just one example: software company Phonelink spent literally months ploughing through Dr. Watson logs trying to discover why this software gave error messages when people exited the online database, Tel-Me. Phonelink finally worked it out: there was nothing wrong with Tel-Me. The fault was a bug in WEP (the Windows exit procedure) that caused Dr. Watson to sound a false alarm.

Multiply this one example of lost

working hours across all Windows users, and you will realise the cost to customers of Microsoft's failure to respond.

Compare this with the case of US Robotics and the 28.8K Sportster modem reported in our previous issue's Newsprint section. Heaven knows how many units were put into the sales chain with faulty chips? USR won't say. And heaven knows how many people who paid £300 or so for a Sportster 28.8 are still trying to make it work?

The Sportster comes bundled with a subscription to CompuServe and I shall treasure forever the comment I received, from one of CompuServe's managers, after I had complained that his Helpline had been slow and clumsy replying to questions about the Sportster's stubborn refusal to connect: "If you had said earlier that you were a journalist, and hadn't masqueraded as a member of the public," he berated me, "this wouldn't have happened."

As the pieces of the jigsaw started to fit together, I found that US Robotics' Helpline was still fobbing off customers with unhelpful help, even after the company knew of the symptoms shown by its dud modems.

When I was asked to return mine for re-chipping, I included a covering letter requesting compensation for postage, and line time wasted on test calls which USR (by then) knew were pointless. The modem was returned with neither comment nor compensation. When it failed again, almost immediately, I was asked to return it once more for re-checking.

"I can assure you that we will check out the particular modem you purchased to find the root of the problem," wrote Clive Hudson, USR's Managing Director. I dutifully returned the modem yet again, with a covering letter and technical note. And back it bounced, this time returned by the Royal Mail with the package marked "Refused - No job number - No number available." The letter and the technical note were returned too, and apparently unread.

Now (but only because I have played my Press card), USR has grovelled and sent a courier to pick up the



Barry Fox

Talking Straight

re-chipped, but still faulty, modem for testing. This is nice if you have a Press card to play, but not much use if you are just a plain 'ornery old customer. And more than a week after collection, I am still waiting for the test results.

"Service and support" reads US Robotics advertising. "We don't merely test our products' reliability. We design for it."

Fine words indeed, but by early July USR had still not explained how its factory had come to let such obviously dud modems escape into the sales chain. And it had still not taken steps to publicise the problem and therefore ease the suffering of those who had bought a £300 dud, and then wasted time and money trying to make it work.

In a recent US survey, people were asked what they thought of Intel: "Dumb but arrogant" was one choice reply. Having dealt with Intel for many years, I would not argue with that description. But on this showing, US Robotics makes a good contender for Intel's title.

PCW

You may get carried away!

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PC Magazine

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Info PC, France

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I must be one of the only technology columnists affecting a business bent who has not yet mentioned IBM's acquisition of Lotus (Notes). A big buy, which might well have tempted some of the people in the know to consider a little insider dealing. Lotus Notes — for the few who still do not know — is the groupware product. It is the one Lotus thing which Bill Gates must have coveted.

Notes can be tough to explain, but IBM's acquisition has helped. Even the most non-IT-aware executives will have read that IBM thought Notes was worth almost doubling the value of Lotus. If it's that good, maybe the office IT guys do know something! The question now must surely be the future direction of the product. Microsoft's marketeers want a Fear Uncertainty Doubt (FUD) factor to infest the minds of the users (or considerers) of non-Microsoft products. Will IBM's very deep pockets alleviate it? Or will there be a deeper angst that Notes will be shoved firmly towards OS/2? For what it's worth, in my view the product should simply continue to sell itself. As the Notes trainer teaching our network analysts said: "Don't think too hard about it, just do it — it's magic."

What are the benefits of Notes? Notes provides a wide spectrum of groupware services. There are three core capabilities: electronic mail/messaging, forms, and freeform text databases. The resultant product is a remarkable piece of business infrastructure, enabling information sharing, forms routing, communication and group working. As a development platform, it's a powerful source of flexibility in precisely those areas of business where package solutions are unsuitable.

Many key business processes are highly standardised, and it makes no sense to build a new in-house solution to automate them. For example, a general ledger is so standardised that only a technology-maniac would attempt to write one in-house. (If your company has an accountant who thinks that it would be "putting technology first" to adapt his working habits to an established GL system, get a new accountant.) However, expense authorisation, travel requisition processes, insurance policy claims processing — these vary between businesses, and there is less wisdom available pre-built, embedded in off-the-shelf packages.

We are starting with a simple workflow application. When a potential customer contacts us, we begin data capture so that by the time a first appoint-

ment is made, the information necessary to register them onto our core systems is already available. Since this "pre-admission" process is subject to alteration as the institution changes, Notes will make it easy to adapt the process — indeed, far more readily than with paper systems.

Changes to a paper process must be communicated in great swathes of text, which most people hate reading. (Who ever reads a three-page tract produced by a highly numerate but semi-literate accounts clerk, explaining authority levels and paper forms routing processes?) With computer-based workflow, the process can be altered centrally, and the finer details of the re-routing of data need not be communicated to the whole organisation. You can complete your expense form as before, press the "submit" button, and Notes can route your form to the person now responsible for authorisation.

Notes also provides consistency of user interface. PA Consulting Group has just released a report called "Transforming your business with workgroup computing". One of the recommendations included (to help businesses avoid spending a pile on such technology, only to deliver email) is to think user interface. Multiple user interfaces make for confused users. Things have improved dramatically since Windows took hold, though there remains room for improvement.

Lotus provides a product called Internotes, which enables selected Internet newsgroups to be poured into the company as Notes databases. This is a sensible approach to deploying limited Internet access in a company. Placing raw NetScape and a wide-bore comms pipe to every desktop in the business is an excellent way of spending a lot of money to cut productivity. Organisations are just catching on to the fact that those things on corporate desks are not personal computers, there for each employee to mess around with as the whim takes them. Unrestricted access to the Internet would be even worse. As well as wasting hours re-



Nick Beard

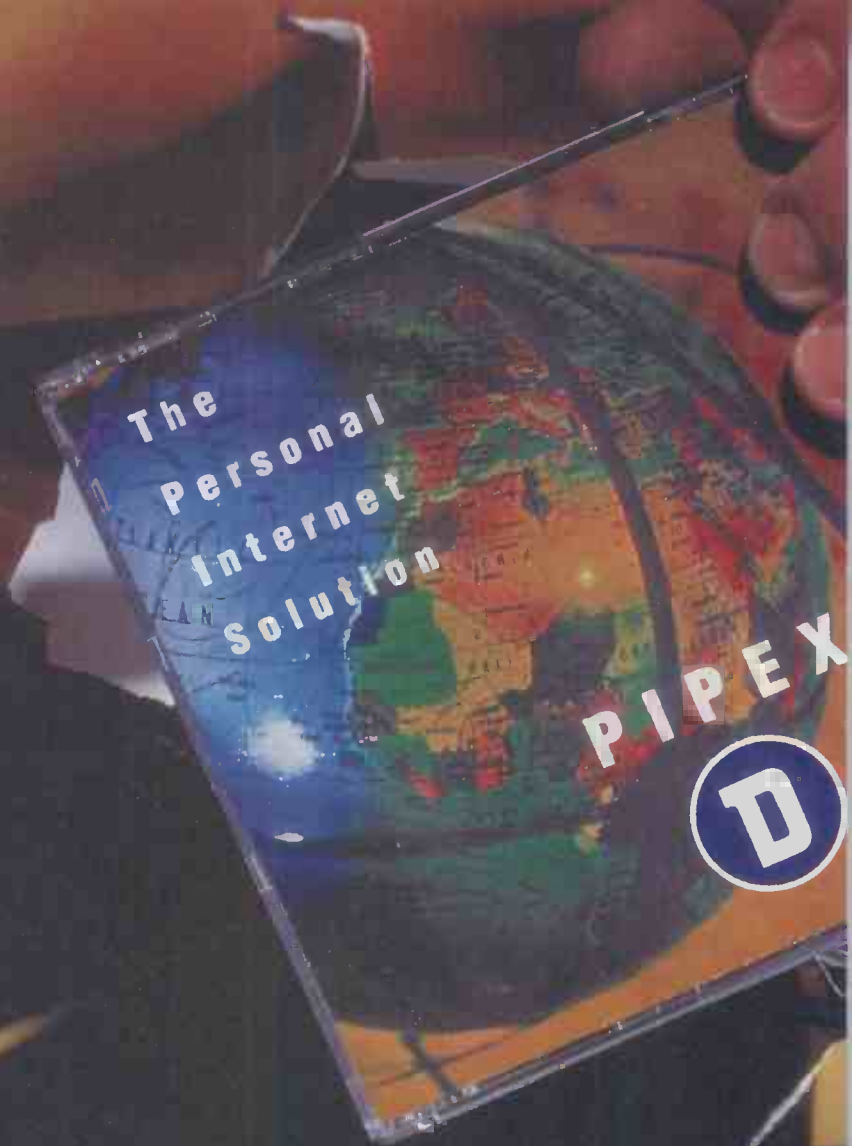
Business Matters

arranging ("personalising") groups of icons and re-working the desktop wallpaper, the "personal productivity tool" would be put to even better use: hours and hours of employee time spent downloading useless wretchedness from various hamster-discussion groups.

So, with my heartfelt distaste for in-house software development, we stride forwards down the path to ever more in-house application development. When is software development not software development? When it is done in Lotus Notes?

PCW

THE ULTIMATE IN PERSONAL



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Tough Viglens

I read with interest your review of hi-spec portables [July '95 issue] and feel that it would be appropriate to comment on the suggestion that the Viglen is one of the less solid machines in the group. A couple of months ago I lent my Dossier to a colleague, who drove over it in a hired Ford Fiesta. It sustained a cracked screen but no other damage apart from a slight indentation in the case. It was repaired and back on duty in less than a week.

The machine has since been to Texas and Germany, and has continued to perform admirably. I should also mention Tolson Messenger Home Office Insurance, who managed to stop laughing for long enough to pay out promptly on the claim.

Adrian Smith
100331,644@compuserve.com

Balancing act

Once again Nick Beard is being provocative. (July's Business Matters). I believe that his assertion that in-house developed software has no place in meeting the business requirement is totally wrong. He also claims incorrectly that good packaged software bought in makes "business processes more effective and

more efficient".

I agree that there are lots of examples where in-house developed software was late, over-budget, and did not meet the customer's requirement. The computer press is always full of good examples. But this is equally true of package solutions where frequently the customisation and maintenance costs turn out to be greater than expected. There is often the realisation after installation that the package does not fully support the business requirement.

The best business solution comes from good analysis and design along with good project control. Once the designer has identified the real business requirement from all areas of the business, from the MD to the filing clerk, then specifying a balanced approach to the solution is relatively easy. Packages have their place as well as bespoke software. A balanced approach consists of buying in packages where they meet the requirement and developing software where they do not. Frequently this will consist of a joint bespoke and package solution. Mr Beard is fortunate that there are a large number of package solutions in the medical field. That is not always the case.

The assertion that the business should fit around the package is ludicrous. I agree that the business processes must change for the better. However, it is vital that business users themselves

change the business processes. The business must drive the technology rather than technology driving the business.

There is the constant impression from Mr Beard's articles that the technology is the driving force. This should never be the case.

Paul Thomas
Cardiff

Mighty Mac

As already established, Macs are no longer oversized toasters, but rather the much longed for and only real alternative to DOS PCs.

You simply can't expect not to lose PCW readers as long as your cover disk doesn't contain some Mac software every issue.

Chris Cain is a great columnist and deserves additional space, in a section closer to the front cover on which the "also Mac software" disk is attached.

Shay Ginsbourg
gshay@techunix.technlon.ac.il

PCW replies: We'll continue to include regular Macintosh coverage within the broader context of personal computing, and to review significant Mac software and hardware. But as an umbrella PC magazine we can't hope to match the comprehensive coverage of the specialist Mac titles.

Teenage kicks

Microsoft is being either cruel or kind to all us technically inclined 16-year-olds in the UK. Windows 95 is being released on 24th August in the US (and hopefully in the UK as well). Unfortunately for us, our GCSE results arrive on the same day or the next.

If our results are bad, we won't have the will to live, let alone enjoy the new OS. If our results are good, however, the arrival of Win95 will heighten an already ecstatic mood. Admittedly, the potential audience of 16-year-old buyers of Win95 in the UK is about 100 at the most (including those, like myself, who advise our parents about things technological), and comparing this to the worldwide market of, presumably, about 20/30 million means that we aren't major players. But please, Bill Gates, spare a thought for us poor working teenagers at the next major release.

Jonathan Sandys
100417,2615@compuserve.com

The Linux connection

In response to Ian Shatwell's letter about Linux in August PCW, I agree that setting up an Internet connection from Linux is not trivial. However, once you have done it (and learned about the way the Internet works in the process) you will have a system equal to — or possibly even greater in functionality than — that of the Internet Service Provider at the other end of the phone. Many ISPs are in fact looking to Linux as a low-cost means of providing all the infrastructure of an Internet service.

There are Howto documents on most aspects of setting up Linux Networking and an excellent book from O'Reilly & Associates called *Linux Network Administrators Guide* that should be available from your local bookshop, along with half a dozen other new books on Linux that have appeared in recent weeks.

If people are interested in Linux I would like to make them aware that the UK Unix Users Group has a Linux Special Interest Group that the general public can join at just £20 per annum. The SIG has a printed and Web-based newsletter called Linux@UK of which I am the editor. There are also several mailing lists that anybody with an interest in Linux is free to join.

There are several usenet

newsgroups associated with Linux. The most important one to look at is comp.os.linux.announce which is a general noticeboard for new Linux projects and events from all over the world.

Martin Houston
UKUUG Linux SIG
Organiser & Linux/Unix
Consultant
Deluxe Technology Ltd,
mhouston@mh01.demon.
co.uk (0378 422002)

Appreciating curves

In your reply to the learning curve letter (*PCW*, August), you ask "Who said the curve was a graph?" The answer is that the concept comes from psychology of learning experiments in animals and people being trained to perform a task. The shape of the curve of success rate versus trial, typically sigmoid (rising to an asymptote), contains a lot of information. Your correspondent, who understands the concept, puts a good interpretation on it.

Laurie Van Someren
laurie@aleph1.co.uk

Final Frontier

What a rip-off! ("Money slipping through the Net", Letters, *PCW* August 1995). Perhaps your reader should look a bit wider when searching for his Internet service provider.

I have registered with Frontier (0171 242 3383) who offer domain name registration for £15. One short phone call from a member of the admin staff to verify the details, a confirmation email and an invoice in the post, and less than two weeks later I have the domain registered, saving £500.

Perhaps you should run a feature on all the facilities offered by the Internet service providers. That would have saved me several weeks of looking and trying demo accounts.

Alex Monaghan
alex@monaghan.co.uk

In praise of Win95

I hate to admit it, but I think I have some words of praise for an operating system. It must be said that Microsoft, however long it may have taken, has really done its homework with Windows 95.

Not only is it very well specified, both aesthetically and technically, it actually works. I have found it to be repeatedly quicker than Windows 3.1 (which took no advantage of my SCSI system) and quite a bit more reliable. Moreover, it is quite intuitively written, especially when one is migrating from earlier version of Windows — which I did with few problems. If this is only a final beta, I must say I'm looking forward to the final release.

It makes one wonder why IBM could not come up with such a good piece of software in Warp, which was heavily advertised but did not match up to what it claimed it could do.

Andrew Davis
andrew@apd1.demon.co.uk

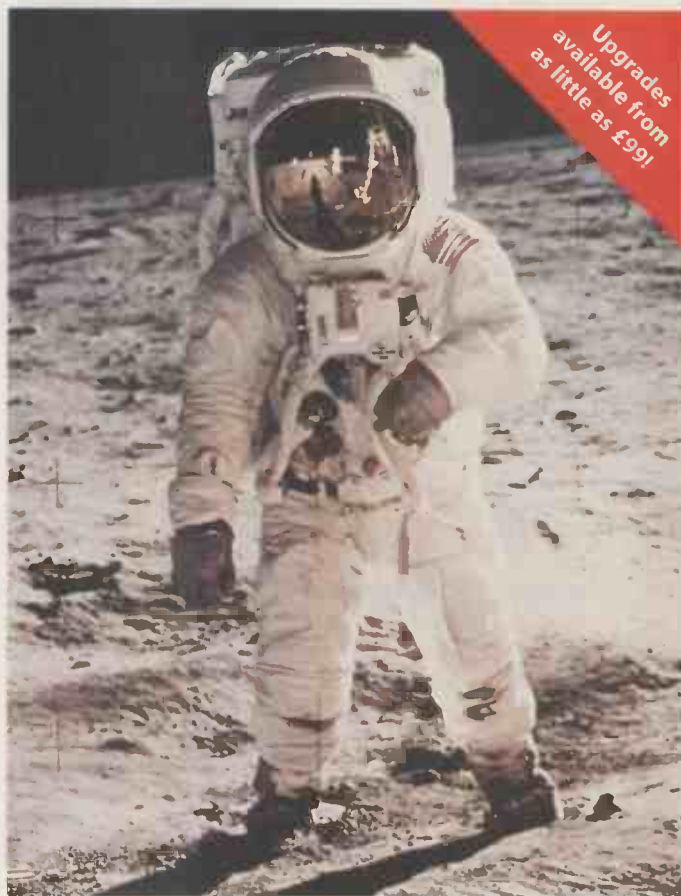
High cost of chips

In response to the letter in *PCW*'s August ("Concern over the price of RAM chips"), a modern semiconductor plant costs somewhere slightly in excess of \$1 billion and the next generation will cost more again.

The profit on 4Mbit devices is probably quite high now but certainly less than the comparison with disks suggests. Rumour has it that it's about 70 percent gross profit margin from factory gate to the end-user price. But even this is not excessive for a manufacturing industry. Fortunately, to survive in the DRAM business, companies have to be very efficient.

The margin is certainly needed if you consider the cost of building the next generation of plants and the huge level of R&D which also runs to billions in this industry. I

It's just a 'small step' from drawing board to CAD — with AutoCAD LT.



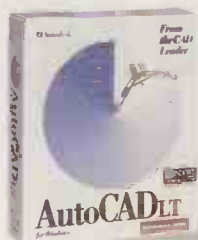
But it could be a 'giant leap' for your productivity.

If you're using outmoded design tools, the chances are that your productivity and competitiveness are being seriously restricted. All too often, though, the move to CAD can seem as daunting as stepping into a new world.

Fortunately, finding the solution is as easy as the solution itself... **AutoCAD LT Release 2**, from Autodesk — the makers of AutoCAD and the world leaders in design software.

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 **Autodesk**

heard that one year Intel's investment in R&D was 30-35 percent of turnover, to which you have to add plant costs and infrastructure.

The alternative is to be happy with Spectrums and 64Kb RAM. The figures above may not be accurate but they should be of the correct magnitude. Perhaps *PCW* could do a proper report on a monster of an industry that drives the modern world by turning out little bits of black plastic with legs.

Ian Packer
ipacker@blogs.
win-uk.net

Memory is made of this

In response to Peter Simmonds' letter in August's *PCW*, I would advise you not to lead a rebellion against the silicon memory manufacturers. When comparing the cost of disk memory against chip memory, you are comparing two rather different technologies. The hard-disk manufacturers have performed production engineering wonders to bring their costs plummeting. However, a hard disk has very few components compared to even a modest memory chip, and the basic technology is fundamentally no different from household audio cassette tape.

Today's 16Mbit dynamic memory (DRAM) chips contain over 20 million components each. Just a few working chips will be obtained from each wafer of silicon costing several hundred dollars. The factories required to manufacture the wafers maintain standards of cleanliness that would put most hospitals to shame. The cost of a single factory is of the order of \$1 billion, and has to be amortised over the short lifetime of the current DRAM technology — just a few years.

In fact, the reason today's memory prices are so low is the fierce competition among the Far Eastern companies which make them. Japanese manufacturing efficiency

occluded the capability of European and US manufacturers over a decade ago. Now the Japanese are being challenged by Korean and other manufacturers.

If you want to tilt your lance at a monopoly which is holding the PC market to ransom, why not aim it at the sole supplier of the processor chip which forms the heart of your computer?

Jon Summers
100332,3463@
compuserve.com

Poor old IBM

I feel sorry for IBM. It seems to set out to earn the poor copy that you and other magazines generally give it. My own experience with the company has been such that I would recommend its hardware products to anybody who can afford them. The service in particular is excellent. They even check to ensure that everything is okay.

Yet when it comes to getting their software to work or putting a positive message across, they may as well forget it. Can I or IBM get OS/2 Warp to work with their own CD-ROM drive in a Thinkpad docking station? All my and IBM's attempts over six months have come to nothing. Yet the whole lot works just fine using Windows. No prizes for guessing what will happen to OS/2 on my hard disk, and no bonus for working out the return on \$64 a Lotus share as far as I am concerned. Windows 95 and Microsoft Office will win without even having to fight for my money.

Another example: the IBM Internet connection is first class. The freephone support service is brilliant. There are points of presence worldwide. Does IBM sell it in the UK? Where do you mention it except as a freebie with Warp? I doubt that IBM aims to let Microsoft Network win in that area by default as well, but if my usage is a typical

example, that would appear inevitable. There are no points of presence in the south east of England outside London. There is no selling, let alone giving away, of the IBM Windows Internet software. The only reason I got the Chameleon Windows software to work was because the very nice IBM man in Holland had spent the weekend struggling to get it functioning for himself.

My sad conclusion is that the pricing of IBM hardware and the selling of its software indicate that Mr Gerstner and his team remain uncomprehending about the millions of semi computer-literate users such as myself who may well become more important than the corporate market.

John Tanzer
West Sussex

Iomega drive destroys dongles

With reference to your review of the Iomega Zip drive (page 406, *PCW* August '95), please check the IOMEGA forum on C!\$. You will find lots of reports of the drive having blown up (yes, actually destroyed) parallel port dongles.

Some dongles in use are not replaceable, and some users aren't happy about this. Especially as some dongles are used to "secure" programs costing thousands of whatever currency.

Peter Holy
100103,554@compuserve.com

Ads that add up

I love it when the advertisers make a printing error. The best to date is in August's *PCW* on page 605 where MultiMax offer some cheap CD-ROMs under the headline:

"2 for the price of one. Buy one of the following titles for £31,000 and get any other one free."

Jim Mann Taylor
100344@compuserve.com

Hindsight



July 1990 — Windows 3.0

"Until recently Windows has suffered, not only from being awkward to use, but from having few applications available for it that were capable of luring users away from traditional DOS applications..."

Our review of Windows 3.0 was generally positive, but like everyone else we massively underestimated the influence it was to have.

"...If you currently prefer the GEM interface to Windows, you really should take a look at Windows 3.0. It does everything GEM does and, for the most part, it does it better. It also does a hell a lot of things GEM doesn't do at all."

Digital Research's GEM interface was popular at the time, but was soon scuppered by the arrival of Windows.

"...In the short term Windows 3.0 is a real competitor to DESQview with some real advantages over Quarterdeck's product. In the long term, it may well prove to be the bridge to OS/2. Its success depends largely on Microsoft's marketing. If the company can forget the pretence that DOS 4.0 is a friendly operating system and sell Windows 3.0 to OEMs as the standard operating system for PCs, it may yet fend off the Unix challenge."

Microsoft didn't do a bad job at marketing Windows and the Unix challenge never materialised.

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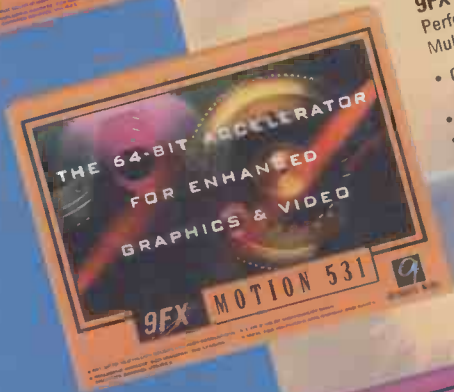
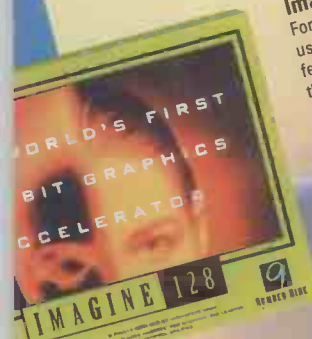
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First Impressions



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Welcome to First Impressions, including the absolutely fabulous "Gadgets" spread on page 64. Full review highlights include Apple's ultimate solution for those who want a Mac but are scared to take the plunge, Dan's Ultimate PC, and Corel's Office Companion.



VNU European Labs

VNU Labs tests cover every kind of hardware and software including PC hardware, printers, network products, modems and software applications. The tests are continually developed and enhanced to reflect hardware and software developments.

Our tests closely simulate real-world use. For example, the suite of PC hardware benchtests uses complete versions of industry-standard applications like Microsoft Excel and Word for Windows, WordPerfect 6.0 (DOS and Windows), Lotus 1-2-3 version 3.4 (DOS) and FoxPro (Windows and DOS).

Application tests are the backbone of all the VNU Labs system evaluations but it's nearly impossible to pin an application result to a specific machine component. Only system-level tests (also known as low-level tests) can reliably tell the difference. VNU Labs' system-level test suite is called Euromark. The tests, which are mainly Windows-based, quickly size up a hard disk, sound card, motherboard, display adaptor and printer, and give individual and overall figures.

● To make them easy to read at a glance, all the graphs in *PCW* are now drawn so that the bigger the bar, the better the result. Normally we'll also include the original data we worked from: for example, the

time in minutes and seconds to print a page in a comparative test of printers.





Yamaha QY 22

Ever had the urge to write music on the train, or perhaps on the beach? Yamaha's QY22 integrates a General MIDI synthesiser, an eight-track MIDI sequencer and a keyboard in a box smaller than a VHS cassette. It looks and sounds great, but will it prove as popular as Rolf's Stylophone?

We think so. Contact

Yamaha Kemble on

01908 366700. Price **£408**. Available August.

Gadgets

PCW Gadget Photography by David Whyte



Panasonic PD System

Panasonic hopes its PD system will be the future of optical storage. This £549 SCSI device takes 650Mb rewritable optical cartridges costing £39 each and uses Panasonic's own Phase Change technologies. You want more? It's also a quad-speed CD-ROM drive. Blimey, that is good. Full review next month. Contact **Panasonic** on **0800 444220**. Drive **£549**; media **£39** each.





Sony Playstation

Destined to do for video games what the Walkman did for music cassettes, the Sony Playstation is the business when it comes to games consoles. With a 32-bit RISC processor, 3D graphics and a smart design, it finally brings true arcade quality into the home. Time to say sayonara, Sega? Released in the UK in September, the Playstation will cost **£299**.

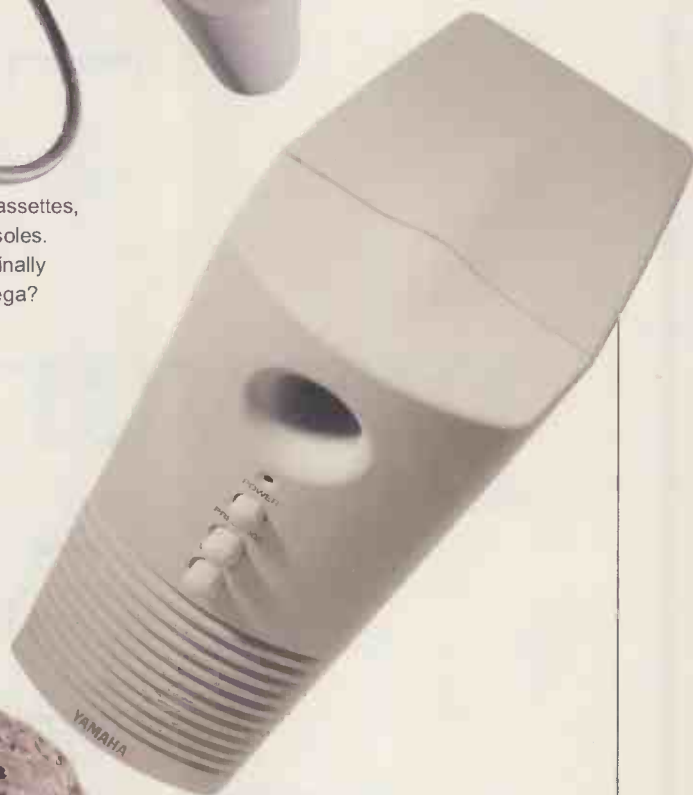
Sony Computer Entertainment is on **0171 911 8200**.

Full review, page 96.



Sony Spresca 920

If you have **£1,525** to spare, you might like to have a go at writing your own CDs. The Spresca fits into a 5.25in drive bay and is capable of writing data, audio and mixed-mode discs at double speed. It comes with Corel's CD authoring software, CD Creator. Contact **Sony** on **01932 816000**. Price **£1,525**. *Full review, page 182.*



Yamaha YST-M5

The M5s have been specifically designed for multimedia and are shielded so as not to damage your PC's monitor. They provide 6 Watts per channel audio output and will work with every sound card, personal stereo, and the QY22 featured here.

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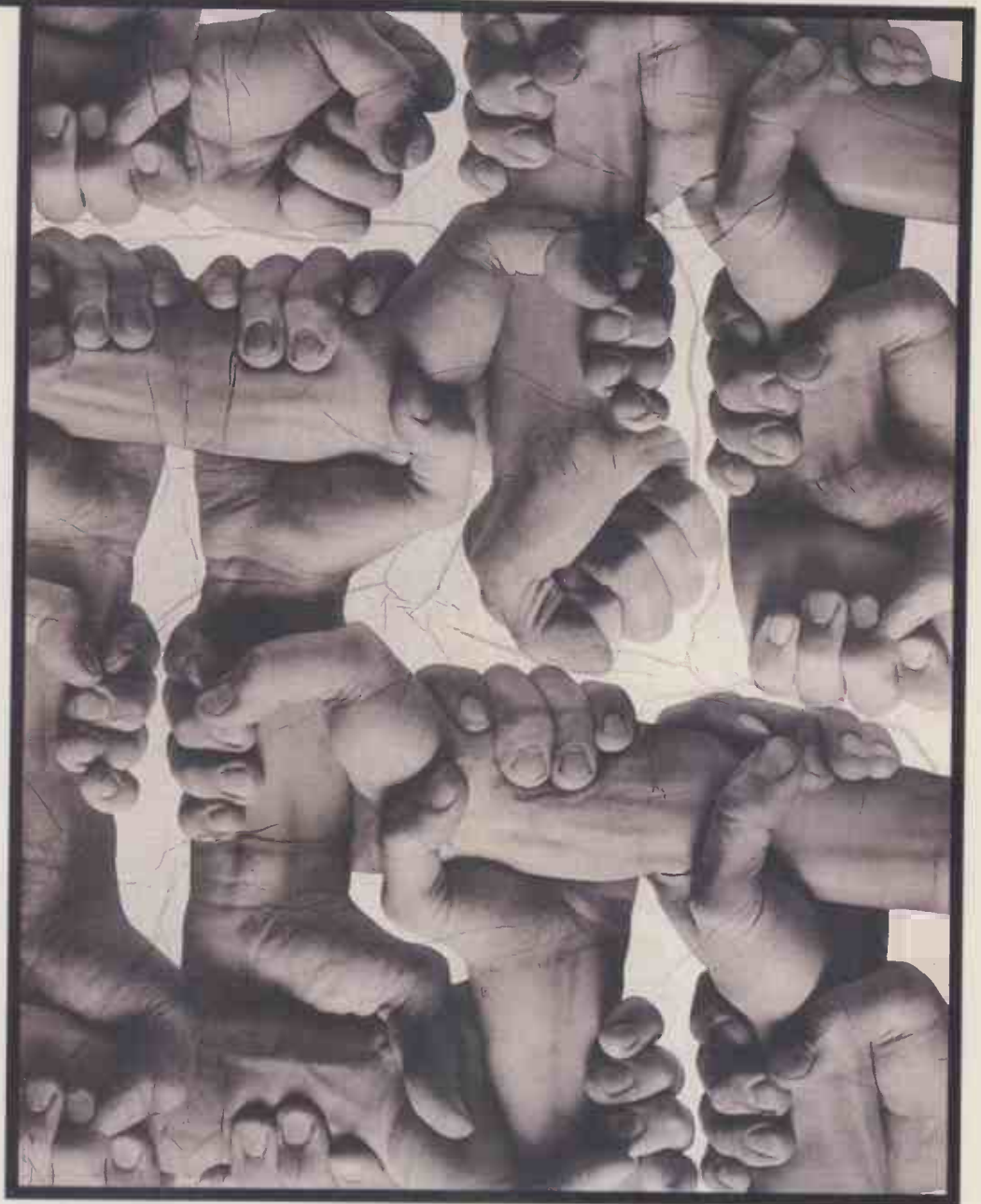
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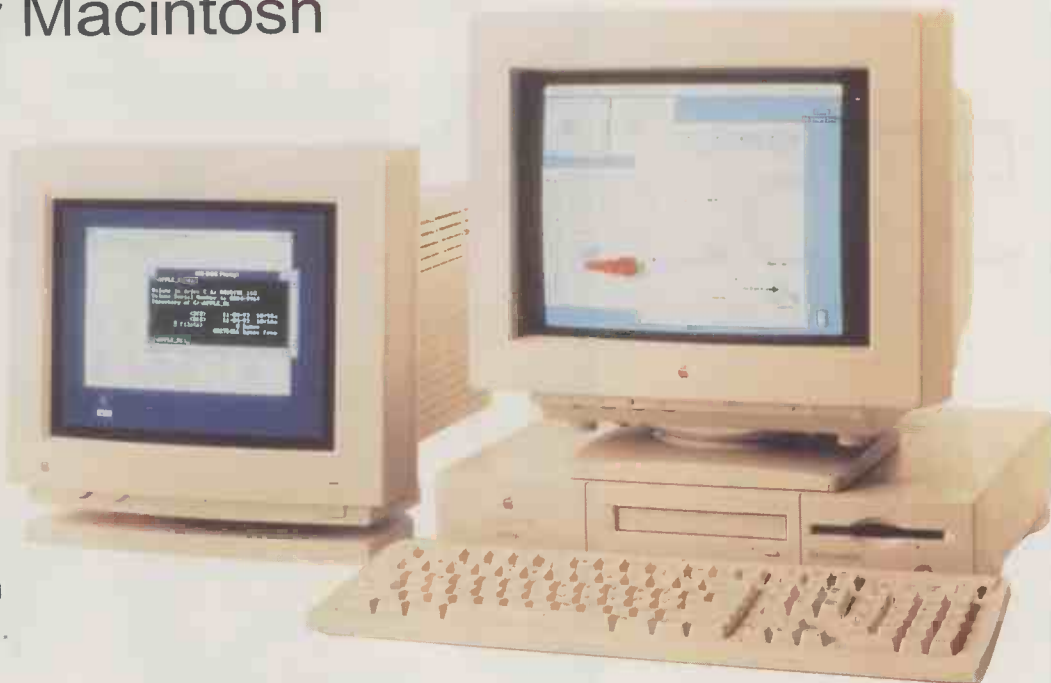
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HARDWARE

Apple Power Macintosh 6100/60 DOS Compatible

If you want a Mac but just can't tear yourself away from the delights of DOS (or Doom, for that matter), then this system is heaven sent. It put Gordon Laing in a world of his own.



When choosing a computer, for business or personal use, ask yourself what you want to do with it — no-one wants to make an expensive mistake. Consider your expectations, budget, the applications you want to run and the systems you want to be compatible with. DOS-based systems may be some of the least elegant around but undeniably have the greatest momentum, so compatibility with these machines is important.

Apple has long realised this, fitting its Macs with increasing degrees of DOS compatibility over the years. A utility now standard with the Mac OS allows the machine to read and write DOS formatted floppies. This, along with file filters, or even versions of the same application across both platforms, has enabled users to exchange documents fairly easily.

But some apps aren't available for the Mac, and some people just want Windows. Apple has solved this in two ways. The first was SoftWindows, running Windows emulation under the Mac OS. But it couldn't do everything, and even on the fastest PowerPC-based Power Macs, it was slow.

Apple's latest solution sounds extreme at first, but is actually the best so far: physically offer a Macintosh card with an Intel processor on it. Enter the DOS-compatible card, right now only available for the 6100 range of entry level Power Macintosh machines, featuring an Intel 486

DX2/66, its own video memory, a SIMM slot for RAM, and connecting to the processor direct slot. It's been out for a few months, but this is our first look at it. Apple supplied us with the Power Macintosh 6100/60, similar in speed to a Pentium 60, with 8Mb RAM on the Macintosh motherboard and the DOS card already fitted. "Card" is a poor description, actually, since the peripheral in question is more the size of an internal CD-ROM drive and occupies the rear left corner of the case; this still leaves plenty of room for an internal CD-ROM drive if you wish.

If you buy a 6100 with the DOS card already fitted, then you'll find the suitable drivers, MSDOS 6.22 and Windows 3.1 preinstalled by Apple. Clearly as part of some cunning plan, our Mac came with the hardware installed but no evidence of any software. Rummaging in the box produced a fair wad of disks and a manual dedicated to the impending task; it would at least clarify a few questions I had in mind.

First is the installation of the Macintosh software, which informs the host machine of a DOS presence. Five extensions, covering the PC clipboard, print spooler and network, are installed from a single disk along with three control panels: Macintosh Easy Open, PC Exchange (for reading and writing to DOS formatted floppy disks), and the most important, PC Setup. This latter, responsible for the PC hardware setup

from the Macintosh, is shown in the accompanying screenshot [page 72]. Eight boxes over two rows select and allocate PC drive partitions, shared drives, comm ports, memory, audio and display. At startup, the top four selections are accompanied by large question marks, awaiting your preferences.

Before anything else, you have to create a partition for the PC's C drive. Pulling down the appropriate menu prompts you to specify a size and location for the required "drive container". I set mine for 100Mb and placed it in the root of the Mac hard disk, where it sits looking like any other folder until you try to open it. If the PC is in use, you can mount it as a read-only volume. A second optional partition, drive D, may be set as shared drive space between both platforms.

Unsurprisingly, the DOS card requires RAM, either installed in its own single 72-pin SIMM slot or shared from the Mac's own resources. The former is far preferable for performance but is the exclusive property of the DOS card. If no SIMM is installed, you must assign some of the Mac's RAM. The portion you set is entirely devoted to the PC and unavailable to the Mac unless you reset it to zero and restart your machine.

Our DOS card came with a paltry 4Mb SIMM, just enough to run Word 6 under Windows but not to launch Doom or Descent after all the suitable Apple

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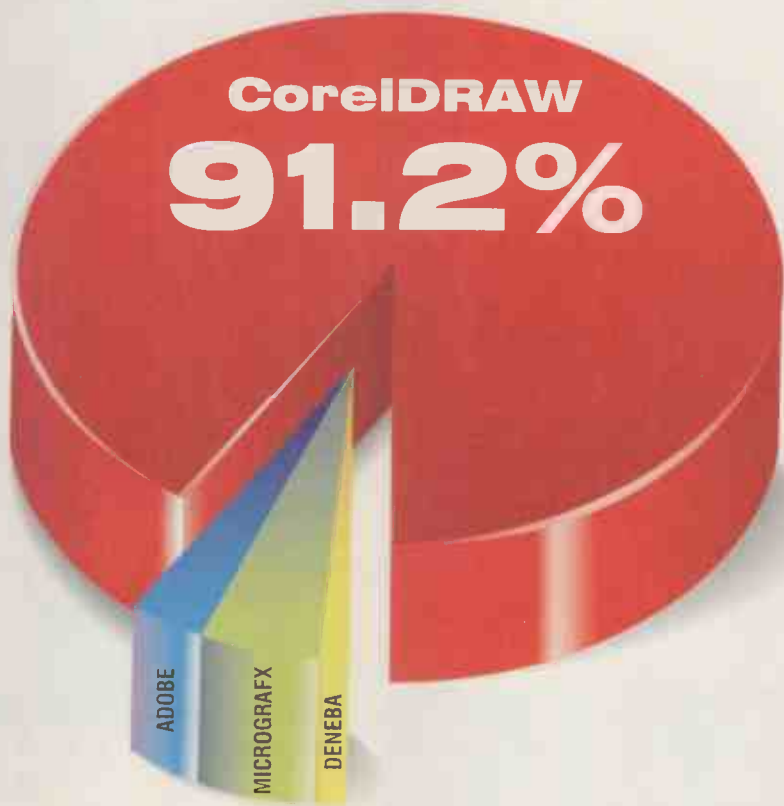
Company	Units	Sales
Corel	7609	1,586,519.83
Adobe	257	73,968.64
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Product	S.L.P. (U\$)	Overall weighted score
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PC World,
Best Buy Award,
April, 1995

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drivers had been loaded. As with any PC, we recommend 8Mb minimum. Sharing the Mac's RAM is very slow and should only be chosen if you rarely use the PC side.

Next you must configure the display, which is limited by the Macintosh monitor you have connected, regardless of whether it is being used to display the PC information. We connected an Apple 16in display, which switches the Macintosh to 832 x 624 resolution; the standard 6100/60 will support this resolution in 256 colours, or 640 x 480 in thousands.

The display options with this monitor connected offered a choice of VGA, Apple 14in and Apple 16in. The DOS card is fitted with 512Kb video memory and comes with Windows drivers to do 640 x 480 in 256 colours, or 800 x 600 or 1024 x 768 in 16 colours. Using the supplied video cable, it is possible to have a single monitor switch between environments, or use two separately. Unfortunately, due to the connection of the Mac 16in monitor with a top resolution of 832 x 624, it would not allow me to use the 1024 x 768 driver even when in a dual monitor configuration.

With a hot-key defined (Apple Return by default) I entered the PC environment, which demanded an OS. Apple supplies three tell-tale disks with MSDOS 6.22 on them. One familiar installation later, and I had a C prompt and the usual DOS configuration files to play with.

Rather than install Windows from floppies I went for a network install off our Novell server. I installed the standard Novell client software but was stumped when it asked what network card I was using. Apple claims that its Ethernet port along with supplied drivers is compatible with Novell's ODI specification and can use the IPX and TCP/IP protocols. I selected the manufacturer's own driver, inserted one of the few floppies I had left, and rejoiced when the words "MACODI driver" were offered.

Once connected to our Novell server, I installed Windows and my daily applications. Both IPX packets on the PC side and AppleTalk packets on the Macintosh side merrily co-existed over the same Ethernet port and transeiver.

Launching Windows I installed the remaining Apple drivers to support the shared clipboard, CD-ROM drive and sound hardware. A rather neat implementation is the latter, which emulates a SoundBlaster 16.

It's not just the sound ports you can share over both platforms, either. The

The PC Setup control panel lets you configure the DOS card with ease

Macintosh serial ports can emulate 16450 serial interfaces as COM1 and COM2 from the PC setup control panel. The Macintosh printer port can emulate a PC XT/AT parallel port as LPT1. The supplied video cable for the DOS card offers a DB-15 joystick/games port.

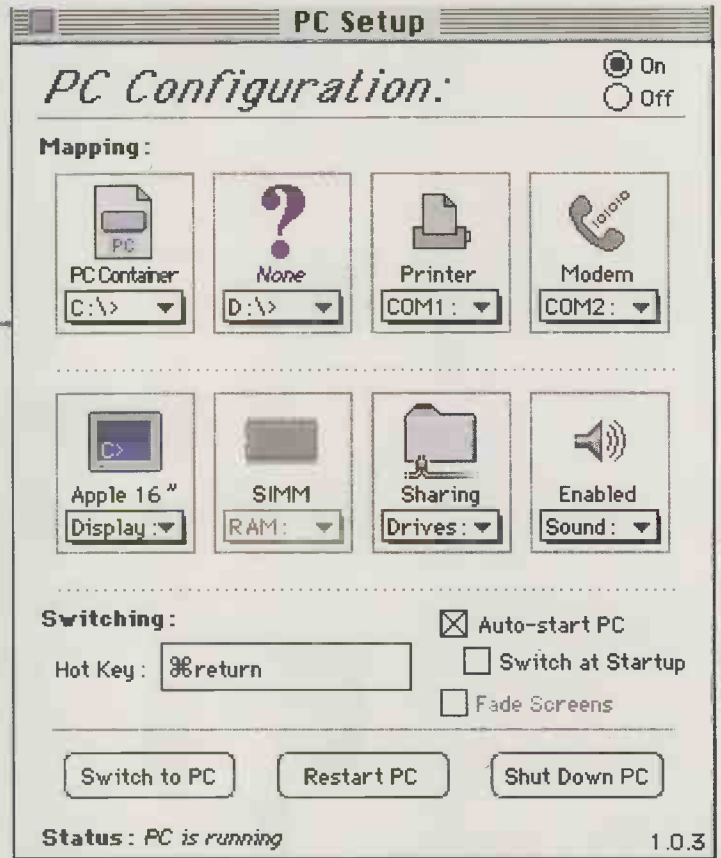
Perhaps best of all is that you

share the mouse and superb Apple keyboard over the ADB chain. The Macintosh extended keyboard may be expensive, but is widely regarded by many, including myself, as one of the best keyboards around. You share the same floppy drive over both platforms too, the eject button in the PC environment replaced by the keyboard combination Apple E.

I'm lucky enough to have both a PC and a Mac on my desk at work, both Ethernetted to the same Novell servers but feeding into separate video inputs of the same excellent Taxan 2100LR monitor; simply press a single button on the monitor's front panel to switch between environments. It works well, but there are disadvantages. Two keyboards and mice, two CD-ROM drives, two sets of sound hardware and speakers; in fact, two sets of everything apart from monitor.

The only way I can share files is to save onto a network drive, close the file, and reopen it into the other platform. Being able to copy and paste between platforms using the DOS card on the 6100/60 is absolutely incredible. Using a single monitor is no big deal for myself, but sharing the one wonderful keyboard and mouse is a joy to behold — I hated returning to my cheapy PC keyboard.

The 6100/60 with DOS card seemed to work with everything I threw at it: copying and pasting a variety of information



across the clipboard, integrating seamlessly with our Novell servers using IPX, TCP/IP and AppleTalk protocols, and playing demanding DOS games complete with SoundBlaster audio.

To be honest, the latter is perhaps what the DOS card is all about. Mac games are great on the simple arcade shoot-em-ups but can't touch the DOS splendours of Doom, Descent and X-Wing. Seeing Windows and some obscure applications run is impressive, particularly using the shared clipboard, but System 7.5 offers everything I want from a GUI. Games playing is virtually all I would really use the DOS card for, and it could justify itself to many games addicts who don't want the inconvenience or expense of two systems.

On the downside, there's only 512Kb of non-expandable video memory. Most PC users today, myself included, expect 1Mb minimum, and fitting this would hardly have broken Apple's bank. Sharing the Mac's RAM was very slow and should only be used in a case of financial emergency. More importantly, the DOS card may only be fitted to the 6100/60 or 6100/66 models, and the processor is a 486 DX2/66, which today is considered entry level.

Apple is clearly waiting to gauge sales of the DOS card before it extends the product line, or even produces this model

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in large quantities: when phoning around I found it extremely difficult to find any supplier who had one in stock. I would personally like to see a version with a Pentium 90 and at least 1Mb of video memory for the 8100 series of Power Macs. Perhaps Apple is wisely waiting until the Power Macs with PCI come out, which could possibly share some high-end PCI hardware across both environments, including fast video and I/O.

In the meantime, if you have a Power

Macintosh 6100 and understandably yearn for excellent DOS games, or curiously yearn for the occasional dabble in Windows, this is the hardware from heaven — and a bargain to boot. If you've got about £1,800 to spend on a system, fancy a Mac, but need reassurance that there's a PC to hand, you should also seriously consider it. Just make sure you've got some RAM to feed the DOS card unless you don't mind hanging around.

PCW Verdict

The ultimate solution for those who want a Mac but are scared to take the plunge, or for those who've taken the plunge and envy nothing but DOS games.

Typical Street Prices DOS card £395 with 8Mb RAM fitted; Power Macintosh 6100/66 8/250 with 15in monitor and 8Mb DOS card, around £1800

Contact Apple 0181 569 1199

HARDWARE

IBM 755CX

This new-generation Thinkpad has many nice features in addition to its infra-red communications port, and an excellent SVGA display, but Simon Rockman was disappointed with its performance in view of its clock speed. And for buyers on a budget, the 370c is also considered.

The IBM 755CX is a Pentium model with a lot of great features but unusually, given the 75MHz clock speed, disappointing performance. It has PCMCIA slots, parallel and serial ports, a docking station connector mouse and keyboard connectors. It also has some features which are less usual, such as a memory slot which takes an IC RAM card in addition to the standard DIMM expansion.

A DSP (digital signal processor) provides support both for SoundBlaster-compatible sound and a fax/modem. And there are features which make this machine really special, such as a type III trackpoint pointing device (joystick) and the display (see later).

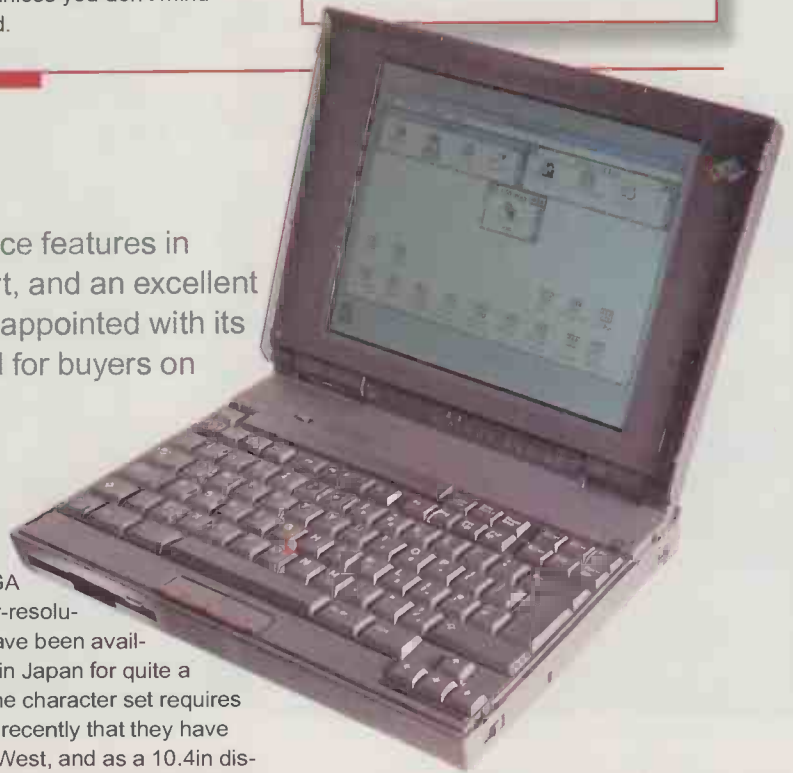
One area in which all recent IBM Thinkpads have excelled is in their Lego-like construction: lifting the keyboard and battery allows the hard and floppy disk drives to easily be popped out. The machine is available with hard disks up to 1.2Gb. The weight of the 755CX, including battery, is 2.75kg (6.1lbs).

Battery life is excellent, although the Lithium Ion only lasted three hours (which is at the bottom of the quoted range) compared with the nine hours maximum. The external power supply is innovative in that the plug slots neatly into the top of the small brick when the cord is wrapped around it. A bar of eleven LEDs indicates the status of everything, from the battery to the disk drives, to the PCMCIA card slot.

The CX model has an excellent 800 x 600 SVGA display. Higher-resolution screens have been available from IBM in Japan for quite a while (where the character set requires it) but it is only recently that they have made it to the West, and as a 10.4in display it is very readable. For compatibility, it is run in 640 x 480 in DOS mode: this is not done by scaling everything up, but by using just the centre of the screen.

Trackpoint is perhaps the best of the pointing devices available and this latest incarnation is the best yet, although the sandpaper-like texture on the nipple can be irritating. It is removable, however, and IBM ships replacements with the computer. The buttons are much improved as they can be slid towards you and locked to prevent accidental operation. This will be even more important when running Windows 95, which makes extensive use of the right button. The lock can be used to make it easy to click and drag an icon.

Controls above the keyboard include a rotating wheel for the volume control and a slider for the screen brightness, which is good enough for anything but working in direct sunlight. There is a built-in speaker above the keyboard and a microphone built into the lid, and the smart, black, case completes the picture.



Performance was a little disappointing; not quite up to that of the similarly powered NEC Versa P75 (PCW July 1995) but when running the pre-installed OS/2 it felt great, partly because the Lexmark keyboard is very slick.

The on-line documentation, supplied in both Windows 3.11 and OS/2 versions, contains the same information as the excellent paper manuals. The other software supplied is similarly slick, with the power shutting down gracefully from operation to standby, suspend and hibernation. The latest-generation Pentium processors run at 3.3v externally but 2.9v internally, which not only conserves power, it keeps the heat down, too. There were no heat problems with the review machine.

The 755CX is one of the new generation Thinkpad machines with an infra-red communications port. This will talk to other, similarly equipped, Thinkpads at 1.15Mb/sec; to some other devices running to the IRDA specification at

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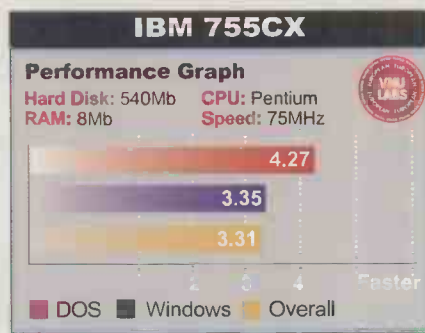
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115Kb/sec; and to the Sharp IQ at 9,600bps. The ports need line of sight communication to work, but with Hewlett Packard joining the specification, they provide a simple way to link up to a printer. There are infra-red windows on both the front and back of the computer.

In addition to the 755CX we also considered the ThinkPad 370c, for users with a lower budget. This has a TFT colour screen but uses a 75MHz DX4 and a Nickel Metal Hydride battery. The overall design is similar but there is no DSP, and hence no sound. The pointing device is a

Trackpoint II, which performed well. The external power supply is of the same



innovative design as the 755CX. Battery limitations are balanced by the reduced power consumption of the smaller screen, and the lack of sound.

PCWVerdict

A smart machine crammed with features. This latest Thinkpad confirms IBM's position as an innovator in the field.

Price 755CX, £5,025; 370C, £2,535

Contact IBM 0345 727272.

Fax 0345 720072

SOFTWARE

Corel CD Office Companion

This CD aims to be all things to all people, and almost succeeds. Not all the modules are perfect, but everyone should find something of use. Paul Begg was impressed.

The Corel CD Office Companion gives you practically everything you won't find in an office suite such as PerfectOffice or Microsoft Office. You get an Internet browser and fax communications software, a fabulous collection of reference books, a correspondence library, a Personal Information Manager (PIM), business graphics and fonts, multimedia utilities and system diagnostic software.

Not every module is brilliant — CorelFax was a bit of a let-down because, although I could work around it, the phone number fields were too small for the now widespread five-digit area code. But in the short time I had in which to evaluate it, I must say that Office

Companion impressed me.

Particularly impressive was the Lotus Organizer-like Personal Information Manager. With a couple of tweaks here and there, this could out-organise Organiser 2.0. It's based on technology licensed from Time Systems, of Phoenix, Arizona, who apparently have 17 years of paper-based time management and two years of electronic time-management experience. The Organiser — sorry, Corel Planner — has a comprehensive calendar featuring daily, weekly, monthly and yearly planning calendars; an Address database that passes muster as a compact contact manager complete with an automatic phone dialler. There's possibly the most detailed to-do section I've seen, plus goal and expense tracking capabilities.

You get CorelFlow 2.0, a flowcharting program. The only difference between this and the full standalone version is that the clip-art and photo

libraries have been modified. It features drag and drop, 2,000 predefined symbols, more than 30 connector styles (that's the way you connect the boxes), direct text and line editing, and a built-in spell checker.

Corel Gallery 2.0 doesn't have the video clips that come with the standalone version, and the photos have been changed and reduced in number, but otherwise you get a powerful multimedia file manager featuring 15,000 clip-art images, 500 TrueType fonts, 200 photos and 75 sound clips. Also included are Corel Capture, a flexible and very neat screen capture utility that's almost as good as Screen Thief (although it won't save in anything like as many formats, which is its weakness), and Font Master, a TrueType font manager that gives you more information about your fonts than you're ever likely to need, but also lets you install and uninstall fonts on the fly.

I was very pleased with the Corel Bookcase module, which contains six integrated reference volumes. The Concise Columbia Electronic Encyclopedia, with 33,000 cross-references and thousands of facts; Webster's II: New Riverside Dictionary, with 59,047 definitions and 3,000 synonyms; Simpson's Contemporary Quotations, containing 9,000 quotations from 4,000 sources in more than 20 categories; and the 1995 Information Please Almanac, three volumes covering general topics, sports and business. In addition to all this you get a Correspondence Library containing over 700 standard-form letters for a variety of business correspondence. These are very useful for those awkward letters we have to write now and again.

With the hype surrounding the Internet, and in particular the World Wide Web, surfers and would-be surfers will probably welcome the Corel Web Mosaic. Back in



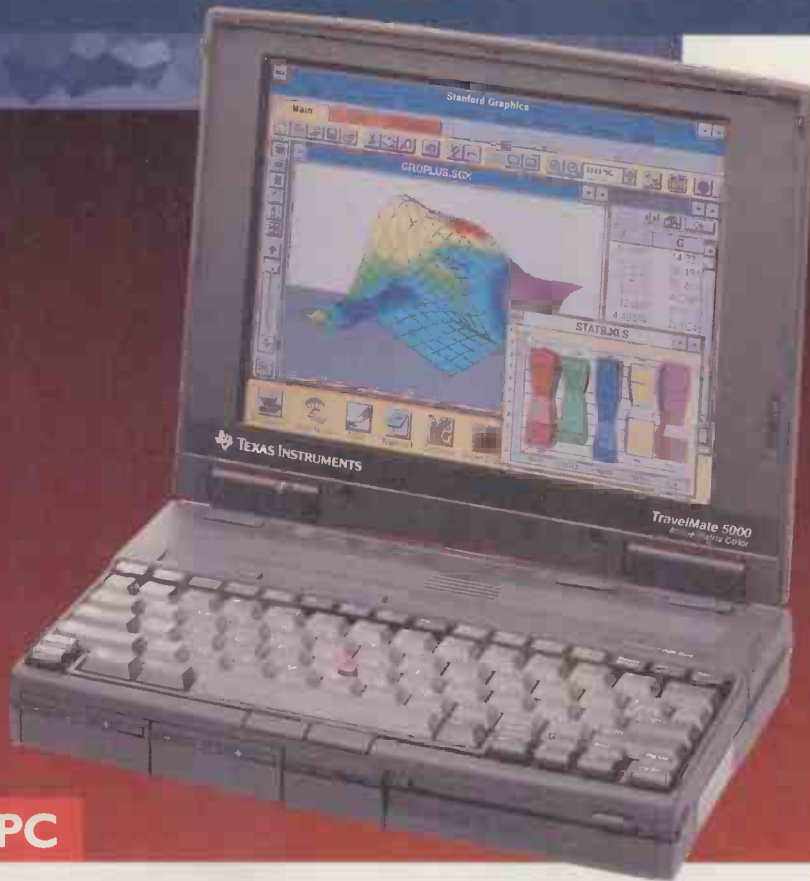
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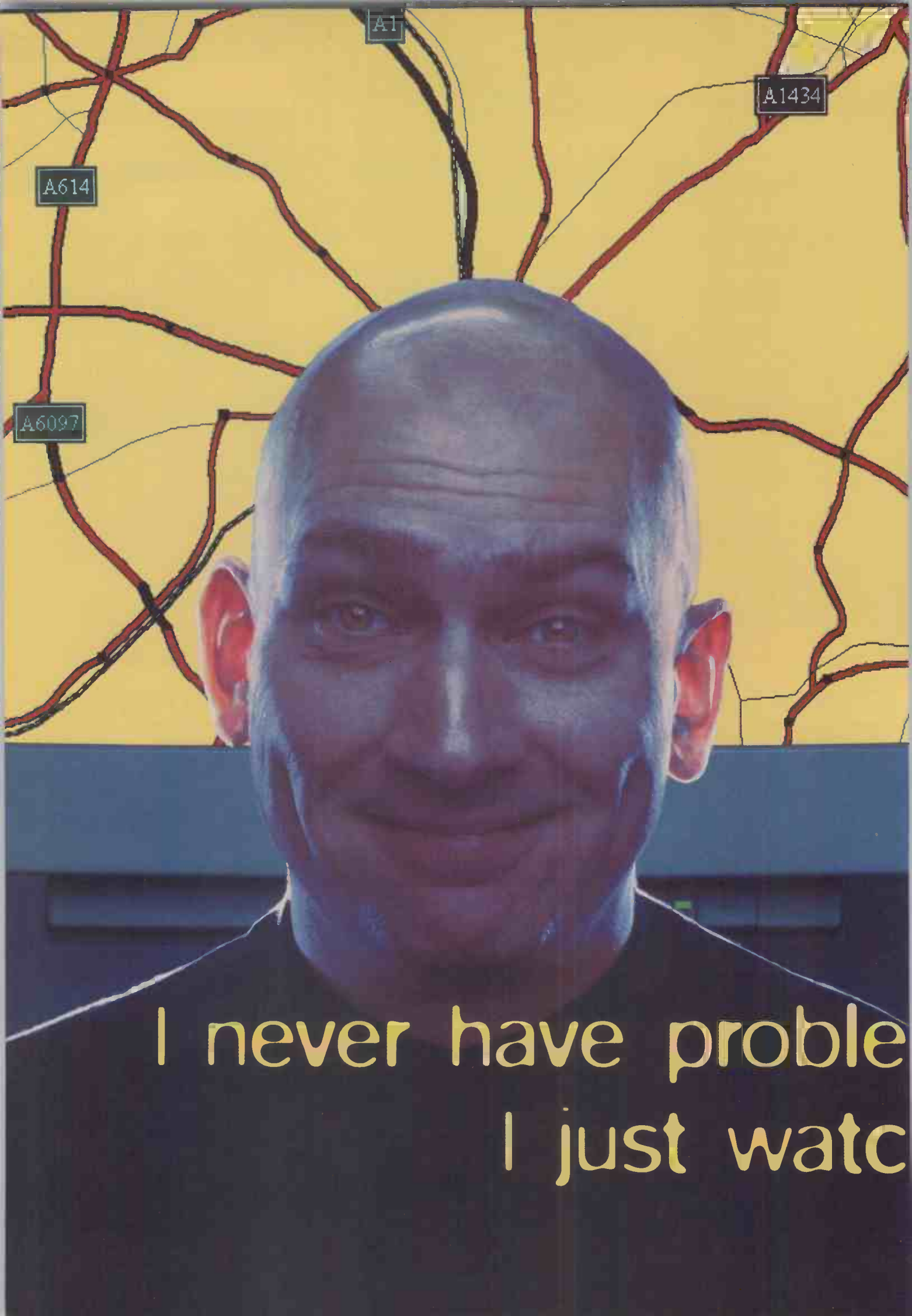


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April, Corel announced the license of Enhanced Mosaic, a World Wide Web browser, from Spyglass (who in February had released Enhanced Mosaic 2.0). This is claimed to be the most advanced browser on the Internet today. Features include built-in JPEG and GIF viewers, direct support for AIFF and AU audio formats, and a hot-list/history box to keep track of your favourite Web sites. It also includes the Internet email capabilities of Eudora licensed from Qualcomm.

And while on the subject of comms, there's the aforementioned CorelFax. It includes an integrated phone book and

allows users to fax directly from within any Windows application.

You get CD Audio, a nice utility that makes playing audio CDs on a standard CD-ROM drive a pure joy. There's CD Office Screen Saver, for creating a screensaver from your own photos. There's also a Wallpaper Flipper which changes your wallpaper automatically each time you start Windows.

Finally, you get Wintune 2.0, a system diagnostic utility from the US *Windows Magazine*, and WinDAT, a WAV file editor that lets you record and edit sound clips.

There's a lot packed onto the Office

Companion and most people should find something here that they'll use regularly, albeit only the PIM or the library of reference books. But the rest of the collection is worth having. I was genuinely impressed

PCW Verdict

A good, solid workhorse which has proved reliable under adverse conditions.

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HARDWARE

Dan Ultimate PC

What's in a name? Everything, if this Dan is anything to go by. It's fast, future-proof and a very good deal, says Nick Lawrence.

As a later entrant to the P133 market than the five manufacturers featured in last month's *PCW*, Dan Technology is nevertheless trying to make ground over the competition. Its Ultimate boasts many of the same features as the others we have seen: an Intel Triton chipset, EIDE on PCI, and a Stealth 64 VRAM with 2Mb memory. It also includes some not so common components.

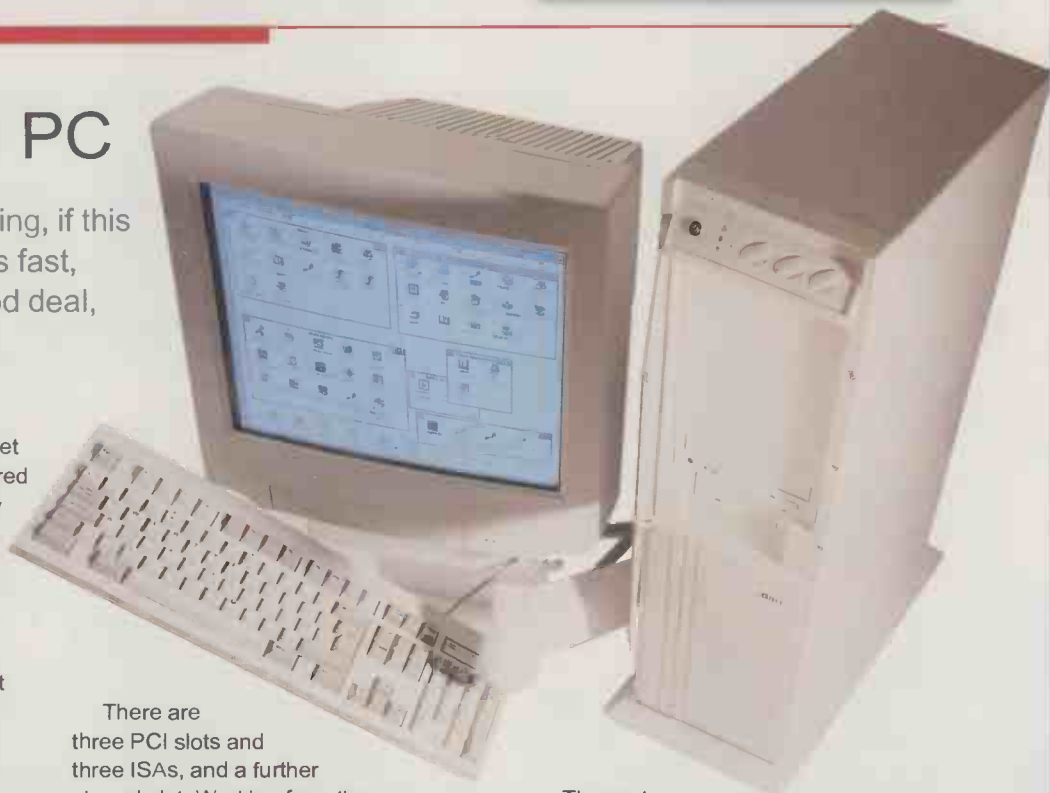
There is room for expansion in the large tower case. Of the six 5.25in drive bays, one is filled with the CD-ROM drive, a quad-speed Toshiba XM5302B on EIDE, and the two 3.5in drive bays are filled with the floppy drive and the hard drive, an 850Mb Seagate ST5850A. The hard drive and CD are on separate channels.

The motherboard is made specially for Dan in the Far East and uses the Triton chipset. It is very close in design to the Intel Aladdin, supporting EDO RAM (in this system there is 16Mb in the form of two 70ns SIMMs; there are four SIMM sockets in all) and a soldered-on 256Kb pipeline burst synchronous cache. Future motherboards will, like the imminent Intel Endeavour, support the "cache on a stick" which allows different cache options such as 512Kb pipeline burst cache or SRAM instead.

There are three PCI slots and three ISAs, and a further shared slot. Working from the bottom ISA slot up, there is a Sound-Blaster AWE-32 Value edition with 512Kb RAM, a BT-approved Dan fax/modem with 14400bps throughput capability and a Rockwell chipset, and a 16-bit network card approved by Novell for connection to NetWare with 10BaseT and thin Ethernet connections. One of the PCI slots is filled with the ever-popular and aforementioned Stealth 64 VRAM with 2Mb, but more interesting is the slot located between the PCIs and ISAs. This has both PCI and ISA connectivity (it can be used as one of the former but not one of the latter), and functions as a proprietary slot for Dan. Chris Bakolas, technical director, says that this is being reserved for future proprietary cards covering multimedia and other fields, though there are no concrete plans as yet.

The system is as future-proof as possible, featuring a Socket 7 and a VRM, enabling upgrades to a P6 Overdrive (unless Intel changes the specifications). A Plug and Play BIOS and Energy Star provide good extras. A thoughtful touch is the stickers on the case which list the DMA, IRQ and base address of each of the included devices, which can prevent headaches when you're trying to install another card and you don't know which addresses are free.

Dan has included a large array of bundled software. Apart from the standard DOS and Windows, the Microsoft bundle includes Scenes, Money, Works for Windows and Encarta 95. On top of this there is Lotus Organizer 2.0, COMit Lite and WinFax Lite to utilise the fax/modem hardware, FontAware for graphics gurus, and the Xing MPEG Player so that MPEG

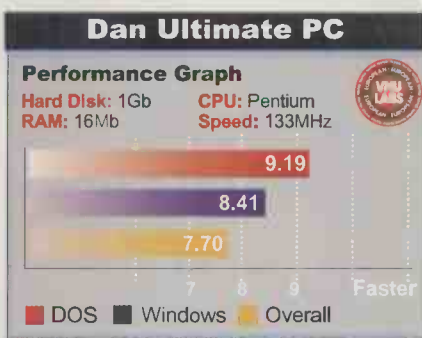


movies can be decoded in software (which yields pretty good results, but then, this is a P133).

The monitor is a Dan-badged 17in Sony Trinitron with a good display and a dot pitch of 0.26mm. The usual controls are supplemented with pincushion/barrel and picture rotation controls. This rounds off what is a very good system indeed, if you have the space for such a big case.

With a price tag of £2,903 (this becomes £2,962 with the 1Gb hard drive configuration that has now become the default) this computer is a good deal compared to the other P133s we have

seen. Its VNU Labs test score came in as an overall 7.70, just behind the fastest two of our P133s featured last month, the



Dell and the Elonex; its Windows score was even better, coming between the two. If you do want all the bells and whistles, with room for more expansion besides, you couldn't get a better deal than this.

PCW Verdict

A well-named PC — absolutely the ultimate.

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Contact Dan Technology 0181 902 9922.

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SOFTWARE

Uninstaller 3.0

Despite the increase in bundled uninstallers, this latest upgrade of the veteran program is still a highly worthwhile investment, reports Paul Begg.

During 1994, Uninstaller 2 sold 500,000 copies. This placed it firmly in the top ten application bestsellers, but as observed in the uninstaller round-up (PCW, June '95), this innovative piece of software needed an upgrade to bring it into line with the burgeoning competition. The upgrade is now with us and it puts Uninstaller equal with the best of the rest, but offers little to push it ahead. Nevertheless, while I was considering uninstalling Uninstaller, now I'm going to stick with it.

But let's face it, uninstallers shouldn't be necessary. Why should we accept software that doesn't uninstall itself as cleanly as if it had never been installed? Uninstallation should be part of the software or at least built into the operating system — and Microsoft obviously agrees. It has insisted that every software vendor wanting to use the Windows 95 logo must include with their software an uninstaller that removes all files and folders copied onto the hard drive, except for DLLs shared with other applications and, of course, user files. The uninstaller must also remove Start Program shortcuts and all Registry entries.

This is great news, but does it mean that uninstallers are now a terminally ill software category? Should you consider buying an uninstaller? Should you even consider upgrading to Uninstaller 3.0?

The answer is "yes". It remains to be seen how effective bundled uninstallers will be when handling shared files, but I imagine they will have to be pretty effective since the accidental deletion of a shared file could render other applications useless. So, if the uninstaller is effective in this area, then the main reasons for buying an uninstaller seem to vanish.

So why do you still need an uninstaller? Well, the best of these packages no longer simply uninstall — they help you manage your applications more efficiently. Indeed, instead of being called uninstallers, they could more accurately be called Application Managers. They can be used to identify directories and files for deletion, move directories and subdirectories from one drive to another, archive little-used programs, and transport programs intact from one computer to another.

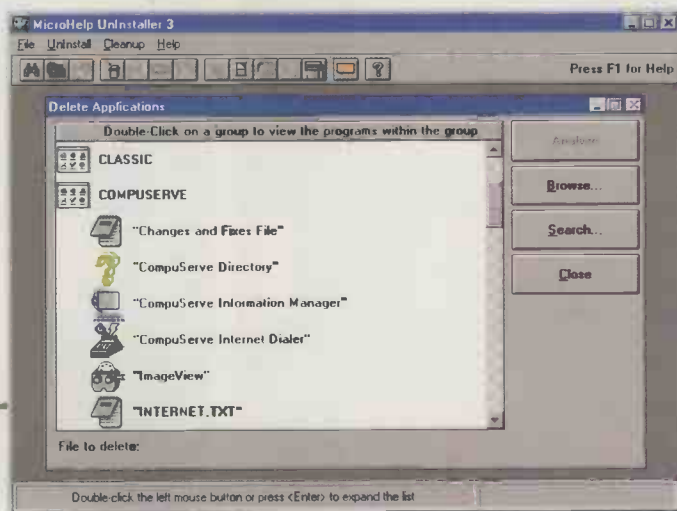
The brain of Uninstaller 3.0 is its SmartLinks technology, much improved in this version. This analyses your hard disk(s) and

Select the application you want to uninstall

gathers all the information about which files belong to which applications, making a careful note of files shared by two or more applications. And according to MicroHelp, SmartLinks establishes the inter-dependencies between files with a near 100 percent accuracy, thereby diminishing the risk of deleting files shared by other applications.

In other words, SmartLinks gathers all the information about your applications, including entries in and changes to Win.ini, System.ini etc. This means that deletion is effective and near 100 percent. But the data accumulated by SmartLinks can be used in other ways. For example, SmartLinks lets you safely Move, Archive and Transport files and directories, while keeping all preferences and Windows settings intact. These are features new to Uninstaller 3.0.

Archiving seldom-used applications and data into space-saving compressed storage, yet having them available when needed with no more than a double-click on a dummy icon, is a great way of



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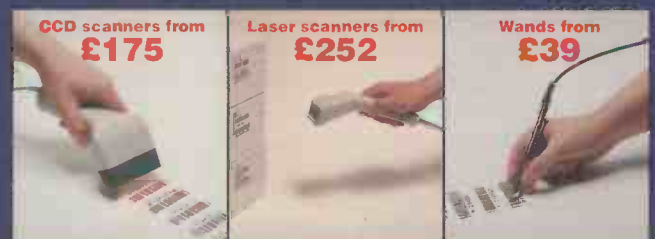


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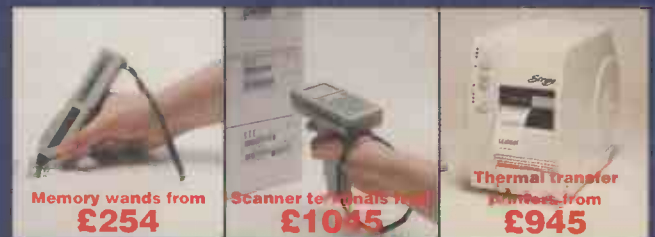
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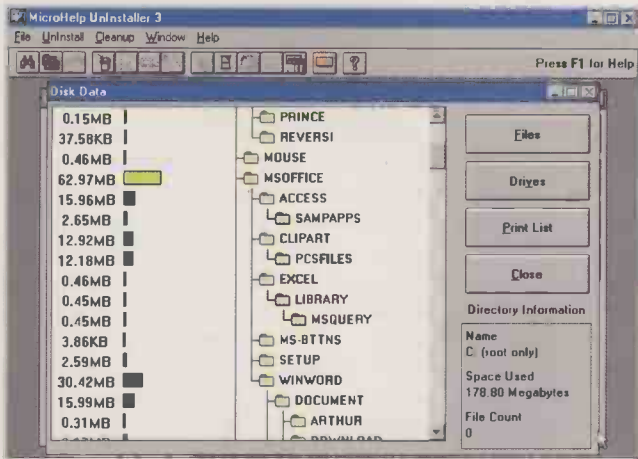
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Want to know which of your applications are gobbling up the most disk space? Uninstaller 3.0 will tell you

And an extension of this is the Transport feature that lets you transfer an application to another PC.

The Duplicate File Finder has been greatly improved and

can now be used to find files based on specified criteria such as file date and size, whereas before it simply looked for files with the same name. The Orphan Finder has been improved too, and like Duplicate File Finder, searches across drives.

Uninstaller 3.0 is currently compatible with 16-bit applications running under Windows 95 and MicroHelp promises a free update within 90 days of the Windows 95 shipdate. This should be available from the MicroHelp BBS, the MicroHelp forum on CompuServe, or, at a small charge, by ordinary mail.

The only utility you won't find in other

uninstallers is the new Disk Data utility, which gives you a simple colour-coded bar chart of your directories so you can quickly see which are absorbing the most space. Then you can analyse the sub-directories, choosing to delete unwanted space-hogging files or archive the directory.

Uninstaller 3.0 coped with everything I threw at it (except it flatly refused to uninstall Uninstaller 2.0), but it can be very slow. By the time it has established what can be deleted, performed the deletion, compressed the files, and adjusted SmartLinks and the Orphan data... well, you'll have a fair idea what it's like waiting for my daughter to get out of the bathroom in the morning.

I wish Uninstaller actually took over installation and kept a text file recording the process, but overall this is a good upgrade that puts Uninstaller up with the very best of the competition.

PCW Verdict

A worthwhile upgrade and an uninstaller to consider if you haven't got one — even if you do plan to move to Windows 95 wholesale!

Price under £50

Contact MicroHelp 01703 814822

HARDWARE

Visioneer Paperport

One of the smallest scanners currently available found its way onto Adele Dyer's desktop. It was easy to install and use, and its accuracy impressed her.

Desktop scanners may be the bees knees when it comes to colour photography, but for simple OCR (optical character recognition) and document management, they are unnecessarily large. Large is certainly not the word to describe the Visioneer Paperport; it has been designed to sit between your keyboard and monitor, and is one of the smallest scanners on the market. It measures only 12ins long, by 3.5ins high, by 3ins deep.

The Paperport is easy to install; there is no messing around in the inner recesses of your desktop because it plugs directly into a free serial port. Once installed, the process of learning

how to use it is painless.

The software is launched automatically by feeding a sheet of paper into the scanner. Having snatched the paper out your hand, the software's desktop appears and its entire functionality is revealed. It looks like Windows 95 and you are mollycoddled by its assumption that all users are computer-illiterate technophobes. The document appears on the desktop as you scan and then becomes a thumbnail rendition. Everything else you need appears as icons, including the printer; word processor application, folders in which to save scans, and fax software, if you have it.



You can either view the document, enlarging it as necessary, or drag and drop it onto the relevant icon.

If you want to OCR a document, you drag the thumbnail onto the word processor icon. The OCR automatically launches, followed by the WP, so all you have to do is sit and wait for the document to appear in word-processable form. The OCR itself is quick, and of course the entire process is accelerated by not having to launch anything yourself, or even open the relevant documents.

The accuracy of the OCR was very impressive, especially when dealing with faxes, which are notoriously tricky to OCR correctly. I even tried scanning a newspaper article, which appeared

across two columns, and was amazed when it arrived in Word with only four mistakes in a 300-word article. If you already have Omnipage or Wordscan, it will automatically detect this and show them as buttons on the desktop.

The same facilities are available for your fax/modem. You can drag your document onto the fax icon and it will link the document to your fax application — a useful tool for sending images such as maps. By the same token you can easily print out scanned documents. This may seem to be of limited value but for home users, without recourse to a panoply of office equipment, documents can be scanned in and printed, bypassing the need for a photocopier.

Saving is easy: Paperport keeps its own folders on the desktop, so you don't even have to find a place to put your scans. To save a document, you drag it onto one of the folders and it saves automatically — see what I mean about being mollycoddled? This also has the effect of creating a whole filing system within the

application. If you want to save a document in electronic form, without going to the bother of OCR-ing it, you can keep the document in Paperport. Any additional information to be stored with it can be pasted on, via the use of associations and sticky notes. These will show up when you print the original document, unless you hide them beforehand.

The scanning settings are fairly limited, but this is not a problem for text input. The settings window can either be launched from a button on the side of the scanner, or from the menu bar, and allows settings for text, images and fine text, which operates at 400dpi. If you mostly scan only one type of document, you will not have to adapt the settings each time. And if the scan is not acceptable first time around, the process of altering the settings and re-scanning is so fast that you will not have to spend all afternoon trying to achieve a decent scan.

One minus point is that it cannot scan colour photographs. Another is that it takes a lot of fiddling to scan black and

white photos, and even then only fairly poor results can be achieved. But to be fair, the Paperport is primarily intended for use with text. The settings for scanning images are easy to adapt, if a little limited, offering only brightness, sharpness and a choice of diffusion or pattern halftone settings. Although it takes a bit of playing around to achieve the right mix for a particular photograph, the scan itself is mercifully quick — I managed to get a reasonable image from a monochrome photograph within 15 minutes. While the results were not excellent, they were good enough to save as a rough version of the image, if that is all you require.

PCW *Verdict*

A good little machine for those who only need a scanner for documents. It has excellent OCR capabilities, but it is only for documents and not for artwork.

Price £369

Contact Computers Unlimited
0181 200 8282. Fax 0181 200 3788

SOFTWARE

Serif DrawPlus 2.0

This low-cost desktop publishing software provides enough power to produce professional-looking publications. Danny Bradbury thinks it is a fine package, especially considering the low price.

Serif is a graphics software developer which offers a number of products including the drawing package Drawplus 2.0, the DTP package PagePlus 3, PhotoPlus for photograph manipulation, as well as a mini spreadsheet and a text effects editor.

DrawPlus 2.0 has more features than its predecessor. It is also supplied on a CD-ROM with "Lite" (cut-down) versions of PagePlus and PhotoPlus, and a selection of 400 fonts and 7,000 clip-art images.

DrawPlus makes use of the Windows interface to provide an easy-to-use front-end. It has toolbars along the top and left-hand sides, and a status bar along the bottom showing cursor positions with controls for a snap grid and for viewing the page at its actual size. A neat idea is the inclusion of a Designer Level button which skips between easy and advanced

● *Despite its price, Serif DrawPlus 2.0 has good object editing tools*

versions of the product, allowing more options.

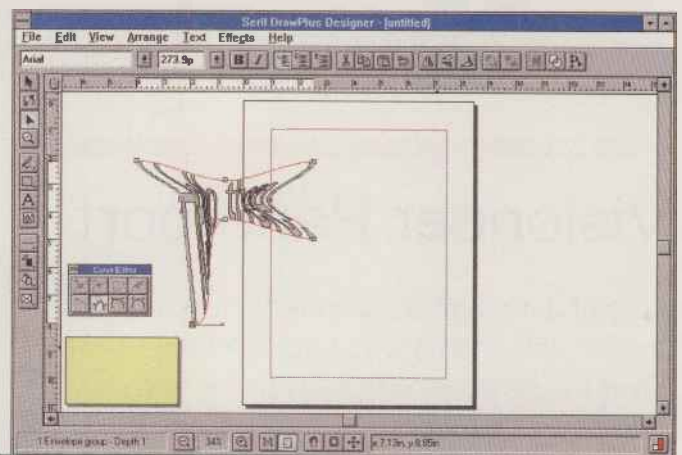
At times the system is almost irritatingly helpful — from the Welcome screen which offers you the choice of starting a new page, loading an existing one or starting a demo, through to the hint boxes that pop up the first time you select anything. Thankfully, these can be turned off — the software is so easy to use that these boxes are not really required.

Some useful drawing features enable the user to combine one drawing with another to create a stencil effect, or to fit images or text inside a certain user-definable envelope shape. "Quickshapes" can be drawn and altered by dragging a node around a box. Many of these shapes are

conventional, such as boxes and ovals, but there are also thermometers and smiley faces (are these really necessary for a designer?).

Other tricks include the ability to edit line thickness and colour, and to fill objects with a number of user-definable colours (solid or graded). Objects can be layered over each other and layer numbers are shown in the status bar.

If you want to save your image as an object, you can choose from either the native DPP format or a Windows Metafile. If you want to save it as a picture, this can be done in a wide variety of formats including JPG, CGM, EPS and PCX. To load images, users can choose from the extensive clip-art collection on the CD or



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from the same variety of formats, in addition to those from applications such as CorelDraw and AutoCad.

DrawPlus 2.0 is a fine package as far as it goes. If you want to enter for a design competition, you might like to consider something else. But if you want to produce a leaflet, poster or small magazine for a local club, then you could do a lot worse than this. Those who are not especially computer literate would cope well with DrawPlus 2.0.

For my money though, PagePlus Lite is the best of the three packages. Providing text and graphics import options from a variety of different formats, this DTP package uses an interface which is broadly

similar to its DrawPlus sibling. It enables users to construct their own templates with text and graphics frames, and to alter text leading and letter spacing. The number of text columns can be specified, text can be flowed from one frame to another, or flowed around objects. If you need to produce a basic, small publication without any bells or whistles, then you can do so using this software. (Although a program such as Quark XPress has many more features, it is far more expensive and will leave you with little change from £600.)

PagePlus caters for OLE links from a number of other packages including PhotoPlus, software which enables the manipulation of the colour and texture of

photographs. Although it provides the ability to smooth, sharpen, add charcoal drawing effects, pixellate and generally mess around with photographs, there is no discernible facility for retouching individual areas — but then, you'd hardly expect a touch-and-burn facility on a package as cheap as this.

PCWVerdict

For the money, DrawPlus is a relative powerhouse. If you want to produce professional-looking publications cheaply, it's a must.

Price £60

Contact Serif 0115 9421502

HARDWARE

Adaptec Cardpark

A device which fits into a drive bay and allows you to plug in PCMCIA cards may be going against the grain, but there are plenty of advantages, says Simon Rockman, especially if you are using a subnotebook.

According to Compaq, 94 percent of notebooks sold last year had a PCMCIA card slot. It's good to see a standard which has been so widely adopted, yet it has failed to excite any interest on the desktop. IBM and Elonex have both tried and failed to sell any significant quantities of PCMCIA equipped desktops. (You can pick up the IBM cheap at Morgans.)

Adaptec is swimming against the flow with the CardPark, a device which fits into a drive bay and allows you to plug in PCMCIA cards. It seems that most desktop users want to fit a card and forget about it. But if you've spent serious money on getting your portable computer kitted out with a PCMCIA hard drive, network card, ISDN TA or modem, a PCMCIA slot in your office machine makes sense. If you are using a subnotebook it makes a lot of sense: you can leave the floppy at home and use the PCMCIA slot with a RAM card as a means of transferring data between machines. And you don't need to restrict yourself to 1.44Mb files.

Intel produces 8Mb RAM cards, and if you have a type III slot in your machine you can use a 170Mb PCMCIA hard disk. In the right environment, a PCMCIA slot on your desk can replace a Syquest system: The ability to put removable media



into a machine which is on an office LAN is a boon. And if you are developing software for a PCMCIA card, it is great to be able to test the software on the development machine.

There are plenty of advantages, but for £172 you would expect something which felt a bit better made than the CardPark. It uses an ISA card with four large ribbon cables to run to the drive. The bay will take a type II and a type III simultaneously, or a type IV card which is 1.5 cm high. Given the large number of

pins necessary to communicate with two cards, it isn't surprising that there's a lot of cable, but it makes it difficult to fit the card and connect it to a bay. The problem is exacerbated by the size of the three-quarter length card, which looks as though it is designed to have extra connectors and SMT chips to handle two sets of bays, but is not capable of doing so.

The result is something unnecessarily large and difficult to fit into machines designed for half-length cards — it's certainly long enough to snag the heat sink on a processor. The drive mounting is flexible and you can either fit the unit into a 3.5in bay or use the supplied shroud to fit it into a 5.25in bay. This all seems a little below par when you are used to Adaptec's usually excellent build quality, but it should be firm enough after installation.

The software will be familiar to portable computer users. It uses Cardsoft's card and socket services, which takes you back to the evil days of hacking autoexec.bat and config.sys files. The DOS-based installation software is excellent but the documentation is horrific, partly because setting up card and socket services is so complex. The manual even offers the advice that this is because desktop machines are an open architecture and notebooks are comparatively easy. Each device needed

a little tinkering to get it to work.

Once it's working, everything runs in much the same way as a notebook. Having the drive bay on the front of the machine is good for cards with no cable but a real pain for those with a short cable like the Ethernet cards.

The ability to swap cards in and out is great, but you need to know what you are doing to get it going. The price is a little steep for something which doesn't contain a massive amount of electronics, but in the right application, the flexibility will soon pay off.

PCWVerdict

Adds one of the best things about having a notebook, to your desktop. Incredibly useful, but at a premium price.

Price £172

Contact Adaptec 01252 811200

SOFTWARE

Janna Contact v2 for Windows

Here is a contacts manager that's not merely another electronic Filofax or executive toy. Adele Dyer discovered that it's more like a digital PA for workgroups.

It is sometimes easy to view any kind of electronic equivalent to the pen and paper with a jaundiced eye. Once upon a time, no-one needed a contacts manager; to deal with the stresses and strains of modern life all you needed was an address book and a diary or... a Filofax. But then came the contacts manager — a chance to entrust all your most vital information to a potentially corruptible hard disk.

However, Janna Contact claims to go beyond your average contacts manager. It is not simply an electronic address book and diary, but allows you to manage your contacts in the sense of keeping on top of your business dealings. It is more of a digital PA than an digital organiser.

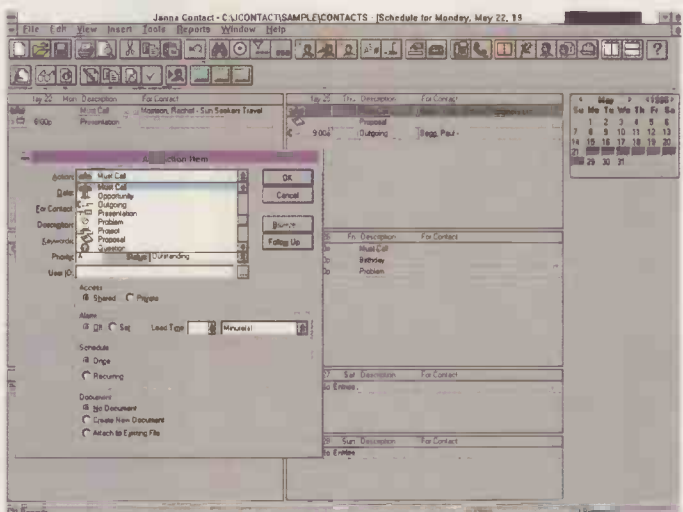
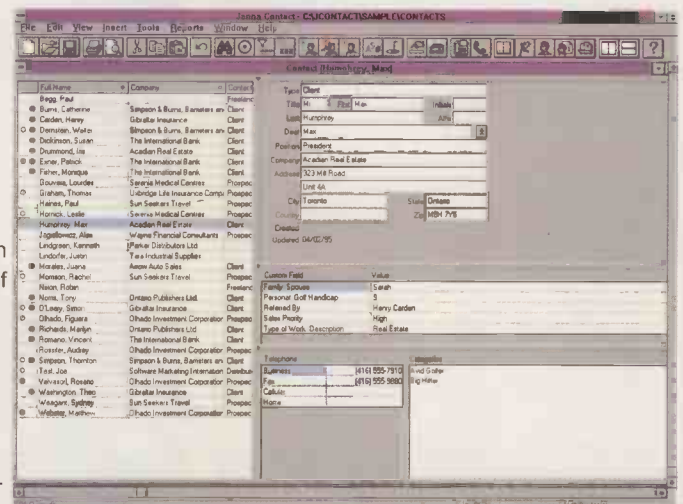
Working through the tutorial did little to dispel my idea that this was just another executive toy. It begins by talking you through the small administrative tasks you need to do at the start of your day. You can check your diary, log any calls you are due to make, write any outstanding letters — all without leaving the contacts manager. And yes, bored executives can probably waste most of their day messing around with their contacts manager, not getting any work done. But the power of the package does not lie in these everyday features.

The basic premise of this software is quite a good one. By integrating Janna Contact with MS Office, all your contacts can be stored along with records of your dealings with them. By pulling up the entry of each contact, you can log all telephone conversations and any correspondence relating to that contact, using Word. And you can access your MS Mail, Access and WinFax Pro. The idea is that you don't need to waste time flicking

between applications but can pull up a log, say, of what client decisions have been made at the same time as looking for that client's telephone number. The implications for workgroups are impressive: if one user calls a client, a second user can gain access to what was discussed and decided, and see what action had been taken.

There is a remote version too, which allows the entire database to be compressed and sent, via MS Mail, to remote users. The central database can either be set to update regularly, or when remote users return to the office with new information. All conflicts in updated information are stored and the users notified so they can choose the correct version.

Building a database is a relatively painless exercise once you have passed beyond the nightmare manual. Each contact is stored with specifically related information so you can group and search for contacts by status and geographical location — you could even target clients in terms of whether they like golf, or how



Dealings with each of your contacts can be tracked through the schedule manager

many children they have. My favourite category is called "big hitter" and merits its own little symbol next to the contact reference. You can add any other categories you want; for instance, I built up a database of PCW freelance contributors, split into subject categories and the time each takes to supply an article. One nice touch is that you can change the names

of the American "zip" and "state" fields, to British post codes and counties.

If you want to make notes on telephone calls, or write letters, you can launch Word from Contact and store the resulting files in the program's information log. Form letters can therefore be pushed through according to the selection of various types of contact. It's a shame, however, that it takes so long to pull up Word even though there is a very useful facility for making simple text-only notes within Contact. But even this does

not allow you to type directly into a box without first having opened a new window.

There is the additional utility of a schedule manager. Despite being very much like any other organiser diary, it does have a fun look to it; there are lists of icons to use with your various schedules, such as a little telephone next to a phone call or a mortar board for a training session. This links to the contacts section as well, so you can easily look up details. But it does seem a shame not to be able

to show a telephone number in the forward schedule window.

PCWVerdict

One of the top two or three OCR programs. Not so much an executive toy; more a valuable tool for workgroups.

Price £150 for a single user; £1,500 for Janna Remote with five licenses

Contact Seefa Software (Rep. of Ireland) 00353 1 2859484. Fax 00353 1 285 7823

HARDWARE

Sotec MMU-2000 PCMCIA

Add a multimedia capability to your notebook with this system designed specifically for multimedia purposes. But take into account a number of small imperfections that Steven Helstrip noticed.

Until recently, Sotec produced hardware for OEM companies only. Among its list of products is the Colourbook, designed exclusively for Gateway. With this experience behind it, Sotec is now marketing its own products and the MMU-2000 is the first of these.

The MMU adds multimedia capability to notebooks by means of a type II PCMCIA card and an external module looking not dissimilar to Sony's Playstation [see page 96]. The main unit measures 267mm x 196mm x 32mm and weighs 1.12kg. A somewhat modest cable is supplied, just long enough to sit the MMU beside a notebook. The external unit houses the double-speed CD-ROM drive and the stereo speaker system. A row of buttons along the front panel enables it to be used as a stand-alone CD player.

Along with the usual transport controls, there are random and repeat features. The MMU comes with a 12-volt power supply and rechargeable batteries which are good for 70 minutes' use. The batteries only recharge from the power supply when the unit is switched off. A full charge takes about 90 minutes.

The system has been designed specifically for multimedia presentations — there's no SoundBlaster and, consequently, limited games compatibility. The 0.9 Watt output of the built-in speakers is disappointing. Presentations for large groups would require more powerful monitors which could connect to the line out port on the right side of the unit



(where there is a line input and headphone socket, too).

From an audio point of view, the MMU is compatible with the Windows Sound System and should work with any Windows application; there's no support for DOS sessions, though. The sound chipset is manufactured by SSE and offers sampling rates up to 44.1kHz in 16-bit stereo and an FM synthesiser for playing MIDI files. But this is another disappointment seeing that we have come to appreciate the sound quality offered by WaveTable synthesis. A microphone, built into the front panel, allows you take voice notes, but in practice it's far from ideal as the unit starts to feed back when the volume level is above the halfway level.

On a more positive note, the CD drive lived up to its claimed speed by

sustaining a transfer rate of 300.64kb/sec. Our overall NSTL test lab results, which take into account CPU usage and access time, show the drive comparing well with the standard

Panasonic CR-562, and scoring 9.08. To put that in perspective, the CD-562 scored 8.07 while Plextor's six-speed SCSI drive achieved 12.72.

The build quality of the MMU-2000 is excellent, although we're not so sure about its grey casing. The software installation was a breeze, automatically setting up CD-ROM and audio drivers. It comes with Windows software for recording digital audio, but nothing much more exciting than Windows MediaPlayer.

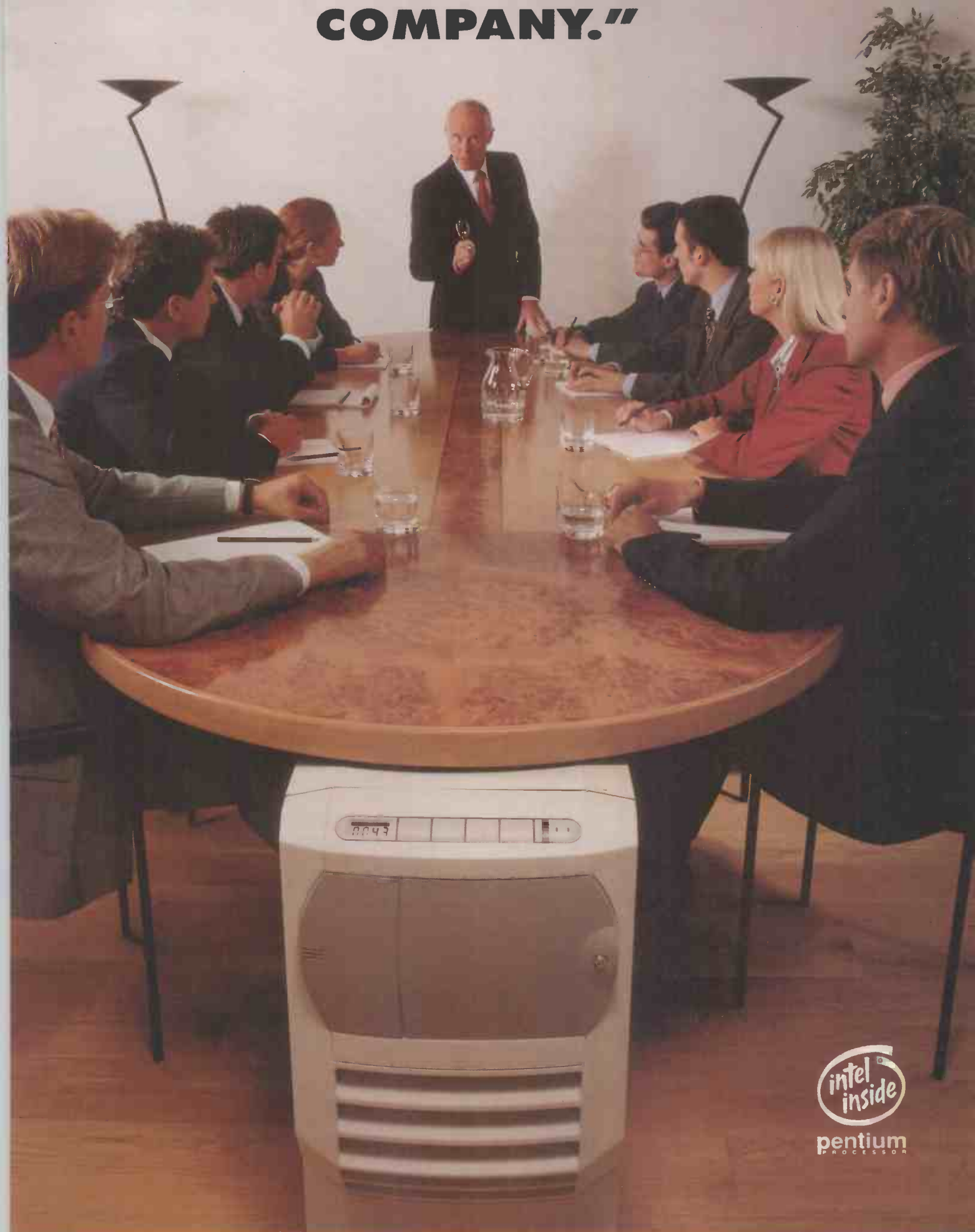
PCWVerdict

If you need to upgrade an existing notebook, the MMU-2000 will do the job. There are too many small imperfections to allow wholehearted recommendation, though.

Price £399

Contact Saratoga Marketing 01635 278449. Fax 01635 278773

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CLEAR WHO'S RUNNING THIS
COMPANY."**



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PROCESSOR

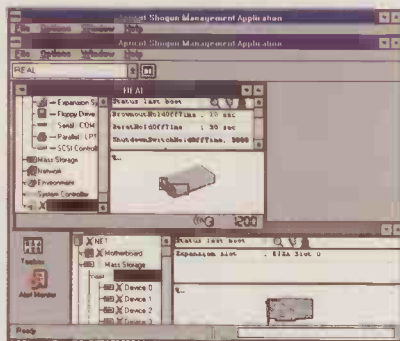
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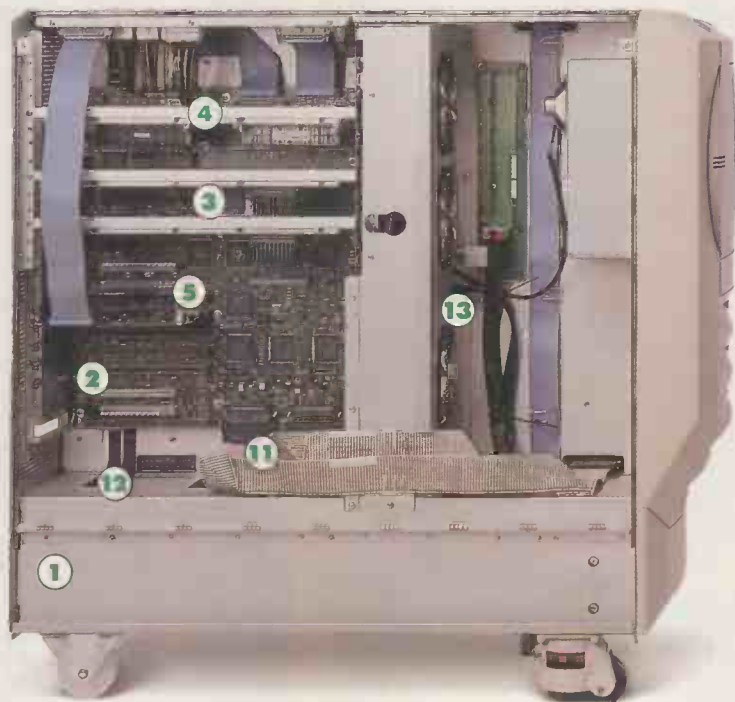
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We welcome contributions from readers for our Long Term Tests section. If you've been using a piece of hardware or software intensively for some time, just write a 450-word article (for hardware) or a 750-word piece with screenshot — GIF format — for software and send it on disk, in MS Word (Mac or PC) or ASCII format, to: The Editor, *Personal Computer World*, VNU House, 32-34 Broadwick Street, London W1A 2HG. Mark your envelope clearly "Long Term Tests". We'll pay for any contributions we use.

SOFTWARE**Turbo Pascal 7.0****2** YEARS
TEST

Since he discovered Turbo Pascal, John Revell has developed many programs which work well. He finds Pascal a joy to use and its sheer speed takes his breath away.

Having discovered that a few lines of code could explode into a screenful of calculations and send my poor old Amstrad into fuse-threatening frisson, I was hooked on programming. I read somewhere that Pascal was the language for serious programmers so I bought Borland's Turbo Pascal 7.0.

What joy! It has syntax highlighting with customised colour control, and a brilliant compiler and debugger. Unimpressed with Borland's user manuals, I bought *Programming In Borland Pascal*, by Scott D Palmer. Backed up with a 5.25in disk of all the listings, this book covered every aspect of the language.

Pascal relies on coding. Its implacable refusal to recognise undeclared constants and variables, allied to its strict protocols for passing parameters by reference or value, imposes a highly disciplined approach to programming. No more GOTOs and spaghetti coding. And, the use of units allows a library of utilities to be built up and called as required, thus saving much repetitive coding.

Standard algorithms, such as binary search and quicksort routines, work like magic in Pascal. For instance, financial programs to calculate interest percentages or number of payments often require iterative algorithms. With a little ingenuity, the binary search routine can be readily adapted to search iteratively for a value which satisfies predetermined

points on the earth, proved to be an ideal project for Pascal. It uses a typed file as a database to store the names of places with their latitudes and longitudes as string records. This can be added to, displayed or altered as required, with provision for the file to be ordered alphabetically to allow a binary search. Since the calculation of distances requires the latitudes and longitudes to be expressed as signed decimals, it is essential that they are correctly entered in the first place. Thus, out of a total of 1,050 lines of code, about half constitute display, validation and error checking procedures. But in spite of this, the sheer speed of Turbo Pascal is breathtaking.

Turbo Pascal gives its files a PAS extension and offers an optional autosave which works impeccably. It also saves a backup copy with a BAK extension. But better still, version 7.0 automatically compiles an exec file with an EXE extension which can be copied to a directory and operated under DOS or opened up from the Windows File Manager. The Pascal file manager is not brilliant, but it does allow excursions into a DOS shell, leaving Pascal in the background.

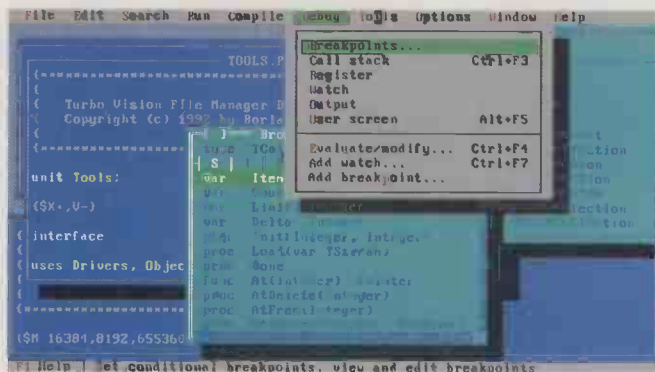
Whereas exponentials under Basic can be operated using a caret (^), Pascal recognises only the exponential operator which must be used in conjunction with the natural log (ln).

Those programs I have developed with Pascal work well enough, but I'm sure they could be written more elegantly. The problem is finding instruction: as it is, I resort to books, but they're getting thin on the ground.

And for databases, 20 probes are all that is needed to search an ordered list of 1,048,576 items.

A program which I first developed in Basic, to calculate great circle distances between any two

Turbo Pascal — slightly out of date, but still a joy to use

**PCW** Verdict

A speedy and useful programming language, but somewhat outmoded now. The user manual is unimpressive, and independently published instruction books are no longer easily available.

Price £99

Contact Borland 0800 2127270

HARDWARE

SoundBlaster 2.0

Jonathan Thaw is particularly impressed by this sound card and its compatibility with a wide range of programs.

One of the most serious shortcomings of the IBM PC clone is its basic sound capability. For years, users have had to put up with the tiresome drone of the internal speaker. So on a cold, dull day back in 1992 I bought the SoundBlaster 2.0, an 8-bit Ad Lib compatible sound card retailing then for £125. It uses the FM 1312 music synthesiser with 44.1kHz playback. As it is only an 8-bit card, recording is limited to 15kHz.

A range of software was included; at the time, mostly DOS applications. Setup was easy as the card required just one, free, 8-bit expansion slot. IRQ jumpers can sometimes be confusing but they were explained in the SoundBlaster test program and in the manual.

The software and its installation was quick and simple but the applications



included were rather limited, with a so-called "intelligent organ", a .voc file recorder and others.

The beauty of this sound card lies in its compatibility with almost any program on the market that requires sound.

Windows sound is adequate with the SoundBlaster

1.5 drivers, but

SoundBlaster 2.0 drivers for Windows were supplied with the updated version, along with other small utilities including a SoundBlaster wave studio, a sound recorder and a talking scheduler.

Although this card is not for MIDI and composing purposes, it copes reasonably well with what I throw at it,

and I was pleasantly surprised to find that I had full sound and speech functions when running Microsoft Encarta.

I don't believe I've ever seen a game that will not work with the SoundBlaster 2.0. With new sound cards rapidly appearing, it may be under threat of discontinuation — the Gravis UltraSound MAX and the Sound Blaster AWE-32, for instance, outperform it in every department. But for a knockdown price of about forty quid, I consider the SoundBlaster 2.0 is still in with a chance.

2 YEARS
TEST

PCW Verdict

An old classic, whose low street price and versatility means it should endure for awhile. (The SoundBlaster 2.0 has now been discontinued but it should still be available from the supplier below. See PCW, April '95 for a review of the latest sound cards).

Price £24 (street price)

Contact Watford Electronics 01582 745555

HARDWARE

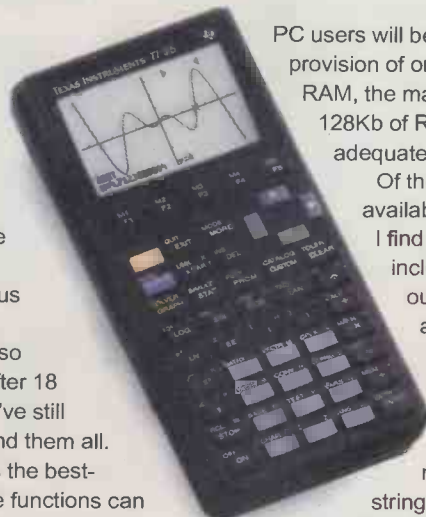
Texas Instruments TI-85

After 18 months, Richard Guy is still discovering new programmable functions within his calculator and considers the interface to be the best design he's seen.

The TI-85 may not be the cheapest graphics calculator on the market but it performs better than any other calculator I've used, and makes its ageing predecessor, the TI-81, look like a glorified abacus.

The TI-85 has numerous graphical, scientific, and programmable functions; so many, in fact, that even after 18 months of intensive use, I've still not managed to understand them all.

The TI-85's interface is the best-designed I've seen. All the functions can be accessed from most screens by an innovative system of on-screen menus. To accommodate these menu bars, the TI-85 has a larger screen (127 x 63 pixels) than its predecessors, and the menu can be removed if necessary. Although



PC users will be shocked by the provision of only 28Kb of usable RAM, the machine does have 128Kb of ROM; both are adequate for my purposes.

Of the many functions available, some of those I find particularly useful include the simultaneous equation solver and the polynomial root finder (up to the 30th order), and the comprehensive matrix, vector, string and list

functions. The statistical analyses are extensive: the TI-85 analyses one-variable and two-variable statistical data, can perform seven types of regression, and draw lines, scatter plots, and such like. There are ten I/O

and 15 control program instructions and almost all the TI-85's functions can be accessed from programs.

There are two additional bonuses: the communication function between calculators which allows the user to connect their calculator to either a PC or a Mac; and there is a lively newsgroup discussion on the Internet (*Calc-TI@lists.ppp.ti.com*), and an archive which holds many TI-85 programs. This archive can be accessed through ftp by connecting to *archive.ppp.ti.com* and logging on with the username "anonymous". You should type your email address as a password.

PCW Verdict

Good performance with an impressive range of functions.

Price £96.99 (inc VAT)

Contact Texas Instruments 01932 780752

1.5 YEARS
TEST

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Network Manager



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The Viglen XX NT SERVER includes Microsoft Windows[™] NT 3.5 Server. For client licences, please add £29 for single user client and £469 for 20 user clients licences.

VIGLEN XX SCO UNIX SERVER

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4GB RAID 5	32MB	£9139	£10739
8GB RAID 5	64MB	£11299	£12899

The Viglen XX SCO Unix SERVER includes SCO Open Server Networks 16 users. Please add £449 for a 32 user licence, £889 for a 64 user licence, £1669 for a 128 user licence and £6429 for a 1024 user licence.

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CLASH

W

hen Atari's Jaguar and Panasonic's 3DO hit the shops a year ago, the games industry

geared itself up for the next generation of console wars. Both were more powerful than existing 16-bit systems, but due to poor timing they passed by relatively unnoticed. Now, as the market and technology have moved on, Sega and Sony are preparing to battle it out.

Sega's latest is the Saturn, a 32-bit console boasting parallel processing and the promise of top-notch conversions of the company's arcade games. Sony is challenging with the Playstation, and backing it up with a horde of third-party titles and the help of rival arcade giant, Namco. Can Sony enter a new market and go straight to the top, or will Sega's existing fans bring it success?

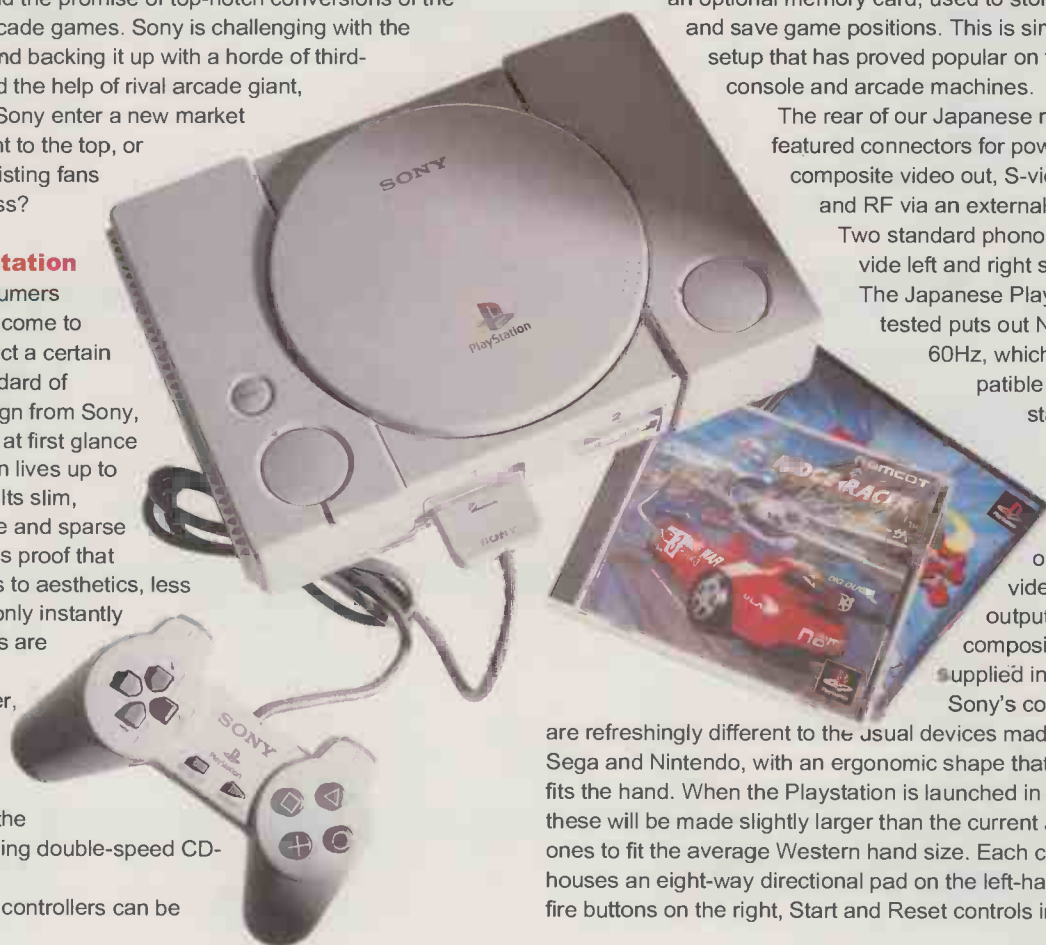
Sony Playstation



Consumers have come to expect a certain standard of design from Sony, and at first glance

the Playstation lives up to expectations. Its slim, light-grey case and sparse use of colour is proof that when it comes to aesthetics, less is more. The only instantly visible controls are three round buttons, Power, Open and Reset, located on either side of the unit's top-loading double-speed CD-ROM drive.

Two game controllers can be



OF THE

plugged into the front, enabling players to go head to head with a friend. Above each controller input is another slot for an optional memory card, used to store high scores and save game positions. This is similar to the setup that has proved popular on the Neo Geo console and arcade machines.

The rear of our Japanese review model featured connectors for power input, composite video out, S-video out, RGB and RF via an external convertor.

Two standard phono outputs provide left and right stereo audio.

The Japanese Playstation tested puts out NTSC video at 60Hz, which is not compatible with

standard British or European PAL television sets. RGB obviously provides the best output, but only a composite lead is supplied in the box.

Sony's controller pads are refreshingly different to the usual devices made popular by Sega and Nintendo, with an ergonomic shape that comfortably fits the hand. When the Playstation is launched in Europe, these will be made slightly larger than the current Japanese ones to fit the average Western hand size. Each controller houses an eight-way directional pad on the left-hand side, four fire buttons on the right, Start and Reset controls in the centre

Photography by David Whyte

There are two new games systems vying for supremacy: Sony's Playstation, with its impressive graphics capabilities, and Sega's Saturn, with an excellent selection of tried-and-tested software. Which one will come out on top? Chris Cain, PCW's gamekeeper-in-residence, looks for an answer.

TITANS

and four additional Fire buttons at the back. It all sounds a bit complicated but in practice it's a joy to use, although diagonal movements are occasionally hard to perform.

The heart of the matter

At the heart of the Playstation is a MIPS R3000A 32-bit RISC processor running at 33MHz. This has a clearing capacity of 30 million instructions per second (mips), and supports a theoretical maximum bus bandwidth of 132Mb/sec. To speed things along there's an internal 4Kb instruction cache and 1Kb data cache, and the chip has 2Mb of main system RAM to work with.

To generate graphics the R3000A works in conjunction with a Sony custom Graphics Processing Unit (GPU), and the much-hyped Geometry Engine (GTE). Reading Sony documentation it's easy to confuse the two, especially when it comes to the machine's polygon-handling capabilities. To many games fans, the amount of polygons a

console can throw up on the screen is all important, as it will affect the quality of 3D-based games.

The GTE, which is basically a high-speed matrix calculator, can calculate the maths for approximately 1.1 million polygons a second. The GPU, on the other hand, can draw 360,000 flat-shaded and between 120,000 and 150,000 texture-mapped, light-sourced polygons/sec. All drawing figures are based on polygons at 10 x 10 pixels. The GPU is quite capable of handling 2D images too, with scrolling, scaling and rotation, although it doesn't deal with sprites in the traditional sense. To quote Sony: "Playstation sprites are simplified polygons".

The Playstation has 1Mb of video RAM and a 24-bit colour palette, but 3D rendering is always done at 16-bits per pixel. Graphics resolutions supported range from 256 x 244 to 640 x 480 pixels, with the latter interlaced.

The top non-interlaced display is 640 x

240 pixels (640 x 256 for PAL). Another interesting graphics component is a Motion Video Engine, also known as MDEC, which has part of the MJPEG video algorithm built into it. The chip can be used to achieve reasonable quality, full-screen, full-motion video.



Windows

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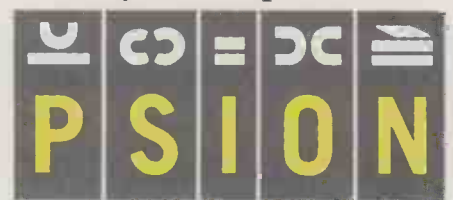
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Sony Playstation



Top left Every good console has at least one fighting game and the Playstation is no exception. Toshinden features stunning 3D graphics at 90,000 polygons/sec, great "Anime style" artwork, and stereo sound

Above Ridge Racer is an almost arcade-perfect conversion of Namco's top driving SIM

Left Mortal Kombat III is due for conversion and Williams is handling the job itself

The console's audio hardware supports 24-channel 44.1kHz 16-bit stereo Adaptive Differential Pulse Code Modulation (ADPCM), with built-in effects like reverb and envelope. The Playstation has 512Kb set aside for pure audio processing and 32Kb for the CD-buffer.

Game on

All this hardware is useless without software and PCW was supplied with two games, Ridge Racer and Toshinden. The first is an almost arcade-perfect port of the popular, if dated, racing game from Namco, with a smooth 30 frames/sec screen update and excellent 3D texture-mapping. Being a traditional driving simulation, it's a single-player affair.

Toshinden is a 3D beat 'em up in the Virtua Fighter tradition, with smooth shaded characters, big swords and an impressive array of backgrounds. The sense of 3D in this title is remarkable, as is the sheer speed and fluidity of movement. Toshinden is truly a visual masterpiece and an ideal title to show off the Playstation.

Other titles played during this test included Tekken, another fighting game with arguably better gameplay, Paradus

Deluxe from Konami, and the weird Jumping Flash.

Sega Saturn

Sega has a great reputation in the video games arena and produces most of today's top coin-ops such as Virtua Fighter II, Daytona USA and Virtua Cop. Its answer for the next generation of gamers is the Saturn, which it claims is heavily based on its arcade technology.



Finished in gunmetal grey (the European model will be black), the Saturn has a hi-tech look which isn't quite as pleasing to the eye as the Playstation. The overall appearance is chunky and robust, and similar to the existing Mega Drive II in some respects. Again, the Saturn is a top-loading system with a double-speed CD-ROM drive, but it does feature a cartridge slot used for memory backup. Buttons for Power, CD Eject and Reset are on top, complete with accompanying LEDs, and two controller ports sit at the front.

The back of the Saturn boasts a single mini DIN output for composite video, S-Video, RGB signals and stereo audio. Next to this is the Communications

Connector, a high-speed serial port, and at the opposite end, an additional expansion interface for an optional MPEG1 decoder. Like the Playstation, the Japanese version of the Saturn tested used 60Hz NTSC video signals, but of course the official UK version will use the PAL format. A fully wired RGB Scart cable will be supplied as standard.

The Saturn controllers are based on existing designs, with an eight-way joystick on the left, six fire buttons on the right and two front buttons for use with forefingers. The design may lack originality but the cables on these pads are a lot longer than Sony's, so you can sit further away from the screen. In use, the controllers are comfortable and feel the same as those on existing Sega systems.

Inside

Unlike the Playstation, which has one fast main processor, the Saturn has two 32-bit Hitachi SH2 RISC chips running in parallel, with each clocked at 28.6MHz. Each SH2 delivers approximately 25mips, but having two processors working together is never likely to give twice the performance of one. At best you get around 1.8 times the power, but either way, in terms of pure number crunching,

Sega Saturn



Top left *Virtua Fighter* doesn't look as good as *Toshinden*, but the gameplay shows that Sega knows what it's doing

Above *Daytona* also plays the same as its arcade counterpart

Left *Panzer Dragoon* shows Saturn's texture mapping in action

the Sega should outperform the Sony. Both CPUs share 2Mb of main memory.

Video is handled by twin 32-bit processors, VDP1 and VDP2, for sprite/polygon handling and background graphic processing respectively. Sega claims VDP1 can render up to 200,000 texture-mapped polygons/sec, and quotes 900,000 flat-shaded. Suspiciously, there is no gauge as to the size of the polygons in question. Unlike the Playstation, the Saturn isn't really a polygon-based machine and instead maps sprites to geometry.

VDP2 supports five simultaneous scrolling backgrounds and two rotating playfields that are independent of other graphics. A 24-bit palette is available for all images, and supported resolutions range from 320 x 224 to 640 x 480 on the current Japanese and American models. Both video processors share 1.5Mb of VRAM.

The Saturn's Yamaha audio hardware is perhaps its most impressive feature, controlled by a Motorola 68EC000 and boasting 32 16-bit PCM channels, eight FM channels and 512Kb of RAM. Another Hitachi chip, called the SH1, controls Saturn's White Book-compatible CD-ROM drive.

It's all in the game

Games played to death on Saturn were *Virtua Fighter* and *Daytona USA*, both ports of Sega polygon-based arcade hits and coded by the teams that wrote the originals. This is one of Sega's main strengths and something it will be pushing with conversions in the future.

Compared to *Toshinden*, *Virtua Fighter*'s visuals are somewhat lacking, with less colour, no shading and a general blockyness about them. Graphics aren't everything though, and gameplay shines through with more moves, a better control system and "just one more go" appeal. The same proved true when comparing *Daytona USA* to *Ridge Racer* — Saturn couldn't quite match its arcade counterpart, but all the game is there.

Other games tested were *Panzer Dragoon*, a 3D shoot 'em up, and the Saturn version of *Paradius Deluxe*. Despite Saturn's superiority with 2D graphics, the latter was practically identical to the Playstation version.

Conclusion

Which next-generation system is the one to choose? In terms of hardware design, with the future heading towards 3D games, the Playstation outclasses the

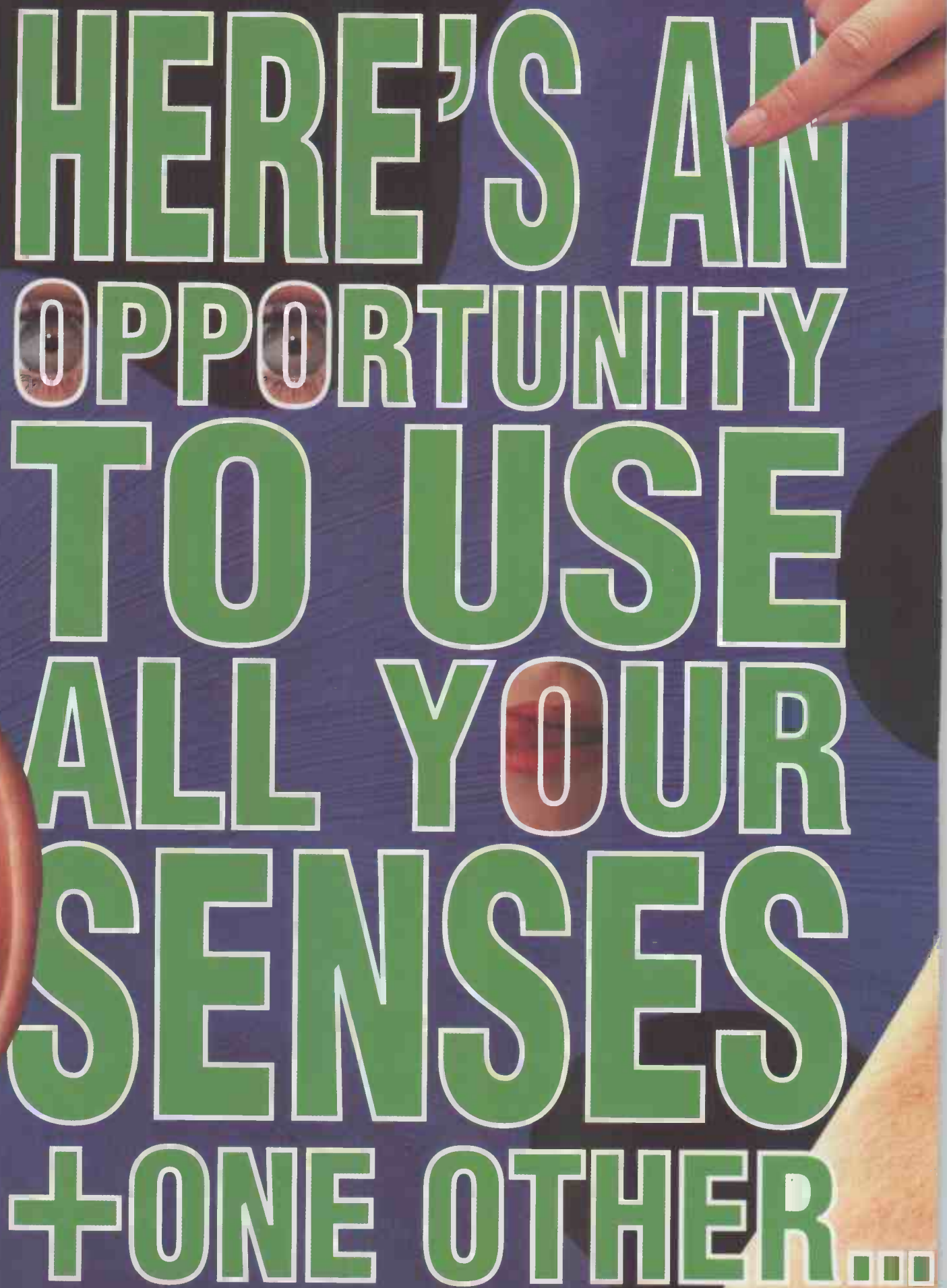
Saturn. Its single, fast, main processor is easier to program than two SH2s, it has a dedicated geometry engine, built-in help with video decompression, and a pleasing exterior design to round it off. Internally, the Saturn is a mixture of third-party chips and, although powerful, its sprite-based architecture is designed primarily for 2D action. The MPEG add-on is a good idea, but it will have to be low cost to be successful.

However, games software is the key issue and the Saturn titles tested were more playable. Sega has been making arguably the best games for years, and its experience is reflected in products like *Virtua Fighter*. Playstation software has plenty of "eye candy", but once you get past the graphics you may be disappointed. This is an issue Sony can do something about, however, and once it does, Sega will have a big problem.

PCW Details

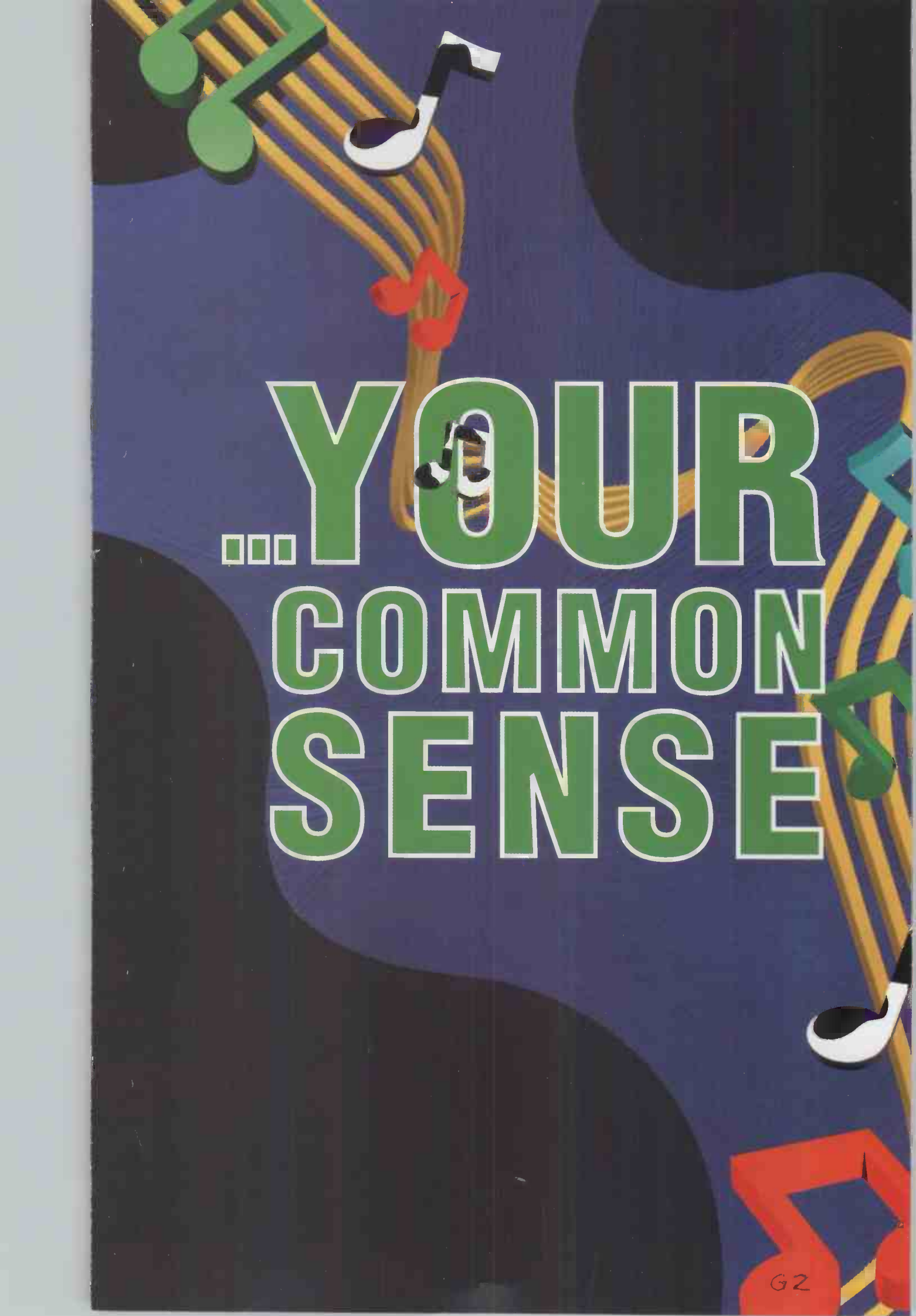
The **Sega Saturn** costs **£399.99** with *Virtua Fighter* bundled. Sega is on **0181 373 3000**

When launched in September, the **UK Playstation** will cost **£299**. Sony Computer Entertainment is on **0171 911 8200**.

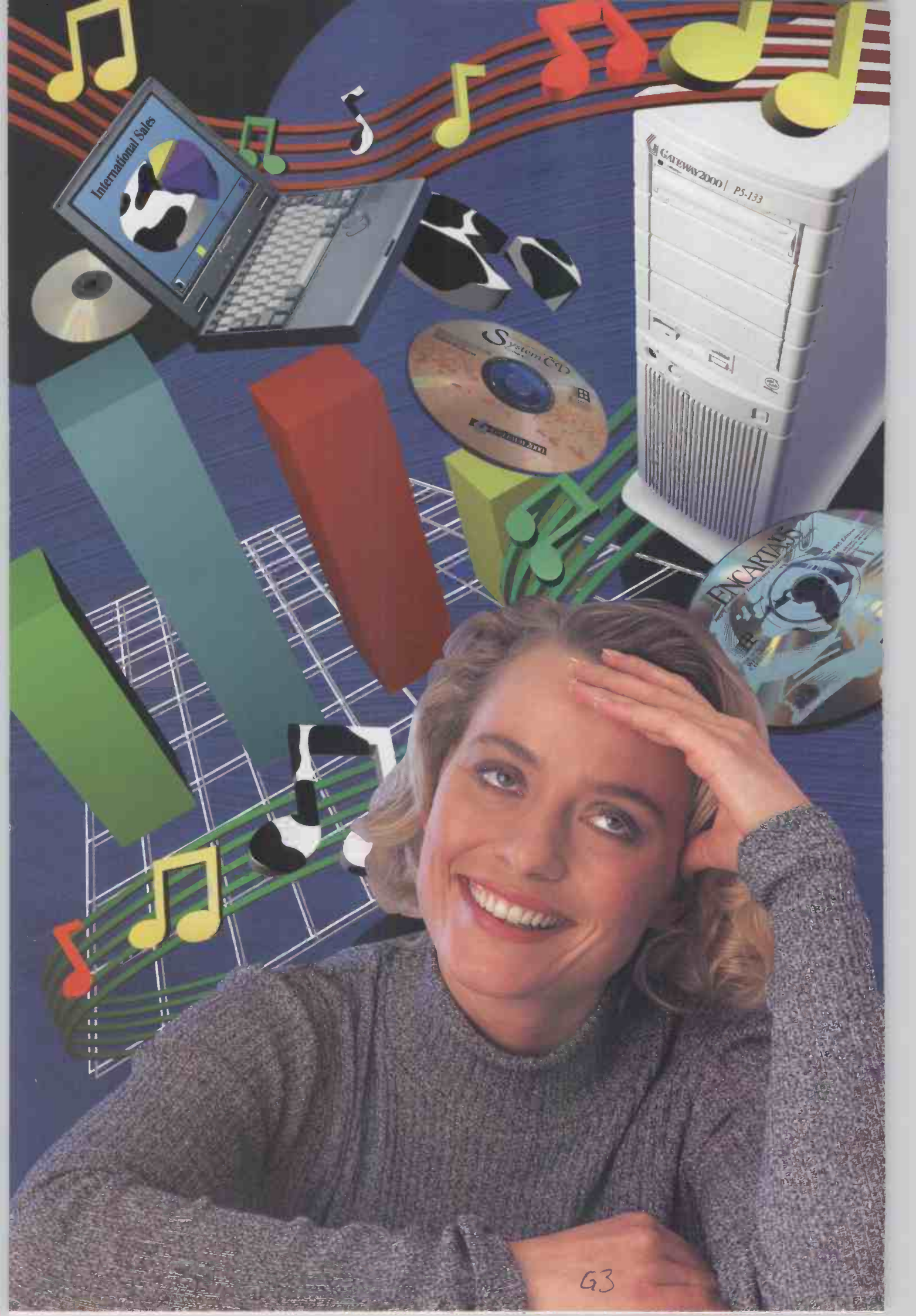


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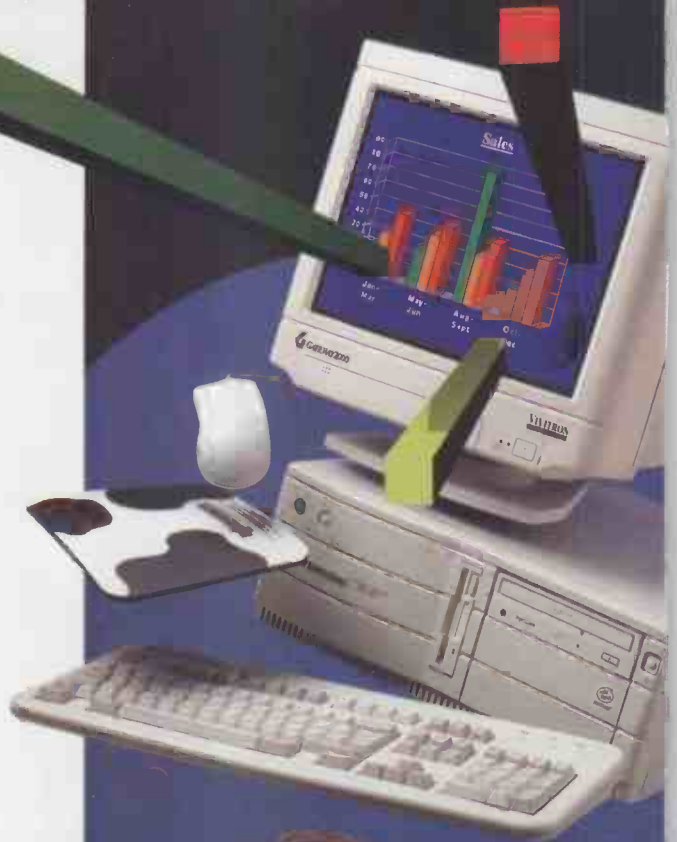
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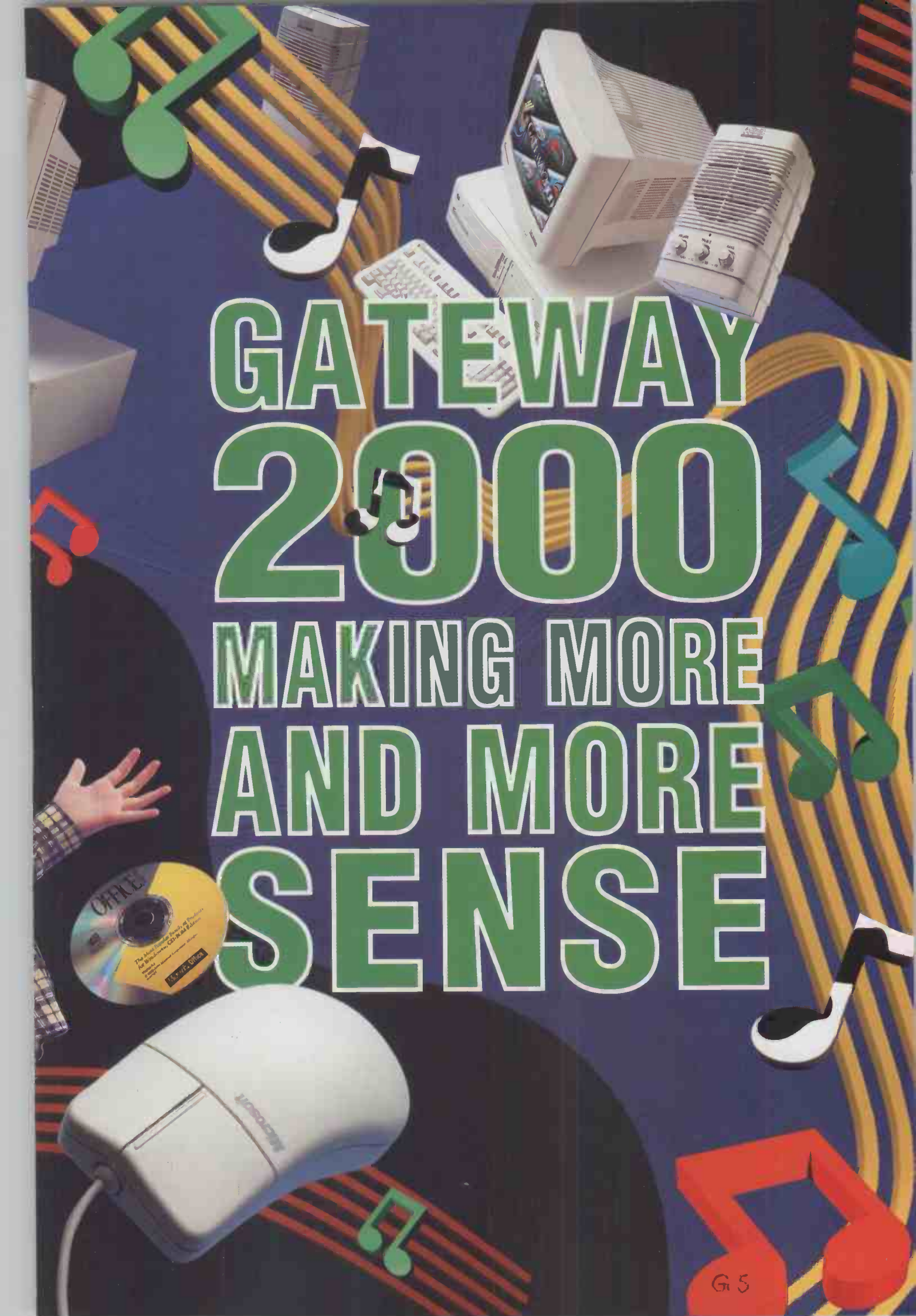


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G4



A vibrant collage on a dark blue background. Yellow wavy lines, resembling musical staves, flow across the scene. Scattered throughout are various computer components: a CRT monitor displaying a colorful game, a keyboard, a mouse, a CD-ROM with a yellow label, and a hand reaching out. Interspersed with these are colorful musical notes in green, red, and blue. The central text is large, bold, and green with a white outline.

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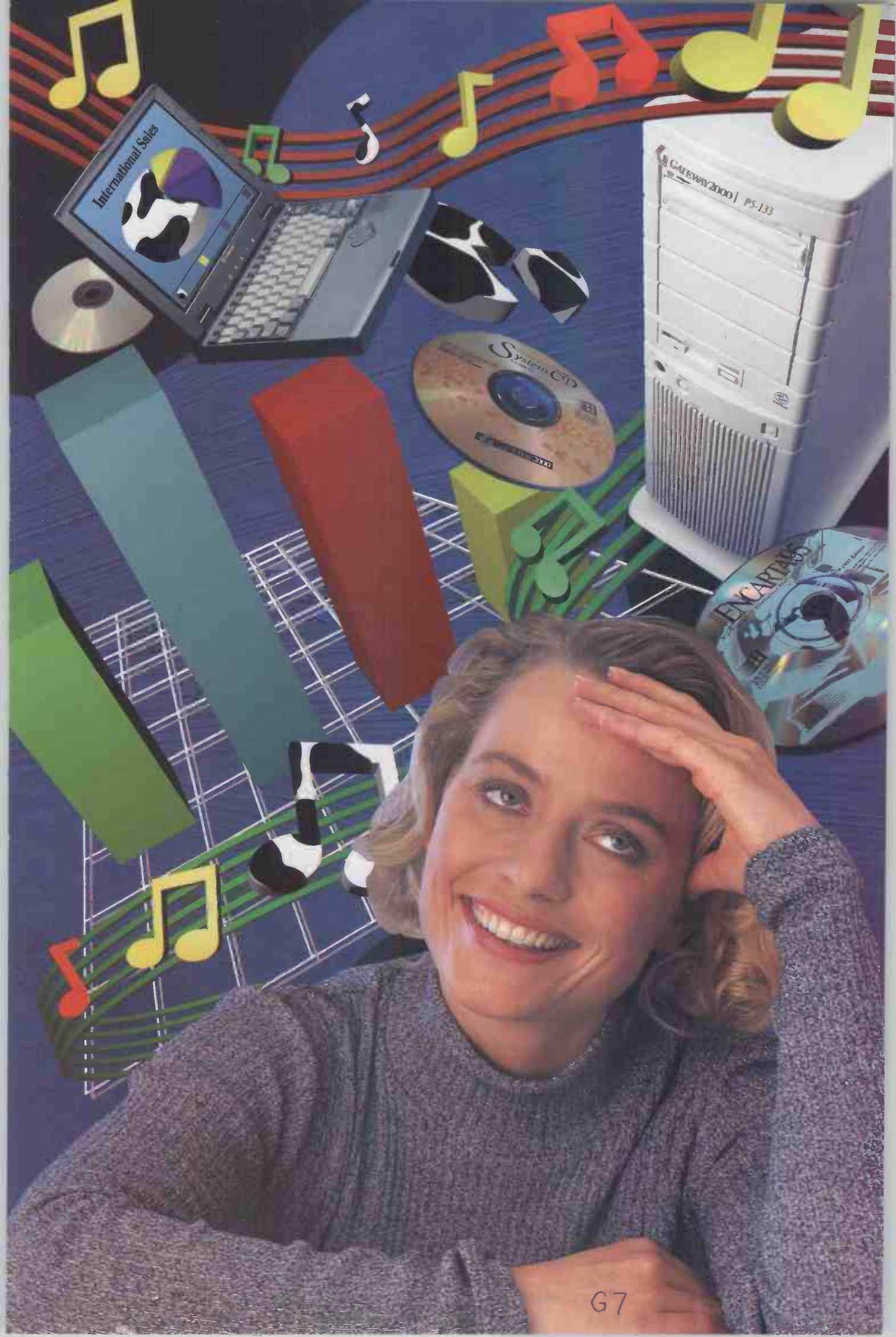
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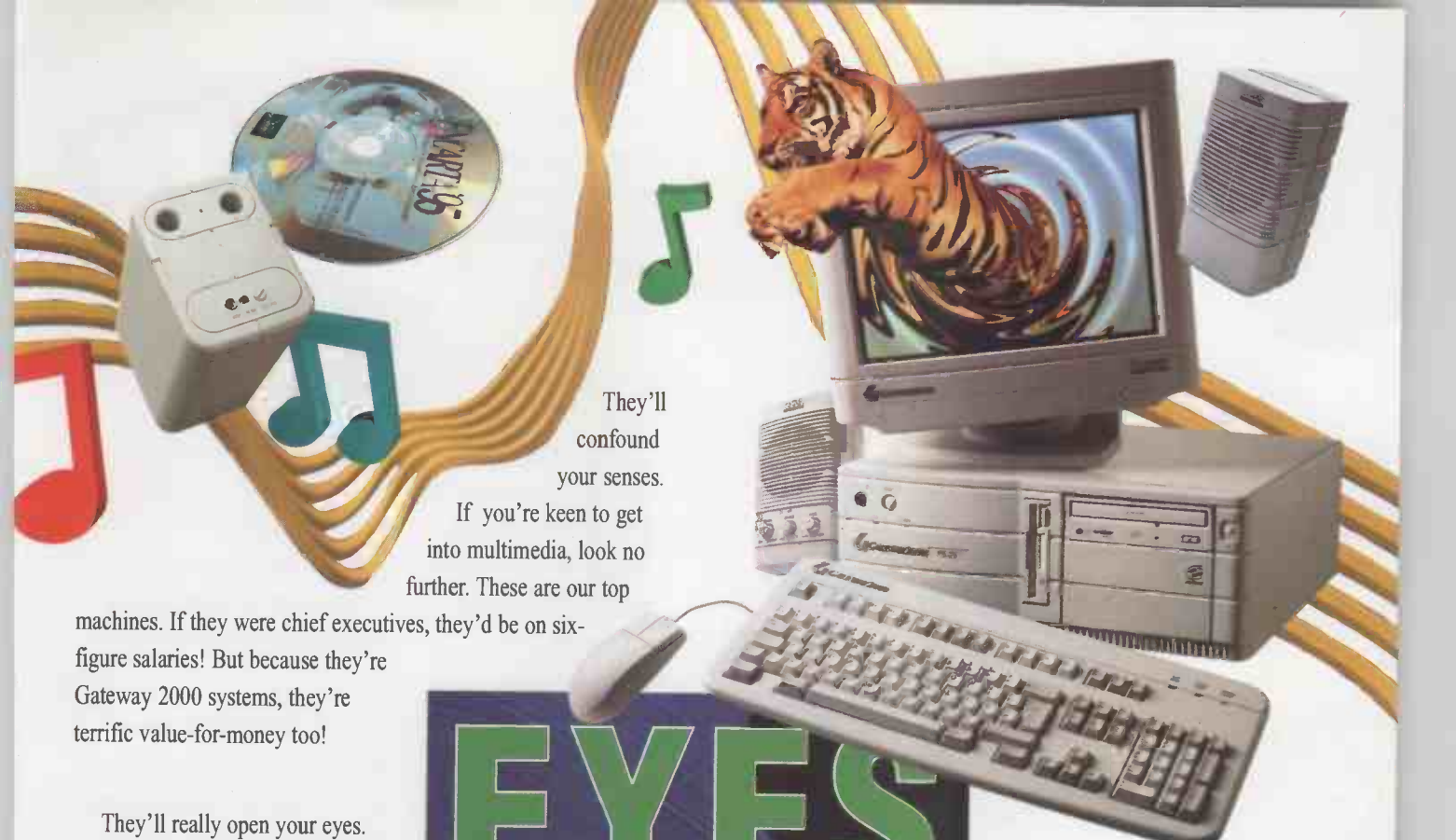
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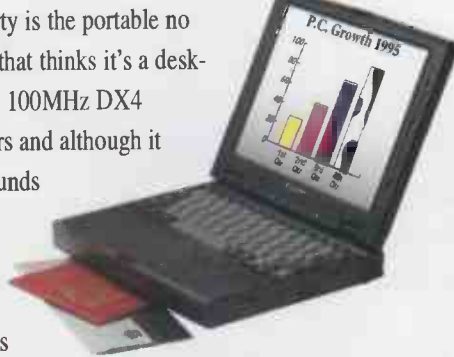
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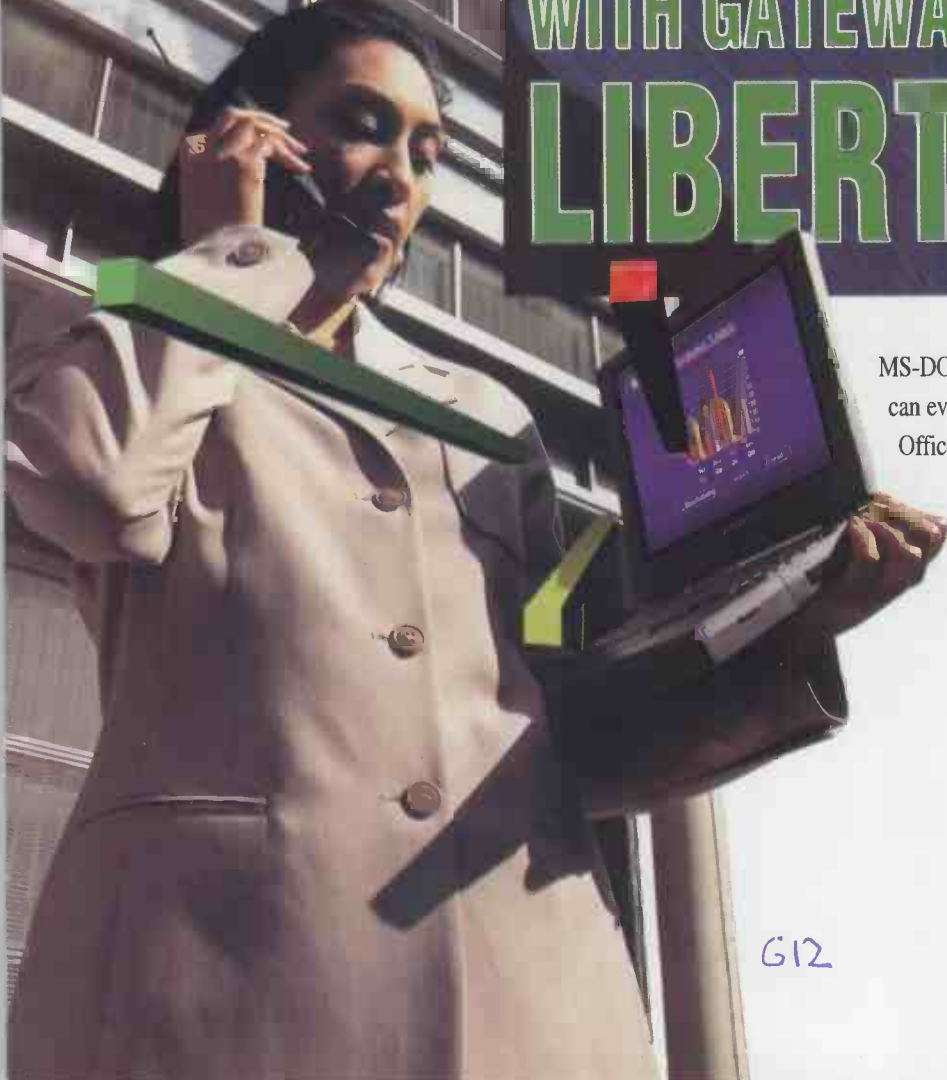


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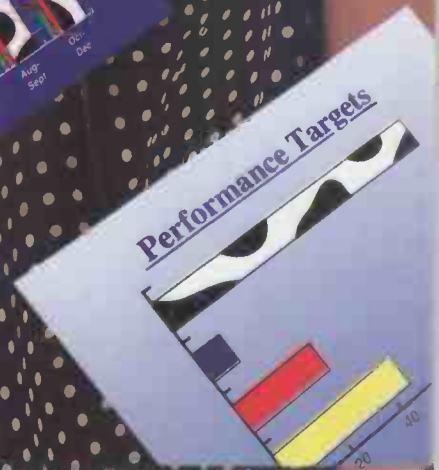



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Win95... are you ready for it?

The Microsoft vice president in charge of Windows 95 said recently: "It's clear that the hype factor for Windows 95 got out of hand. It's not a floor wax, it's not a dessert topping, it's just Windows."

When a senior representative of a company as adept at high-powered hyping and intensive marketing as Microsoft says things have got out of hand, then they must be pretty out of hand.

Windows 95 has generated millions of words in the last couple of years including quite a few thousand in *PCW*. The constant delays and set-backs which have bedevilled its development only seem to have whetted people's appetite for more information about the product.

The scale of Microsoft's preview program for Win95 has also been unprecedented, and close to half a million beta copies have been released. This means that practically any interested party will have a pretty clear idea of what to expect from the product before it ships. Certainly, some of the material in this article will already be familiar to our regular readers.

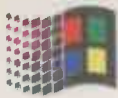
A couple of months ago we introduced a three-line whip in the *PCW* office, to "encourage" every member of staff to install Windows 95. Since then we've been putting it through hoops, encouraging it to make the coffee and generally trying to determine whether or not that mountain of hype matches up to reality.

In the pages that follow we'll explain everything you need to know to make that crucial upgrading decision, and decide whether or not you're ready for Windows 95.

PCW Windows 95 Illustrations by Stephen Caplin

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Introduction to the user interface

During the course of this feature you'll read everything you always wanted to know about Windows 95, whether or not you were afraid to ask: protected multi-tasking, 32-bit operation, Internet TCP/IP support, plug and play and the rest. However, the one thing they all have in common, the one thing that holds it all together and the place where you fit in is the user interface, or UI.

The simplest way to describe a user interface is to picture all the computer's resources at one end of a room, and you at the other, with only the UI sat between you. It's a classic scenario with two foreign parties desperately needing to communicate but clearly speaking two different languages, with quite different priorities; a translator and general mediator is required, and that's the UI.

The first computer incarnations saw the interface compromised at the user's end with punch cards, then command line interfaces, systems hardly described by anyone as intuitive. By the mid-eighties the user interface had become graphically described (aka GUI) on desktop machines, thereby considerably improving the situation.

The GUI designers have the not inconsiderable problem of representing the computer's resources in a way that is clear and easy for the user to work with. How do you represent, on-screen, the physical drives and their virtual contents, the folders with applications and files nested within? What about the wealth of options that require the user's various confirmations or denials? How should one object, whether it relates to physical hardware or virtual software, interact with another? Such are the pieces which



fit together to make a graphical user interface.

Apple has led the way with what has evolved into System 7.5 for Macintosh. When Microsoft first launched Windows, it was an operating *environment* of DOS, not a genuine bootable operating system in its own right. Apple uses the world over sneered at what was arguably the most sophisticated DOS application of all time.

All but this latest version of Windows suffered from the legacy of DOS — not surprising since DOS was still running the show underneath. Conventional memory problems and 8.3 filename limitations, amongst others, were a constant reminder of the price we paid for backwards compatibility.

But now here's Windows 95, supposedly a true bootable operating system with a graphical user interface. And it'll still run DOS along with existing 16-bit Windows applications. The important thing throughout the following pages is the completely new GUI, admittedly

borrowing a lot from Apple's System 7.5 and UNIX/NeXTStep, but what is still going to be a massive shock to many current Windows 3.1 users.

Microsoft undertook one of the largest programs of focus groups, usability tests and interviews to find out exactly what people wanted. The subsequent written objective for Windows 95 was to make PCs easier for all to use. But make what easier? Microsoft discovered, perhaps not that surprisingly, that the most common user activities are launching applications, switching between tasks and finding files.

The Taskbar

The Taskbar is the anchor of Windows 95's GUI, offering virtually every operation possible. Indeed, most begin with the same unassuming button, always present, ready, willing — and aptly named, Start.

The Taskbar may be resized, relocated to any side of the display, and auto hidden while not in use to free up that precious desk space. By default it runs horizontally along the bottom of the screen, always on top, with the clock on the far right and Start button on the far lefthand side. All currently open windows, whether running applications, open documents or nested folders, are represented by separate buttons on the Taskbar. Since the Taskbar is always on top, displaying all open windows, you can easily find your way around by checking the bar and clicking the button to select the desired window.

The conventional Alt-Tab switching is improved, cycling through all current tasks, be they open applications or windows. Better still is that all current tasks are displayed simultaneously side by side, with Alt-Tab shifting a selection box over each one in turn.

The Start button

Almost any operation may be performed with the Start button; a fact further confirmed by the "click here to begin" message which bounces itself off the button on startup. Any Macintosh users will be

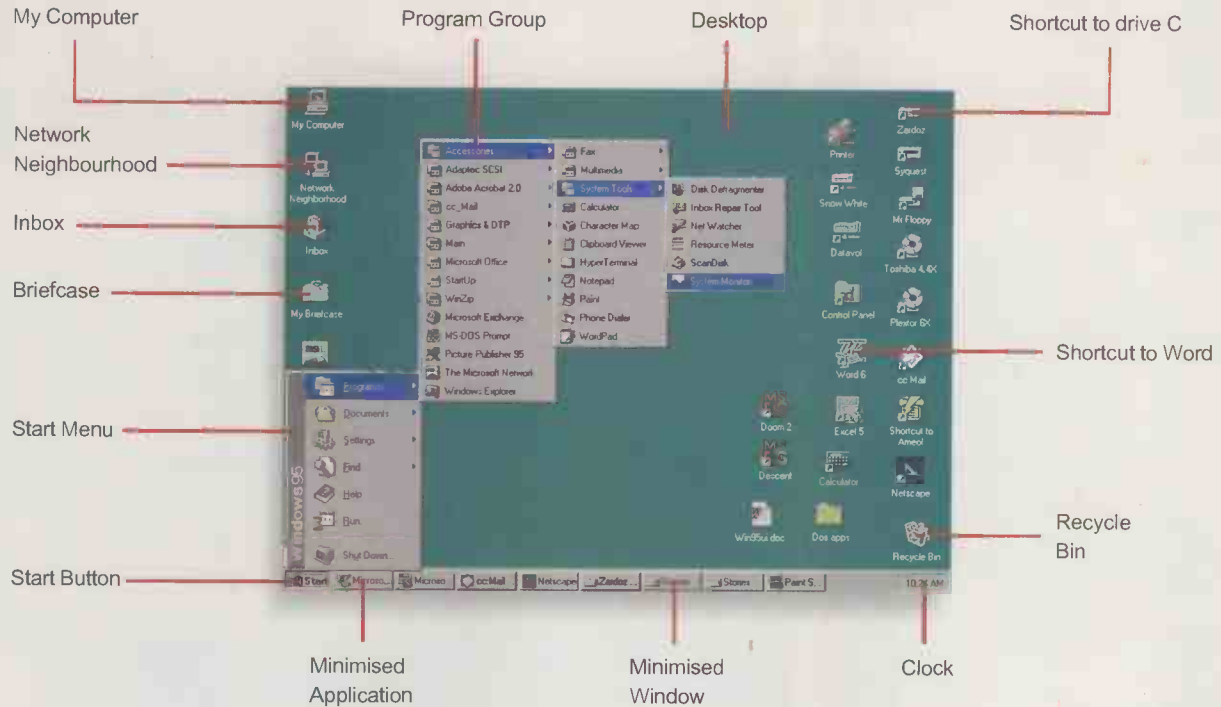
Right-clicking objects

PC pointing devices have more often than not boasted at least two buttons. We've always been aware of the obligatory left button click and double clicks, but Windows 95 makes much more use of the neglected right button.

Similarly to the implementation in MS Office 4.2 applications; right clicking in Windows 95 presents a menu of relevant options unique to, and next to, the object right clicked. Try right clicking anything to see how the options, and in particular the properties of that object change.

Windows 95 will offer options and properties of literally any object right clicked, including any drives, files, applications, shortcuts, Recycle Bin, Taskbar, Start button, and even the desktop itself.

The Desktop



Windows 3.x Program Manager was where all your applications lived in carefully ordered program groups. No folders were allowed, nested or not, beyond that of a minimised program group opening one level to reveal all its contents. Suffice it to say the desktop itself was nothing more than decorative.

Windows 95 changes all of that with a so-called real desktop where real

objects may be merrily dragged and dropped, whether they be drives, files, applications, folders, or Shortcuts. Right clicking and selecting new folder places a new folder wherever you clicked, be it within another folder or on the desktop itself.

Windows 95's desktop, which the Windows Explorer confirms, is where everything in your system branches from.

Documents from Windows 95 applications may be saved to, or opened from, the desktop. Existing 16-bit files may be dragged to, copied to, or have a shortcut made to them and placed on the desktop.

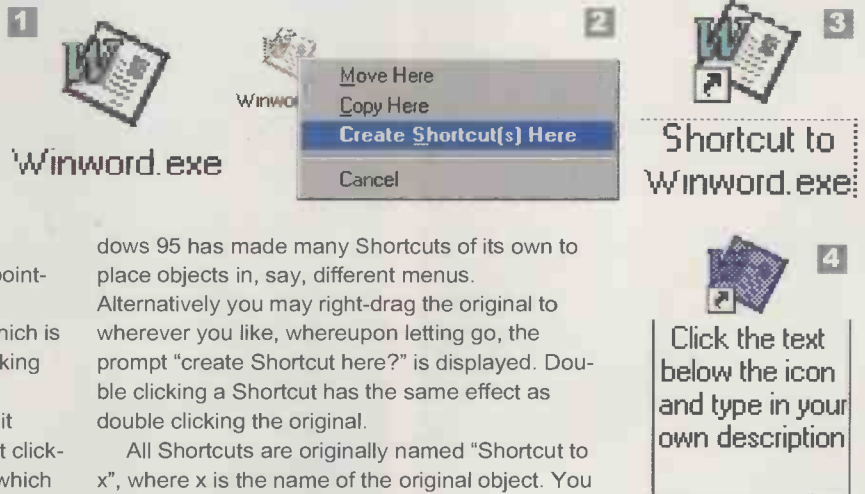
Before you panic, Windows 95's desktop can be decorative too, with the same backdrop tiling or centred schemes as were used in Windows 3.x.

Shortcuts

Despite the huge array of navigation offered in Windows 95, you'll still find yourself wanting to regularly access certain objects with the least trouble — such as applications which you'd like to launch by double clicking a desktop based icon. At least Windows 3.x's Program Manager placed icons for all your apps in neat Windows waiting to be double clicked.

These icons in Program Manager were pointers to the original executables. Windows 95 Shortcuts offer a similar concept, but one which is much more versatile and sophisticated, working very much like Macintosh aliases.

First, find your frequently used object be it application, folder, file, drive or device. Right clicking it offers the option to create a Shortcut, which produces a duplicate of the icon, only with a little curved arrow in the bottom lefthand corner. You can now drag this Shortcut to wherever you like, most usually the desktop, although you'll find Win-



Windows 95 has made many Shortcuts of its own to place objects in, say, different menus. Alternatively you may right-drag the original to wherever you like, whereupon letting go, the prompt "create Shortcut here?" is displayed. Double clicking a Shortcut has the same effect as double clicking the original.

All Shortcuts are originally named "Shortcut to x", where x is the name of the original object. You may click the text string and change the name of a Shortcut to whatever you like and even use the same name as the original. Macintosh forbids the use of exactly the same name, and indicates its

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Shortcuts (Cont..)

aliases with italicised type.

Right clicking presents options for the Shortcut only, although properties allows the original to be found in a single step. Binning the Shortcut does not affect the original but sadly, deleting the original does not as yet automatically do away with the Shortcut.

Shortcuts may be made of absolutely

anything, including printers. Dragging a document onto a printer icon or its Shortcut automatically launches the creating application, prints the document, then closes it back down again. Dragging a file onto an application or its Shortcut launches the app and opens the document, although unlike System 7.5, this cannot be done with multiple files.



Copying files

It's a small touch, but Windows 95 cutely represents the file copying or transferring process as two open folders tossing sheets of paper from one to the other.

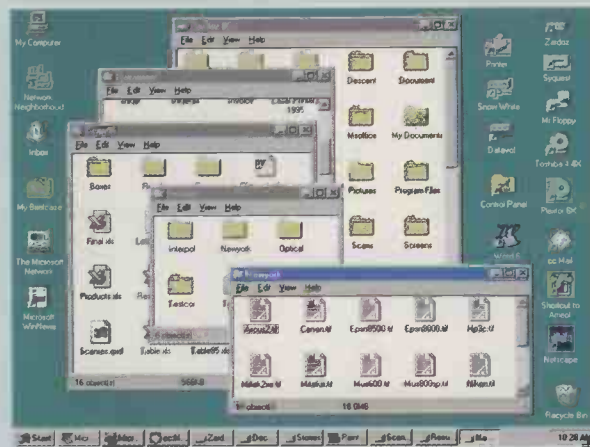
FROM PAGE 104

immediately at home with this button, similar to a combination of the Apple and Finder buttons.

Clicking the Start button brings up a menu offering Programs, Documents, Settings, Find, Help, Run and Shutdown. The first four have arrows indicating further sub-menus. Users will notice that they don't have to hold the mouse button down, instead finding the pointer automatically highlighting anything it falls across — just click once more to select your final choice.

During Windows 95 installation, all program groups are converted into folders, and pointers to these are placed within the Programs menu. Once the required application is highlighted, simply click to launch. Documents contains the last 15 opened files, which may be re-opened by their creating application just by clicking (once highlighted).

Find performs searches on criteria such as size of file and date last modified, along with incomplete file names, without any need for the confusing *.* wildcard syntax.



Nested folders

Directories are out of the Window, in favour of folders, the staple diet of a proper GUI. The nested structure works exactly the same way as in Windows 3.x's File Manager, where double clicking a directory reveals its contents, including

further sub-directories and their contents.

Windows 95's folders work the same way, except offering the same nested structure in windows on the desktop too. An open folder displays its contents in a window, either as small or large icons, or variously ordered lists. Double clicking a folder within a folder opens another window, again with your choice of how the contents should be displayed. This nested opening can go on until there are no more folders remaining to be opened.

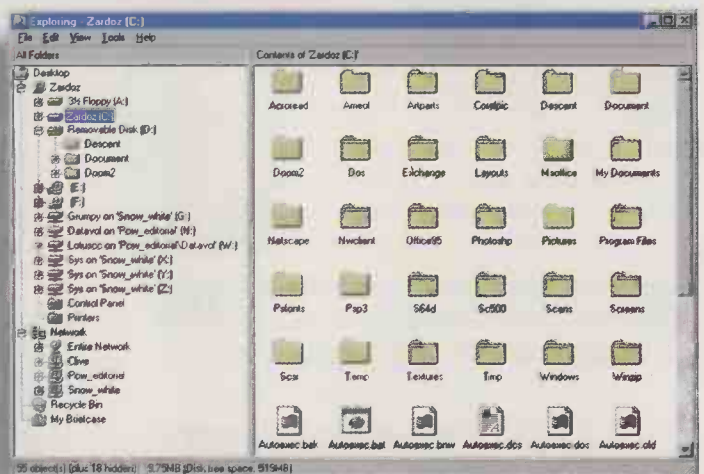
At any time within a folder, an application may be launched or a document opened by double clicking the icon. Documents are opened by a listed choice or associated application. When an association is present, the document identifies itself by using the icon of the associated application.

The Explorer

If you're completely mad, or just a little nostalgic, it is possible to launch the old Windows 3.x Program and File Managers. But there is an alternative in the Windows Explorer, which could be described as the File Manager on steroids.

At first glance it looks similar, with the familiar hierarchical tree structure on the left and the contents of an opened folder on the right. However there are no drives listed along the top; instead, everything branches off the desktop. The first branch consists of all objects on the desktop: the Recycle Bin, any Short Cuts, the Network Neighbourhood and My Computer.

My Computer contains all your drives, the Control Panels, and Printers folder. Drives contain all the folders with applications, files, documents and further folders. It's great to see how everything fits together and comes off a single branch, but it's tricky to drag a file out of one folder and onto the tree. You can't open and display two folders or drives at a time either, as you can with File Manager, instead you have to launch the Explorer twice.



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Long filenames without three letter extensions are finally here. Notice how the text wraps automatically from line to line.

Long filenames

Windows 95 supports long filenames with spaces, so there is no need to skimp on your file descriptions. Text is automatically wrapped to new lines, unlike System 7.5 which keeps it all on the same, often long, line. Three-letter file extensions still exist for compatibility with DOS and Windows 3.x, although by default they are hidden from sight — phew!

To rename a file, click the text under the icon and type away just like System 7.5. However, where Macintosh only allows up to 31 characters, Windows 95 stretches to 256.

It is currently uncertain whether Macintosh or OS/2 long file names will be recognised and displayed on Windows 95. Rumours imply that they would in a network scenario, so long as your server OS was Windows NT.

The Recycle Bin

When you think about it, having to launch File Manager to delete files was pretty ridiculous. Macintosh has always had its Wastebasket and now in an environmentally friendly move, Windows 95 boasts a Recycle Bin.

Both act similarly. Simply drag whatever it is you want deleting onto the Recycle Bin icon and let go. The icon changes to show it contains something but won't delete it until you right click it and select "empty recycle bin". Like Apple's Wastebasket you can double click the Recycle Bin to reveal a Window displaying its contents. Any last minute changes of decision and you can drag the items back out to safety.

Beware however, since the build we tested did not hold onto any files dragged from a network volume. It did prompt to ask whether you were sure you wanted them deleted, but once confirmed, they were gone.



Recycle Bin Recycle Bin

My Computer



Windows 95's graphical representation of your computer's basic hardware. My Computer, which can mercifully be renamed, contains all your drives, the Control Panels and Printers Folders.

Drives may include your bootable C: hard disk, any floppy or CD-ROM drives, and network volumes. As with Windows 3.x's File Manager, no account is taken of whether there is media present within the drive, so you'll still have instances of "not reading drive a:".

Macintosh System 7.5, along with the Apple hardware, only displays icons on the desktop for the

floppy and CD-ROM drives when a disk has been inserted. Dragging the drive icon to the wastebasket ejects the disk and removes the icon from the desktop.

In Windows 95 it is not possible to drag any of the drive icons from My Computer into the Recycle Bin — while dragging shortcuts to the bin deletes them. One consolation is that audio CDs change both the original drive and any shortcut icons to a CD with a musical note placed on top. On recognition of an audio disc, Windows 95 also launches the new CD playing utility.



New Windows

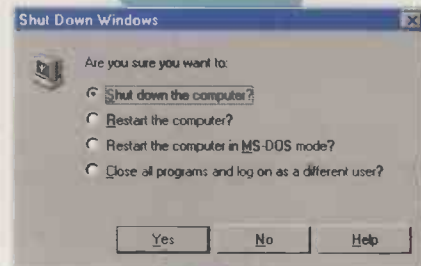
It's a new version of Windows, so why not have newly-designed windows? The Windows in Windows 95 look a little different to those in 3.x but still work in basically the same way. Along with a new 3D relief look, they now feature proportional scroll bars, giving some indication as to the extent of what's not on view.

The top left icon, which previously was double clicked to close, now bears the icon of the application. To close in Windows 95, single click the crossed box in the top right. The other two icons in the top right minimise, maximise or custom size. Whether it was left in to help acclimatise new users, or forgotten to remove from old code, double clicking the top left corner does still close the Window.

Shutdown

Remember that Windows 95 is a bootable OS in its own right, so there's no quitting to the C: prompt. Selecting Shut Down from the Start menu offers four options: shut down the computer, restart the computer, restart the computer in DOS mode, or close all programs and log on as another user.

The first option pauses while all virtual memory and temporary files are cleared, then informs you when it's safe to switch off your computer.



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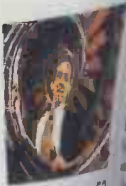
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CONNECTION

THE NETWORKING NEWSPAPER

Mercury



INTERVIEW 52
Andy Greaves, director of networking at BT UK, tells Connexion why ATM to the desktop will change the world forever.

RECYCLING 18
After 10 years of chaos and furores, IT firms in Europe are looking at new ways of gaining a competitive edge. Connexion reports.

SUPER SAVER 23
One of the UK's largest non-military telecomms infrastructures, BR Telecommunications, is up for grabs. The sale of BR starts here. Andrew Cooper reports.

OUTLAWS 26
The problem of software piracy never seems to go away, but Microsoft has come up with a new way of persuading users to stick to the letter of the law. Danny Bradbury investigates.

STACK IT 33
Increasingly sophisticated capabilities are taking stackable hubs ever closer in functionality to their modular, chassis-based cousins. Connexion offers users a guide to the main differences.



Mercury has announced a new service which will allow users to connect their PCs to the Internet via a dedicated line. The service is being offered as a trial for a limited period. Mercury is also planning to launch a new range of networking products in the near future. The company is currently working on a new generation of routers and switches which will be designed to support high-speed data transfer. Mercury is also investing in research and development to improve its network management tools. The company is currently working on a new generation of network management tools which will be designed to support high-speed data transfer. Mercury is also investing in research and development to improve its network management tools. The company is currently working on a new generation of network management tools which will be designed to support high-speed data transfer.

How to run DoT network

...were not within our remit. We pulled out they [Mercury] were the only ones left." ... will be linking up DoT sites initially. ... dial-link frame relay ... service. It will ... equipment ... Corporation ... manage the ... The Wans ... Mercury, and ... of the two ... connected to ... of contact for ... transport. ... head of the ... ment sector ... at the deal ... parts — the ... work and a

catalogue-based services that which would enable services to be tailored according to the needs of each DoT site. To make it as future-proof as it could be it has options on other services we provide which allow agencies to be able to mix and match their requirements at a local level. There are various general services, such as silver and gold, she said. ... Time also discussed Hagan's decision to leave the contract. "What was the reason for this? It was a happy coincidence, although interesting to know the details were on the grounds of incompatibility. "I would like to have had a change in management, but that it implemented," she added. ... The contract is the latest in a series of agreements with Mercury for the provision of a national data network. It is a three-year contract worth £10m and will cover a number of countries via its networks, which was awarded last September and is due to go live.



Mercury: "happy to bring"

Danny Bradbury

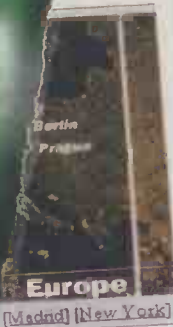


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MSoft

Microsoft has laid out its long-term plan for distributed computing, including its current object technology across the enterprise and how applications such as data integration, transaction management and distributed support. The online centres around new interfaces for Microsoft's OLE architecture model and the currently OLE DB allows developers to connect their applications to data from existing components. The aim is to take OLE beyond the desktop to create a framework for assembling software components into new applications. "It's all about bringing the rich integration that people have come to expect on the desktop to



Europe

has taken its first steps on the web. www.timeout.co.uk

Multimedia Murdoch

Rupert Murdoch's News Corporation is to form a joint venture with MCI to provide multimedia services to MCI subscribers — the first time a major media corporation has teamed up with a telecommunications company. Both partners will put \$200 million into the joint venture. News Corporation may pay for its share through assets in EMI and Star TV. As part of the deal, MCI will also invest up to \$2 billion in News Corporation services on offer are expected to include pay TV, home shopping and online information services. The deal would also be used to publish News Corporation's 130-odd newspaper electronically. It is also a partner in the deal through its 20 per cent stake in MCI. A spokesman said: "We are pleased to support this action, and we see it as a major development in the convergence of electronics and broadcasting." The agreement represents a major step towards the availability of multimedia services in the UK, at least in the short term. Michael Vukob, director of consultancy BRG, said: "I've yet to be convinced this is going to make sense."

lays out Objectives

enterprise," said Tom Honeybone, the company's European OLE marketing manager. According to Honeybone, over the next two to three years, new interfaces will be added. The new OLE — previously known as distributed OLE — will include remote procedure call technology for distributed components across a network and will add security features. It will be delivered as part of a distributed system. Honeybone has been dubbed by OLE as a "universal data" and will give users a "universal" of writing queries. "I think the idea they were trying to convey was essential in the first year. Honeybone is intended to let developers add selected

transaction processing services to existing OLE applications, and OLE Team development is a set of interfaces that will allow OLE components to be managed by repositories and other tools that support transaction development, catalogue software components manage them over their life cycle. OLE does not work with other object standards such as OpenDoc, although it is working towards interoperability with the Object Management Group's COMBA.



Honeybone: "rich integration"

but Honeybone claimed that, with 35 million users running OLE-based applications, it was the most valid standard available. "Certainly, in the case of competing technologies out there, they're just not delivering," said Honeybone. He pointed out that OLE was already supported by Lotus and Novell, adding: "They talk OpenDoc but they ship OLE." Eric Leach, the UK representative of the Object Management Group, said: "They clearly don't have a well-understood strategy for deployment through the enterprise — this is new information." Emma Willacott



System requirements

Microsoft says, "Windows 95 runs on PCs with at least a 386DX processor and 4Mb RAM at least as fast as Windows 3.1 does." The truth, to quote our Cutting Edge editor David Brake, is that "Windows 95 stinks on a 4Mb PC". Windows 3.x stinks on a 4Mb machine too, but at least its disk requirements are a little more modest.

For at least two years we've recommended 8Mb machines to our readers. Under Windows 95 this recommendation becomes a must. And because Win95 is much better at handling extra memory than 3.x you'll get even better performance from 16Mb RAM. If you can afford it, get 16Mb RAM.

Our preliminary tests suggest that Windows 95, even at late beta stage (build 462), is quite a bit livelier than Windows 3.11 on an 8Mb machine. It's particularly noticeable that the infamous Windows resource problems have been

solved. Running Word, Excel, Lotus Organizer and cc:Mail simultaneously is still slow on an 8Mb machine because your PC will be resorting to virtual memory, but your system will not crash routinely or grind to a complete halt.

On a 16Mb machine build 462 was already substantially faster than

Windows 3.11. Windows 95's extensive and efficient use of RAM caching means that applications can be re-opened extremely quickly. In general, graphics operations are where you notice the biggest improvement, particularly when using applications like Photoshop. Disk operations are not noticeably quicker than Windows 3.11.

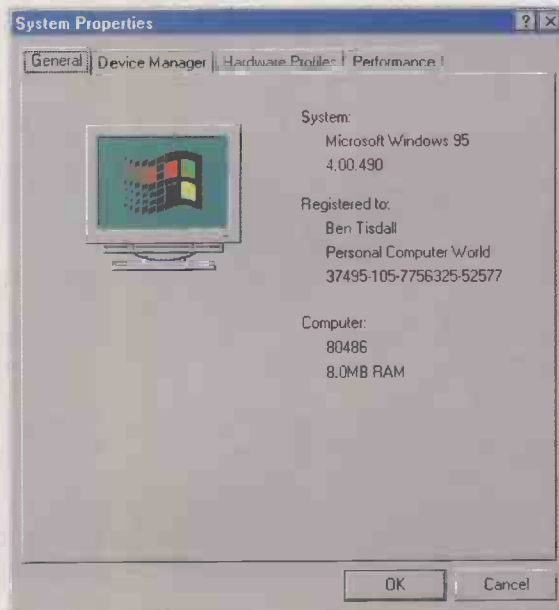
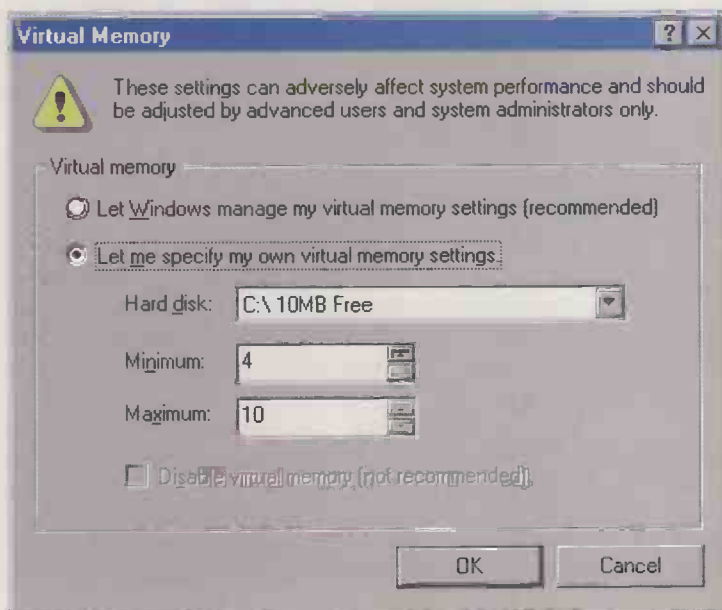
Hard disk

Microsoft says the minimum hard disk size is 120Mb. But a full installation of Windows 95 is 80Mb. Once you've installed a couple of applications and created some document files your disk will be full. A typical installation of Microsoft Office is 55Mb, but add filters and clip art and you can add tens of megabytes more. The sensible minimum hard disk size for Win95 is 250Mb.

Microsoft says Windows 95 doesn't require a CD-ROM drive but Windows 95 ships on around 20 disks. If you're not on a network you probably won't want to run Windows 95 without a CD-ROM drive.

Upgraders — what you should do

Upgrading to Windows 95 gets you a radically different interface, which is explained in detail on page 104. But



beneath the cosmetics are some significant changes to the operating system architecture and its capabilities. Some of these, like plug and play, multithreading and multitasking, comms and multimedia are dealt with in detail elsewhere. But it's worth summarising the main points.

- New user interface — supposedly easier to use but a big change from Win 3.x.
- Robustness improvements — Windows 95 is much more stable.
- Less limitations — support for larger hard disks (IDE up to 137Gb), improved display driver support.
- Comms improvements — the 32-bit comms subsystem is just the tip of the iceberg; there's also Microsoft Exchange.

For home users of standalone PCs the rough and ready guide to upgrading which follows, should fit the bill. But for companies, whose businesses depend

Upgrading tips

- You're the proud owner of an ageing 486SX, 4Mb of memory, 120Mb hard disk.
Verdict: It's not worth upgrading to Windows 95. Bringing your hardware up to scratch will be too expensive. Unless you're prepared to consider buying a new PC, stick with Windows 3.x.
- You own a DX2/66MHz, 8Mb of memory, 250Mb hard disk.
Verdict: It's definitely well worth upgrading. And when you can afford it add more memory and a bigger hard disk for better performance. Unfortunately, if your machine is over a year old you're unlikely to be able to take advantage of plug and play.
- You own a Pentium, 16Mb Ram, 500Mb or larger hard disk.
Verdict: You've got a machine ideally suited to Windows 95. Upgrade as soon as you can. However, your PC may still not be completely plug and play-compatible.
- Your old PC is about to go belly up, or you're buying a PC for the first time.
Verdict: Windows 95 is definitely the way to go. If you're buying a new PC from a reputable supplier, Windows 95 will have been thoroughly tested on it. New PCs should also be using plug and play compatible components.

on working computer systems it's a more difficult decision. Certainly most corporates are likely to spend many months evaluating the final version of Windows 95 before rolling it out to all users. And for corporates the choice between Windows NT, Windows 95 and OS/2 will need careful consideration.

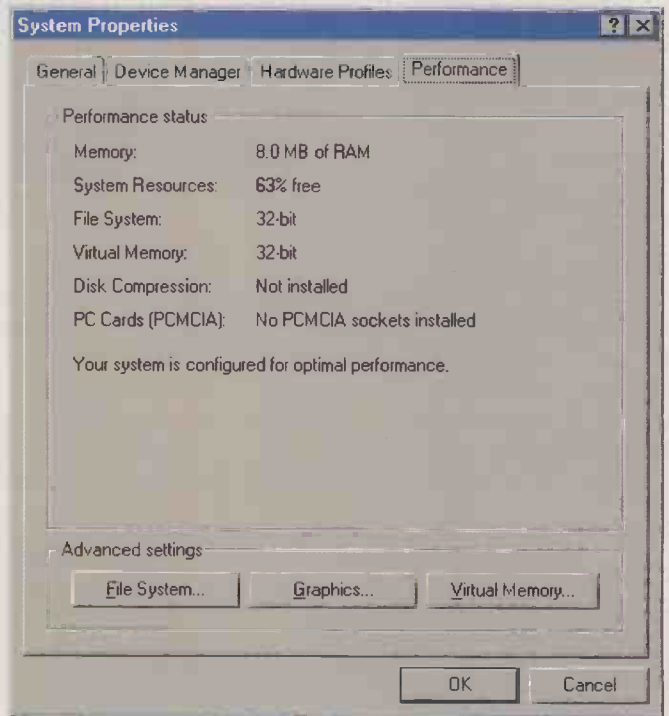
Compatibility

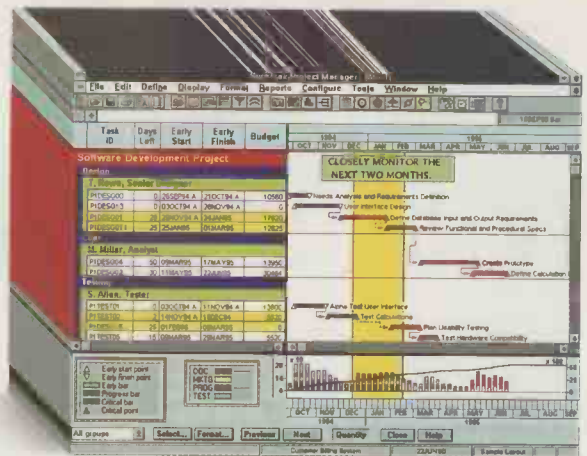
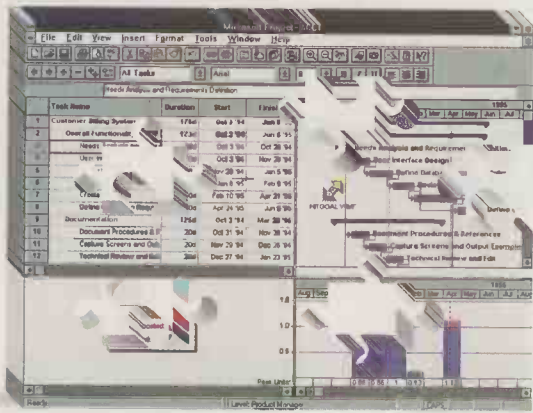
This has been a huge issue for Microsoft and one of the main reasons for the long delay of Windows 95. It's probably impossible for Microsoft to ensure that Win95 is compatible with every application, utility, peripheral and driver. After all, OS/2 still suffers from some compatibility problems after several releases.

You can be confident that Microsoft has ensured compatibility with the major software applications and common graphics cards and peripherals. However, if your business depends on any slightly

obscure hardware or software, don't plunge into installing Windows 95 until you've checked that your kit is supported.

We've experienced a number of compatibility problems with Windows 95, but until the finished product goes out it's difficult to comment on specific issues. It's also important to realise that to get the full benefits of Windows 95 you will need to upgrade your applications. For example, to use long filenames your application software needs to support them.





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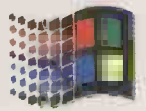
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What's the **CRACK!**



Windows 95 is touted as an overnight multimedia upgrade. Whether this means you'll be up until 7.00am trying to install it we don't know, but in many respects could be worth it anyway. There are some significant enhancements in the multimedia field, the most welcome of which are the software-based digital video and optimised CD-ROM drivers. Video for Windows is an option for Windows 3.1, offering resolutions up to 320 x 240 at around 15 frames/sec. In real terms this means putting up with jerky credit card-sized video clips, and only if you have a well equipped 486DX and have managed to install Win95 successfully.

In Win95, digital video is built into the operating system, making for better performance and reliability. By using 32-bit drivers, and better compression (likely to be Indeo 4.0, but not confirmed at press time) a 386-based system is capable of playing back AVI files at a reasonable quality. Frame rates and window size are still dependent on the CPU, and a Pentium will therefore provide better output.

Microsoft has been working towards setting a Windows-based standard for MPEG and has licensed a software-based MPEG driver. Again, it was not confirmed at the time of writing if this will be in the final release, but it is likely to appear at some point thereafter if not. We ran several AVI movies and compared them to Windows 3.1 running on an identical system (486DX/50, 8Mb RAM Stealth 24VL graphics card) and there was an appreciable difference in quality. At 320 x 240, images were smoother and fewer frames were dropped. Due to the nature of 32-bit



Multimedia



multitasking operating systems it is also possible move the windows across the desktop, or work within other applications without distorting the video.

Due to the massive file size of digital video, CD-ROM is the only sensible medium for distributing AV material. As mentioned earlier, there are new drivers for CD drives, and better cacheing facili-

ties. Within the control panel you can customise your drive by setting up the cache, and by optimising the driver for double-, triple- or quad-speed drives.

The CD Player

Utilities for playing audio CDs are not new and have been bundled with sound cards for several years. Windows 3.1 didn't come with a CD player as such, but used the Media Player which was finicky in use. Windows 95 has a simple but useful player which benefits from AutoPlay. When a CD is inserted, audio tracks are recognised and begin to play automatically. After all, if you insert a CD, chances are you'll want to listen to it. This is all part of making Windows easier to use.

The player offers features you'd expect to find on a domestic CD player, including random play, intro search and multi-disk play, should you have more than one drive. It will also let you name CDs, and list the artist's name and track titles. Another feature of AutoPlay is that applications will automatically install, and run, when a disk is put in the drive. This is determined by a file in the root directory called setup.inf. The file contains all the setup information needed for an automatic setup. Although we haven't yet seen any applications that utilise this, they will first give you the option



Video for Windows



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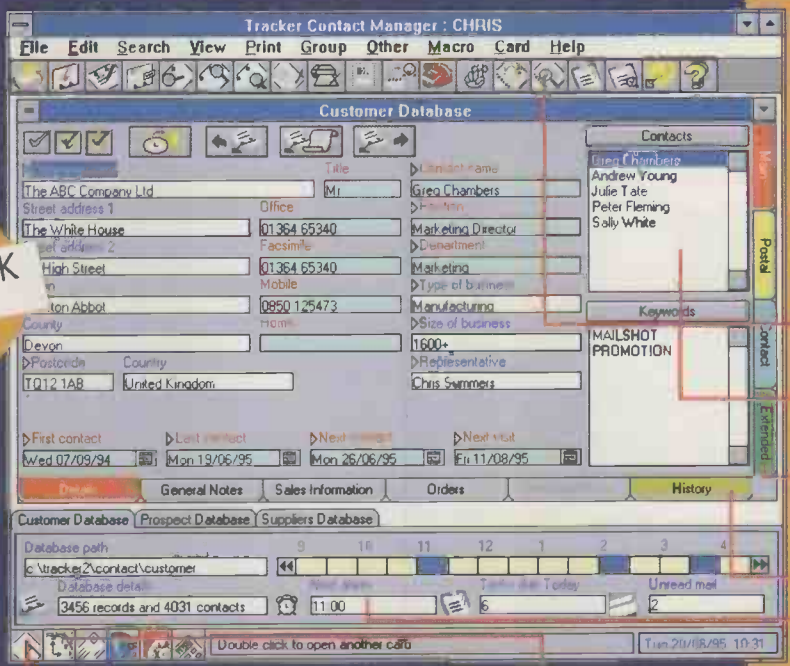
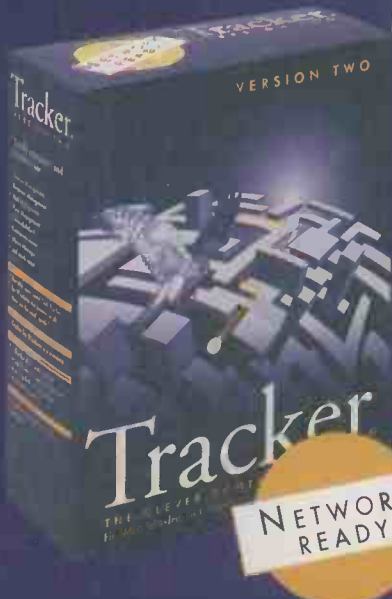
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Video Galaxy

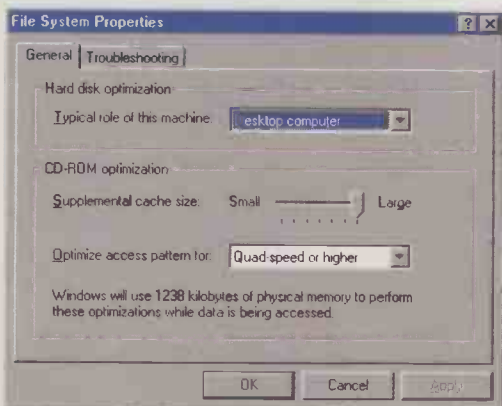
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Configuring CD-ROM performance

to install software before going on to do so.

MIDI

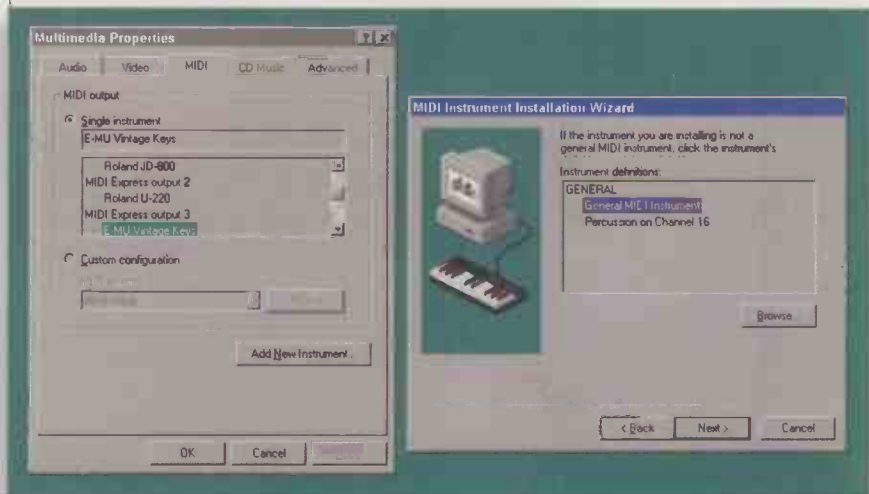
There are new developments in the MIDI department which promises to make life easier for both musicians and games developers. With full support for General MIDI, or GM, it will be possible to refer to instruments by names, as opposed to numbers (which has been the case so far). In more complex MIDI environments each synthesiser, drum machine and other MIDI device can be named and assigned to an individual MIDI port and channel using a system called OMS (Open Music System).

OMS has already proved hugely successful on the Mac and more MIDI applications, such as sequencers and patch editors, are supporting the standard. OMS for Windows 95 has been developed by Opcode and will be available as a plug-in module at the time of shipping.

Digital Audio

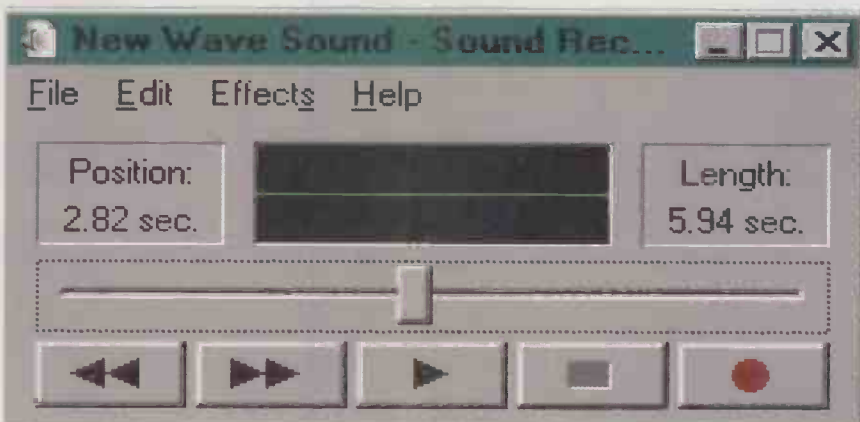
Setting up hardware for Windows 95 will

Full support for General MIDI



be easier thanks to plug and play technology. For devices which aren't plug and play, setting up should still be easier since Windows 95 is supplied with universal drivers. For sound cards there's a Sound Blaster driver which Microsoft claims will work with any Sound Blaster-compatible. It is still possible, however, to install manufacturers own drivers.

The standard SB drivers have been made easier to understand and use simple terminology for setting sampling rates. For example, selecting CD-quality will set the card up to record at 44.1KHz, 16-bit stereo, whilst selecting "telephone quality" will record at 11KHz 8-bit mono. The Sound Recorder remains the same

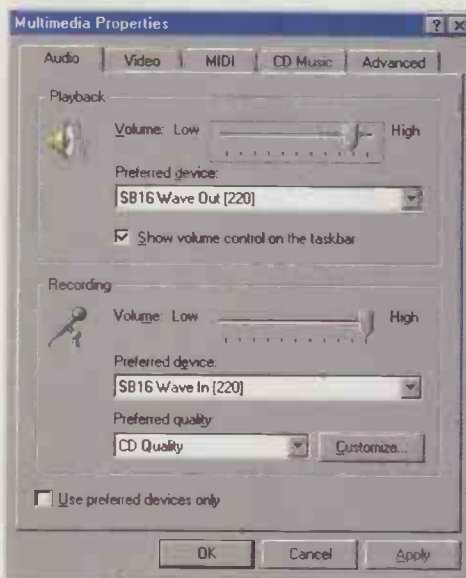


Windows standard wave player

as found in Windows 3.1, only with a link to the record setup dialogue box.

Multimedia Device Drivers

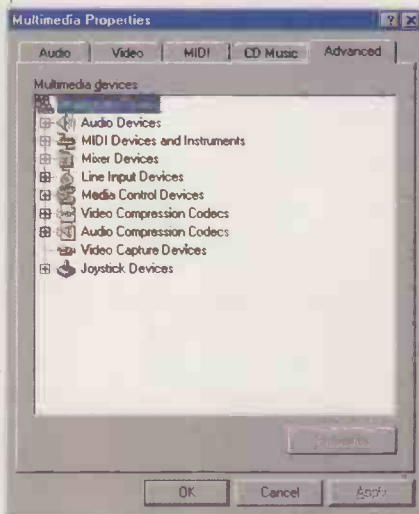
Multimedia has its own section within the control panel that lists the devices installed on your system and default settings for video playback (full-screen or

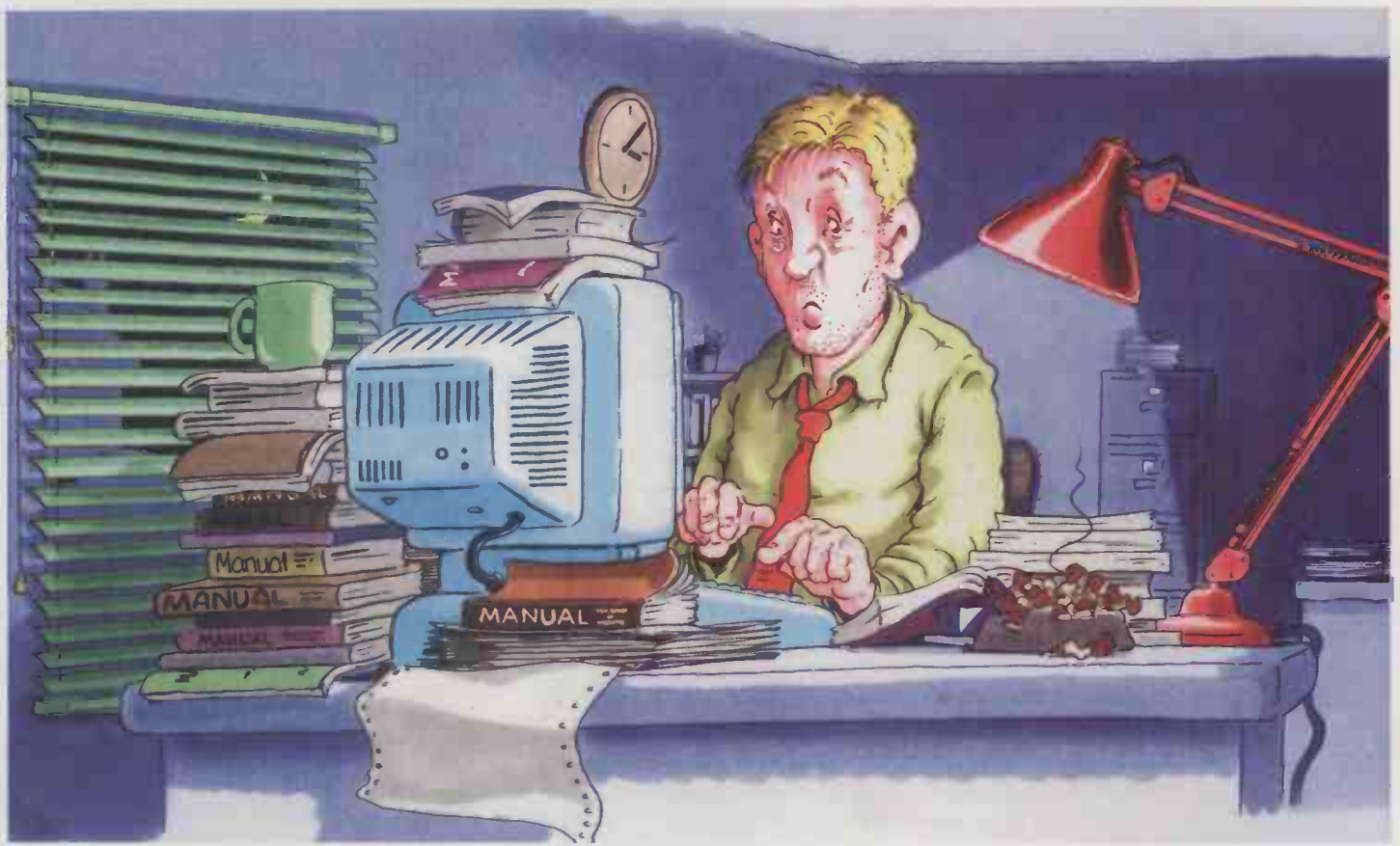


Setting up your soundcard

window). It's also here that you select a CD drive for audio and configure the MIDI mapper, or MIDI configuration as it's now called.

Windows 95's intuitive driver setup





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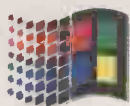
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Working away

Windows 95 offers Advanced Power Management and the concept of the "briefcase", among other features the user on the move will find useful.

Mobile and remote working features are expected to become increasingly important in the coming years. Notebook sales are surging, wireless communication is becoming easier, and working from home is increasingly popular for organisations large and small.

Since notebook computers tend to be less powerful than their desktop equivalents, Windows 95 should stay in use on them long after NT supersedes it on desktops, so it's not surprising that it's full of features useful for mobile users. Some of these have been covered more extensively elsewhere in this feature: Plug & Play (page 135), for example, should finally provide a standard, reliable way for notebook owners to use PCMCIA cards — they should be instantly recognised when they are inserted and you'll be able to use them right away, without re-booting. Advanced Power Management has been improved: the Windows 95 shell now includes a battery meter; users can put their computers into "suspend" mode directly from the Start menu, instead of through hardware; and with appropriate hardware they can switch their machines off automatically when they shut down. With the right drivers and hardware support, users will also be able to "hot dock" their notebooks once they are back at base; network resources and additional storage will appear automatically, also without having to reboot.

The "briefcase"

Synchronising files when they are updated while out of the office was possible even under DOS, but there has been no standard programming interface or way to use the facilities provided by different programs. As a result, users may have to run several different "reconciliation" programs when they return to base. Windows 95 introduces a concept called the "briefcase". You drag files which you want to keep up to date into the briefcase, copy the briefcase file to a floppy or hard disk, and work on the files in the case while away from the office. When you return,

you select "update", and Windows 95 will perform the synchronisation for you. In its simplest form, it replaces older files with those with a more recent modification date, but it also provides a single interface for programmers to produce their own synchronisation. Microsoft's new Office for Windows 95 already uses this to handle record-by-record updates of Access databases and Schedule+.

Windows 95 gives you more ways to connect two machines together than ever before, and makes those connections easy to manage. Ever since DOS 6 it has been possible to use Microsoft's own software to connect to other machines through a serial cable and exchange files, but the software provided was rather primitive. Windows 95 supports connections between PCs via serial cable, parallel cable or across the telephone by modem. The first two connection methods are available free, and are easy to use. There is a simple Wizard which walks users through how to connect machines together this way, and after that, the drive on the host machine appears in the "Network Neighbourhood" viewer of the client.



Above If all you want is file access across a serial or parallel cable, Windows 95 now makes it easy to handle

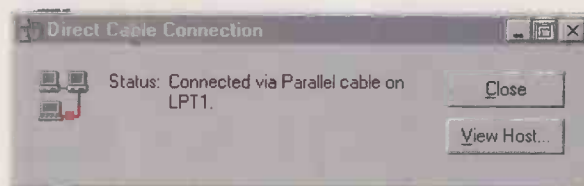
Right There is a setup wizard which "walks you through" all of the steps you need to connect two machines by a cable



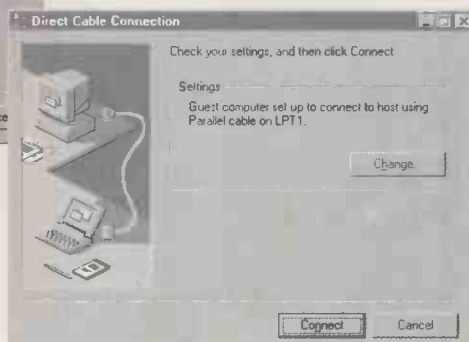
Dial up, dial in

Dial-up connection is more complex, because higher levels of security are required. Every Windows 95 machine comes with the ability to dial into another machine to exchange mail or get access to data stored on the office network. If your office is on the Internet, you can even connect to a host machine using PPP (Point to Point Protocol) and get access to the Internet through a modem without buying a separate dial-up account from an Internet service provider (though many corporate Internet connections are likely to be limited in the access they allow for fear of break-ins from hackers).

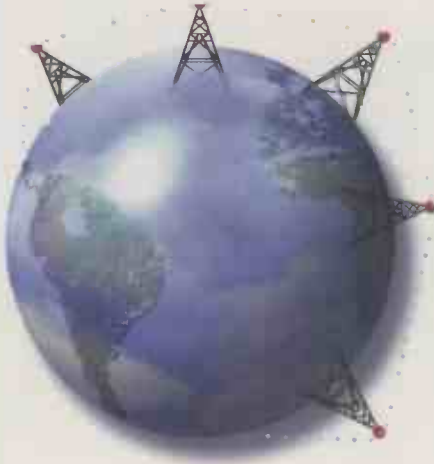
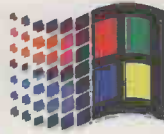
If a machine is to be used as a dial-up gateway for several remote machines, Windows NT includes the software required and is a robust and secure system. For less-demanding tasks, the Plus pack includes simple dial-up server software.



Using the direct cable or modem connection, the files which you are permitted to view can be treated just like files on your own hard disk



Get connected



It should be relatively easy to connect to the Internet using Windows 95. You'll need the Plus pack too (unless you're a corporate user), but this includes everything to get you up and running.

Windows 95, when combined with the Plus pack, has all the basic necessities to enable you to use and browse the Internet.

If you already know how to get your Windows PC connected to the Internet and you have an email package and a Web client you are happy with, Windows 95 (as supplied) includes SLIP or PPP dialup software or LAN-based TCP/IP software — everything you need to get online. You'll have to work out how to configure all the software yourself though, as it's primarily designed for in-house corporate use. There's a helpful Web page available which "talks" you through how to configure your machine manually at <http://www.utw.com/~sjj/tcpip.html>.

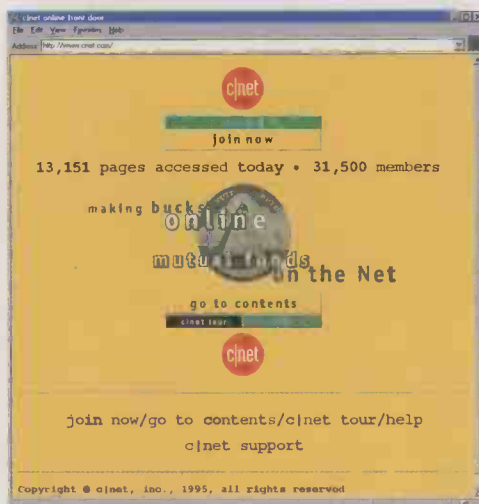
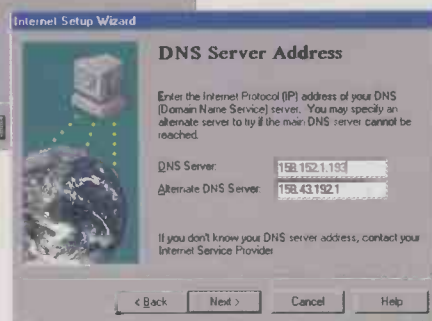
For all sorts of reasons the Plus pack is a "must buy" for non-corporate users, but from the point of view of the Internet user the biggest incentive is the inclusion of Internet email for the Exchange client, and a Microsoft Web browser, with Internet Setup Wizard to help set them both up.

The Setup Wizard guides you directly to the boxes you'll need to complete to get the Internet stuff working, but you'll still need some guidance from your service provider if you're going to answer questions like "what is the TCP/IP address of your designated DNS server?" If you have an Internet service provider which is included in Plus's database of settings, some of those awkward settings will be filled in for you. It is not yet clear how many UK service



providers will have settings files available, but once Windows 95 takes off, most of the larger providers will probably write their own.

The Internet email client works well and is integrated with Exchange. In time this should mean you won't need several



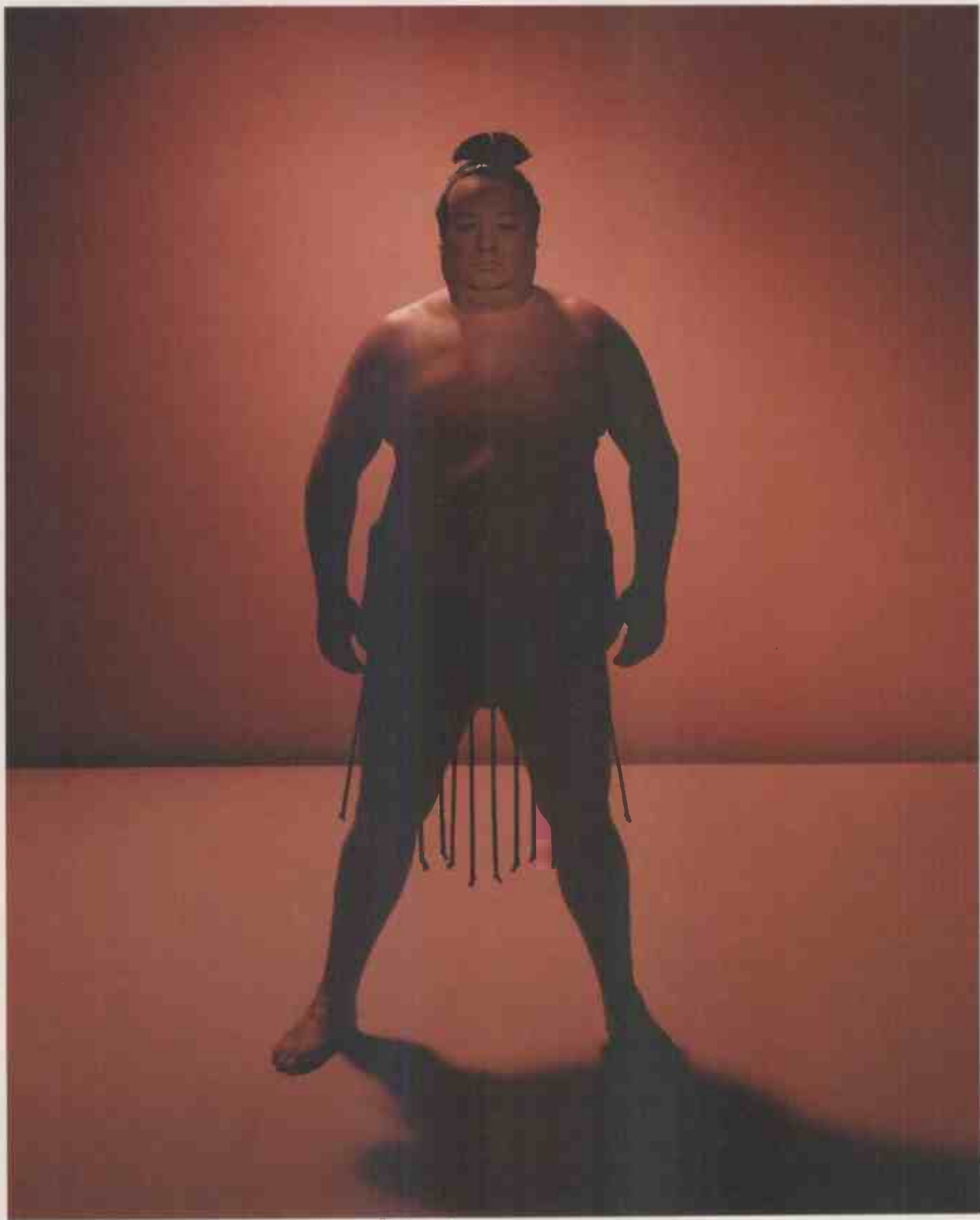
different packages running simultaneously to get mail from office colleagues, and faxes or email from external organisations. Read more about what Exchange has to offer on page 126. Until Exchange Server is available towards the end of the year Exchange won't have the sophisticated email filtering tools you can get in many existing packages, but it does allow rich text (text with boldface, in different fonts and with embedded shortcuts) as long as you are connecting to other Exchange users. You can disable this feature for individual email addresses so you aren't sending people mail which is full of codes they can't read. If you have created a mail message with formatting which is sent to people with and without Exchange, they may find it hard to read in places, but it should at least be intelligible.

The "Internet Explorer" included in the Plus pack is a capable Web browser. The beta version I have used doesn't support displaying tables, and for the next few months it won't support secure transactions so it will be unsafe to use for this purpose over the Web, but these

are just minor considerations. Most pages, even those designed to look good using Netscape, will also look good in Internet Explorer and it seems just as fast. It even has a couple of handy features which I hope other suppliers might emulate, such as the ability to memorise your passwords for sites that require them. Microsoft is unlikely to be able to move as fast as dedicated Internet suppliers in keeping its browser up to date, but it is starting from a pretty good base.

Microsoft has done a better job than might be expected of making it easy to get connected to the Internet using Windows 95. It's a pity that you'll have to shell out extra cash for the Plus pack if you want to gain maximum advantage.

Microsoft's Internet Explorer is a capable Web browser which is as good as Netscape for most purposes



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Fair Exchange

The Exchange client looks like a pretty minor part of Windows 95 to begin with — superficially it seems little more than a basic email package, and many who install Windows 95 may not bother with it at first. But once Exchange server ships, adding new conferencing features, Exchange will be at the heart of Microsoft's attempt to beat Lotus Notes.

Exchange is designed to be a "universal in box". Email messages from a variety of destinations, cross-company bulletin boards, faxes, and even voicemail, will all be handled by the same program. As it ships, Windows 95 includes "free" LAN-based email compatible with existing MS Mail setups on Windows for Workgroups, and basic fax handling. If Windows 95 users sign up to MSN (Microsoft Network), they can also send (and receive) email to MSN members, and out to the Internet. CompuServe has developed an add-on to allow people to send and receive CompuServe mail through Exchange, and buyers of Microsoft's Plus pack will get an Internet email reader as part of the package. More details of Exchange's handling of Internet email are given in the Internet section on page 122.

When the Exchange server ships (some time before the end of this year), it will add "public folders" — instead of posting a message to an individual you will be able to post it to an online conference in a common folder, and members of the conference can respond to it publicly. It is this feature, together with additions from third party developers and replication technology, which Microsoft hopes will enable it to compete with Notes.

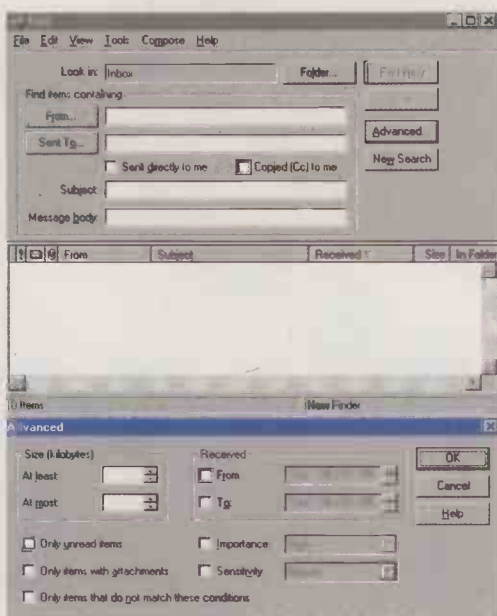
The biggest problem with the Exchange client is that in some ways it is just too powerful. With so many ways to send and receive messages, and so many possible settings for different parts of the configuration it can be tricky to figure out where to look to change a setting. It's a pretty hefty program, too. On a Dell Dimension Pentium 60 with 8Mb of RAM

Don't discount the importance of Exchange. Although it may seem only a small part of Windows 95, first impressions can be deceptive.

Once you've been through the pain of installing it, if you've got a machine powerful enough to run it, then Exchange is certainly appealing. Being able to receive and administer all of your communications through a single interface is a good idea — you can send the same message to different people via fax, company email or external email without having to copy and paste it between different packages, and any enhancements to Exchange help all of your communications. When Exchange server ships it will allow Exchange users to set up filters for their email, and those same filters will help you sort your faxes or voicemail, too. Exchange already allows you to use the spelling checker in Microsoft Office for your email messages before despatch, wherever they are going.

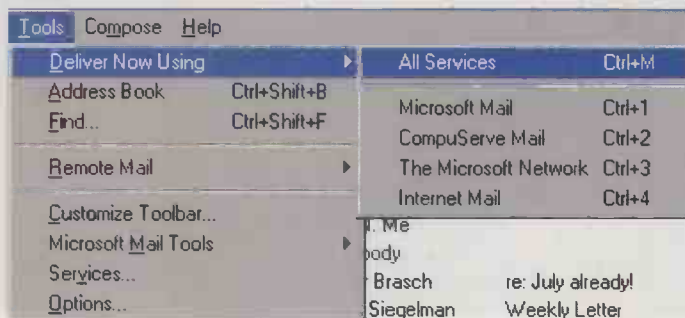
Having been designed from scratch, the program has additional features that few other email packages can match. When working between Exchange users, it supports "rich text": not just boldface and italics but different fonts, different text sizes, bulleted lists and graphics. And it will support attached files and embedded "shortcuts" — links to files on a server, on the Internet, or on MSN. When communicating with users who can't make use of features like these, Exchange's email reduces to plain text.

PCW



Exchange doesn't ship with tools to filter incoming mail into folders, but it does have a sophisticated search engine to help you find messages once you've sorted them

running beta 490 it takes more than 45 seconds to load and is noticeably slower than the cc:mail package we use internally, for instance. Judging by what we've seen so far, we wouldn't recommend using it on a machine with 4Mb of RAM (but then neither would we recommend using Windows 95, or even Windows 3.11, on less than 8Mb of RAM these days).



You can use MSN to send and receive messages from a variety of sources — it will even automatically check all the services you use simultaneously

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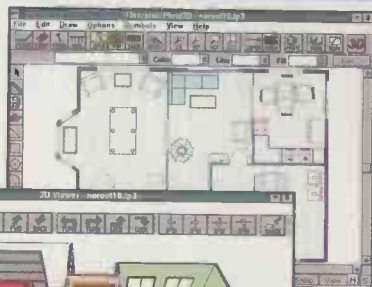


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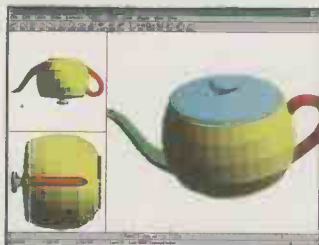
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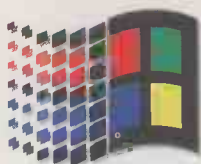
Networking

Networking Windows 95, both by itself and as a part of a Novell network, turned out to be easier than with any other desktop operating system we've seen. It integrates with Novell NetWare as easily as with Windows NT, and will even share files as a sort of Novell fileserver. It does require a real Novell fileserver to be present for this aspect of connectivity, though, as it obtains user names and password validation from the NetWare server. It certainly is good to be able to share out a local printer under Windows to NetWare clients without the unreliability of Novell's RPRINTER, which can be somewhat ungainly under a Windows session.

Windows 95's NetWare connectivity is currently limited to NetWare versions 2.0 and 3.0; NetWare 4.0's Network Directory Services (NDS) aren't currently supported, although these are said to be under development and will be available when the full package is released. Of course if you have a Novell 4.0 network, simply enabling bindery emulation on the server(s) will give you a limited connectivity, although the Novell utilities may not work as expected.

Of course, Windows networks are also supported and will co-exist with Novell networking, although you do have to choose under which network system a specific machine will advertise its services (that is, whether it is to conform to Novell or Windows networking calls). We linked a Win95 machine to a Windows NT server with the same amount of effort it takes to add a Windows for Workgroups machine to the network — hardly any. This will undoubtedly demystify the hitherto rather magical incantations which until now had to be added to the config.sys and autoexec.bat files, because there are none.

We tested the functionality of printer sharing by adding a LaserJet 4M to a parallel port and sharing it; the printer worked fine.



Moreover, it was visible to all the NetWare clients on the LAN. We did the same with a Novell workstation, and once it had been validated by the NetWare fileserver, we were allowed to map a drive to a share on the Windows 95 machine. It behaved exactly like a Novell server. It even responded to all NetWare utilities we tried, such as VOLINFO, SYSCON, PCONSOLE and so on, showing the CD-ROM which was shared across the network as an ordinary (but non-writeable) drive. This turns out to be a lot simpler (and less memory-hungry) than Novell's own CD-ROM-sharing method. It also allows you to use CD players which aren't supported by NetWare — since Novell only allows the use of SCSI CDs, this will be the ideal opportunity to have more CDs online at once and to use all those IDE or proprietary-type Mitsumi, Sony and Panasonic CDs which might have been consigned to the role of single-user access.

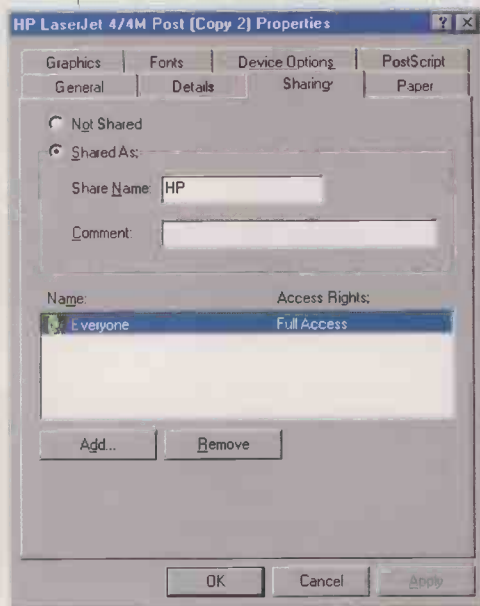
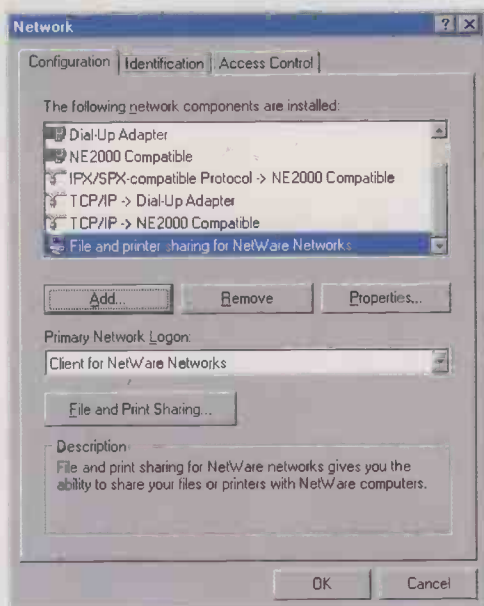
Of course, Windows 95 won't run Novell's NLMs and so won't, for example, act as a Mac fileserver, although when NDS support for NetWare 4.x is available, it's possible that a Mac could log into it

using the NetWare NDS Macintosh client. It is also possible that, say, Dayna's Net-Mounter would allow the Mac to log into the Win95 fileserver.

Similarly, we switched the sharing from Novell-type to being a simple Windows Network (Windows for Workgroups and NT) type of fileserver. Again, we shared the same drives and printer, and again it worked without complaint and as expected. Since we were using the standard Final Beta Preview CD-ROM for these tests (which has been available to everyone for some while) and not a later beta-testers' build, we were very impressed.

Overall, in fact, we found Windows 95 to be more stable, versatile and simple to configure than Windows for Workgroups 3.11. If your headache is supporting a mixed Novell 2.x or 3.x and Windows network, you could do a lot worse than buy into the preview program as soon as possible.

Below left Here we are setting up NetWare file and printer sharing...
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T2150CDS DX4/75 10.4" 4MB/520Mi.b		£2,050	
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The games Windows play

Direct Draw, part of Windows 95, allows games to run at least as well as they do under DOS. The PCW team assesses this new games programming facility.

Microsoft wants you to forget that DOS ever existed. But games programmers love DOS. It may be archaic, but most of the time it allows them access to a computer's hardware without getting in the way of the software. While the likes of Lotus, Microsoft and Borland pay lip-service to performance, it's the games programmers who really worry about where their cycles are going.

If Microsoft wants games to run under Windows 95, they must run at least as well as they do under DOS — some of the tricks employed by games programmers get right to the hardware of the machine. This rather goes against the grain of an operating system like Windows which needs control of the hardware to make sure things like multi-tasking take place in an ordered manner.

The first solution to this was WinG, an addition to the Windows API specifically tailored for Games programmers. WinG looks at the operations performed by the software and then chooses the best way to do it using the available hardware. This is fine for some games, but for Windows 95 there is a better scheme known as Direct Draw. From the programmer's point of view, the greatest asset of Direct Draw is that it makes Windows step out of the way and provide access to straight-to-video frame buffers, and use any available blitter. Anything you can do under DOS, you should be able to do just as quickly under Direct Draw unless the multi-tasking continues to drain processor resources while you are playing a game.

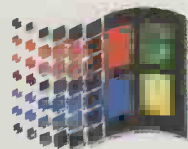


Don't try a download and a games session simultaneously. The Direct Draw DDI (Device Driver Interface) co-exists with Windows' standard Graphical Device Interface (as used by GDI printers), and the three-dimensional DDI used by cards with 3D graphics hardware. A good video card manufacturer will supply drives which support all three types.

The setup for Direct Draw is object orientated. There are objects for the card, or cards (you can have more than one card fitted to a machine and address them individually); and an object for the pixel data (setting colour depth, resolution and addressing individual pixels); and an object for the palette. A program can use an exclusive mode and take over the whole display, or work within a window. If there is a window set up, the Direct Draw programmer still has access to the whole of video memory and thus has to read the co-ordinates given by Direct Draw to make sure that the games program doesn't draw outside its rectangle.

Access to the video memory allows faster page flipping by taking over the whole display in exclusive mode, or you can have multiple direct draw objects (display devices) on one machine. Direct Draw is not a library of routines, but it

does allow memory to be set up to provide for different hardware features such as an alpha buffer, if the video card supports transparency, and a z-buffer for 3D manipulation. The information stored can be RGB, YUV or compressed video, depending on the hardware to hand.



The use of objects doesn't hinder the speed necessary for the best possible gameplay because all the slow OOP code is necessary only for creating structures: once these have been set up you have control, and you can write optimum code. You can call structures from C, C++ and assembler, have multiple frame buffers, and either flip the video pointers or use a blitter chip on the video card to move the image onto the screen. The software can lock video buffers to prevent multiple applications from using the same areas of memory. There is support for copying, mirroring and rotation, and to drive hardware sprites (if the hardware supports it). Plenty of video cards support a single hardware sprite usually used for the pointer, but with the advent of Direct Draw we should see more video cards which are better at playing games. The current developer's kit only supports an ATI card, but manufacturers will be producing drivers.

To compliment Direct Draw there is Direct Input which supports joysticks and other input devices — it even has facilities to handle tactile feedback with the add-ons. Direct Sound offers midi and digital sound with software mixing, Direct Play is referred to as "multiplayer game connectivity", allowing for multi-user games. Rumours about Direct Smell (a system which mixes different esters to produce an authentic atmosphere for games) are totally unfounded.

Microsoft wants to be a big player in the games market and there are several titles lined up including Hover Havoc, an enhanced version of the Hover game supplied on the Windows 95 CD. Direct Draw may yet help you to forget DOS. **PCW**

Taking turns with Windows 95



At last, true multitasking is available with Windows, and it can cope with multithreading, too. Here is PCW's rough guide to multitasking and how it works with Windows 95.

Windows 95 is the first version of Windows that can really be classified as an operating system. This opens up possibilities for true multitasking.

Back in the days when computers were tended by men in white coats, the machines were too valuable for everyone to have one. Instead, people used dumb terminals connected to the computer. Sharing out processor power between users became a principal task of the operating system which would only allocate a little time to each.

Each program was "time-sliced". But this took place in milliseconds. Users would be unaware of what was happening to their program. But as more users logged onto the system, everyone would notice the reduction in speed. Eventually, there were so many users, the amount of time taken for the operating system to constantly switch between programs resulted in less time remaining in which to run them. Later, with the advent of the microprocessor, there was so much low-cost processing power available that the need to share became redundant.

In the late eighties, Microsoft's Bill Gates claimed that people only wanted print spooling and task switching. PC users argued that the 8086 (and to a certain extent the 286) was not capable of supporting proper multitasking since there was no memory management. But this did not prevent various versions of Unix from supporting proper multitasking on the PC, nor the Amiga from multitasking to the same standard as Windows 95



way back in 1985. The Amiga managed with a 68000: a processor with no multitasking hardware and 512K of RAM. A decade later, the PC has caught up.

With the advent of the 386 came the possibility of true multitasking. Users could run their spreadsheets to perform re-calcs, have their word processors carrying out mail merges and their databases sorting and searching without one having to stop to let another in. The 386 could do this because it had the ability to emulate several 8086 processors, each running a task. This was fine except that PC compatibility meant that very few programs supported the 386 protected mode; software just used the new chip like an 8086 with go-faster stripes. At that time OS/2 (a collaboration between Microsoft and IBM) should have supported true multitasking but it became hide-bound with company politics and has only recently sorted itself out.

With Windows 3.0 came a first element of PC multitasking for the masses, but there was a compatibility problem. Programs were still used to having total control. There was no point in a program thinking it could write to a serial port if something else was using it or expecting keyboard input if the text one typed was meant for another application. To solve this problem, programs

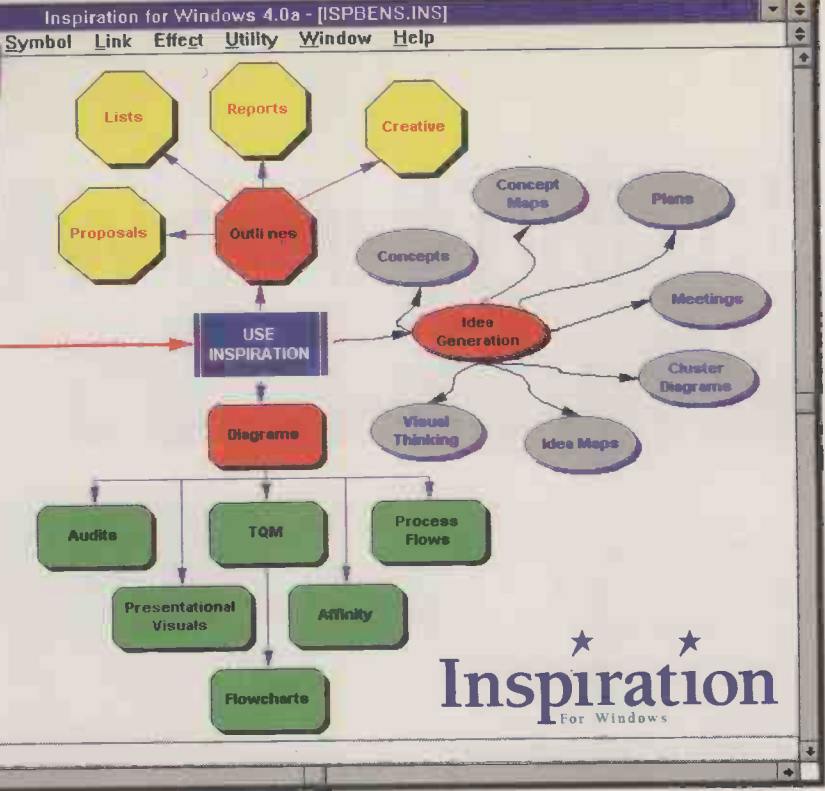
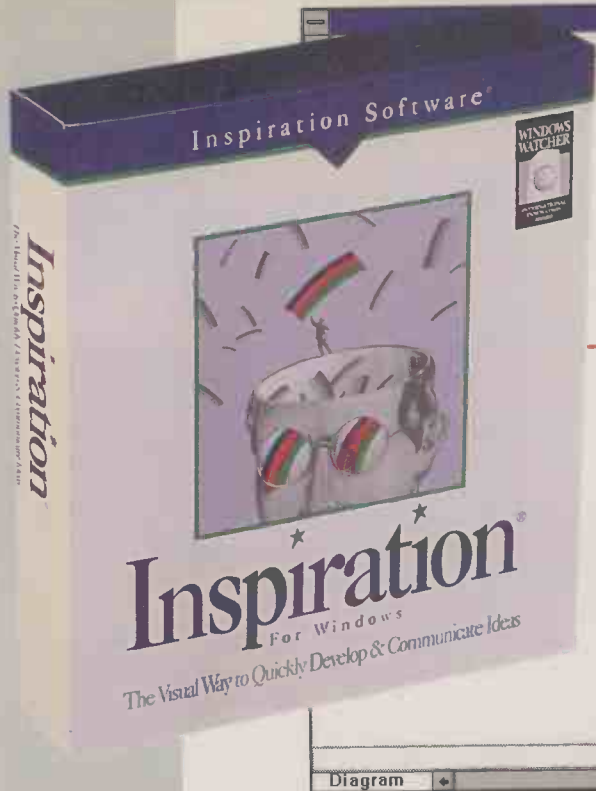
written to Windows 3.0 guidelines were expected to know about the rest of the system. An idle program was expected to tell Windows which would then allocate the time to another program. This system, where the applications tell the operating system when to switch, is known as co-operative multitasking. One bad, or greedy, program can slow the system down for all.

Windows 95 follows OS/2 and NT in providing true, or "pre-emptive", multitasking for the PC — all programs have their time-slices, and the tasks switch whenever the operating system dictates. This provides a much more elegant solution and makes the system slicker. Pre-emptive multitasking is ideal for those systems where you have electronic mail, a network and other database work using a lot of communications.

The need to provide compatibility with 16-Bit applications limits the scope for pre-emptive multitasking — reports based on beta copies of the 32-bit applications state that Windows 95 is very slow. In our experience this is not the case, but we have been using fast systems with a lot of memory. If you move to Windows 95 and intend to multi-task heavily, it is worth adding more RAM.

Multitasking in Windows 95 isn't just limited to switching between programs. Programs are made up of sub-routines, and each of these can be hived off as separate tasks. The application needs to be able to cope with sub-routines running out of sequence: a skill which has been developed by mainframe and minicomputer programmers who are used to multitasking, but which is still new to PC programmers. These sub-routines are known as "threads".

In theory a multi-threaded application will run more smoothly than a non-threaded one, but the idea is so new that not many applications are multi-threaded and so Windows 95 won't see much benefit from this. In Office 95, only the print spooling in Word runs on a separate thread, so you have to wait for things like the interactive spell check, and the file import filters. Multithreading is particularly relevant to multimedia, where video and audio tracks can run as separate threads, allowing proper multitasking with the rest of the system. This level of integration has yet to happen, but it will be an important step in the evolution of the PC. **PCW**



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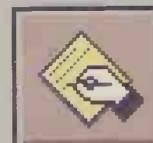
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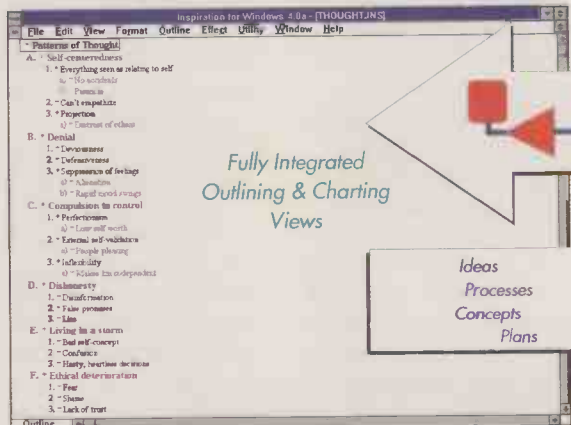
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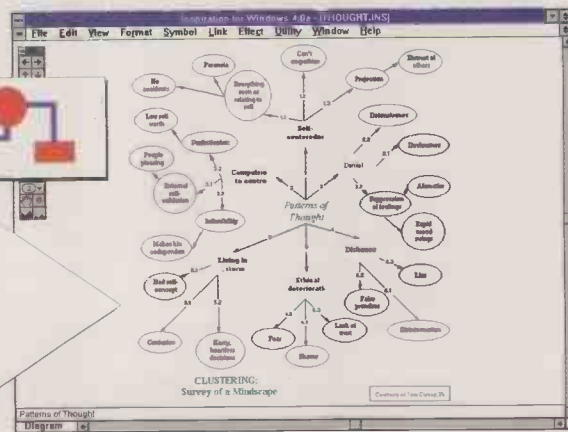


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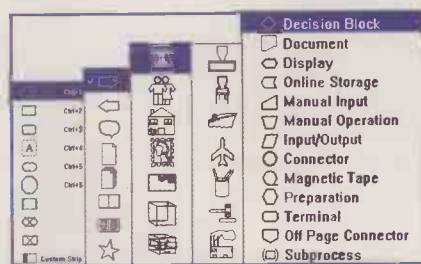
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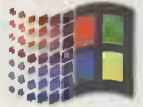
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Plug and Play with Windows 95



Plug and play technology explained: what to expect from it and how it co-ordinates with Windows 95.

Microsoft estimates that nearly half its support calls are from people with hardware conflict problems. The solution would be if computers could allocate the resources themselves, without the need for user intervention. This is exactly what plug and play is all about.

Unfortunately, plug and play is not as simple as it sounds. The computer needs to be configurable on each and every bootup and to be able to exercise control over different devices. The devices have to be able to talk to the system and be dynamically alterable (in such cases as the docking of a notebook into an office network setup). What's more, legacy devices (that is, non plug and play devices) must be factored in so that their less flexible demands for system resources can be met as well.

On boot-up, a plug and play system must perform the following tasks:

- Identify all the devices
- Determine resource requirements
- Create a non-conflicting configuration
- Program devices
- Load device drivers
- Notify the operating system of configuration changes

The co-ordination of these tasks requires several plug and play components at various levels including the devices and their drivers, the BIOS and the operating system. Fig 1 is a virtual diagram of how everything fits together and Fig 2 shows how the computer system really works.

The devices and their drivers must become dynamically loadable and unloadable, both to enable reconfiguration and to make the best use of system memory. They must also be able to communicate with the operating system so that, for example, a word processing application can block the removal of a disk until it has written to it. A plug and play BIOS must be able to isolate and ini-



tialise those system board devices crucial to boot-up (such as the floppy drive, input devices and the graphics adaptor) while maintaining a list of these devices, and communicating information to the operating system. And it must be capable of notifying the operating system of dynamic events like the linking of a notebook into a docking station.

The OS must be able to co-ordinate different facets of plug and play, and for this Windows 95 has various pieces of software: the Configuration Manager, the

accepts and responds to communications from the BIOS and devices during the configuration process and during operation. It's responsible for communicating information between devices and the operating system.

The Hardware Registry is a database of all the devices relevant to its particular computer, whether or not they are currently installed. The Hardware Tree is created by the Configuration Manager and is a complete record for a particular session — it can either change on boot-up, or with installed or removed devices during a session. Bus and Port Enumerators build up a picture for the Hardware Tree of which devices are present. Enumerators are based on specific bus architectures so that an ISA enumerator could identify the devices on an ISA bus, read their resource requirements and configure them, as instructed by the Configuration Manager. There are enumerators for ISA, PCI, SCSI, VLB, PCMCIA, and serial and parallel ports.

Conflicts between devices are negotiated by the Resource Arbitrators which also allocate specific types of resources to devices. The separation between the Configuration Manager and the Resource Arbitrators provides for future extension of Windows 95 to accommodate new types of resources.

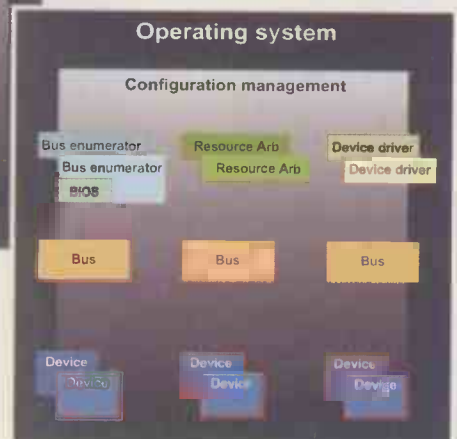
The Setup and Device Installer will probably be the only part of the Windows 95 plug and play architecture which the user will encounter. If the system fails to detect a legacy device the user can force its installation, or if two legacy devices conflict the user will have to reconfigure one of them using the Installer.

PCW

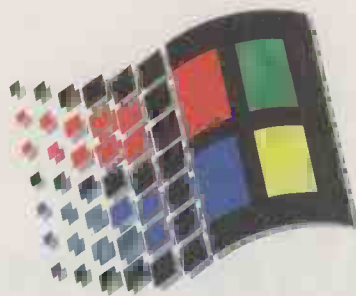


Hardware Tree and Registry, the Bus and Port Enumerators, the Resource Arbitrators, and the Setup and Device Installer.

The Configuration Manager is the manager of all the various processes. It



Windows in the land of OS

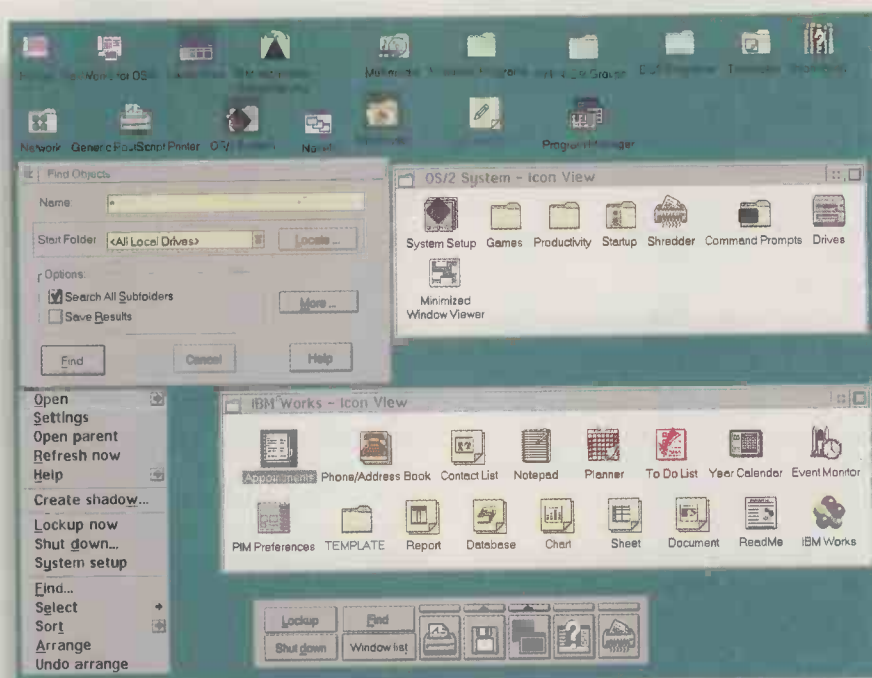


Windows 95 or Warp OS/2? Both operating systems claim superiority, and both offer powerful features. Here, we examine each OS to help you decide which will best suit your computing needs.

The whole world is awaiting the release of Windows 95. In fact the entire computer industry is poised in anticipation, trying to predict what effect the new operating system will have on the market. Software companies are frantically upgrading their applications while hardware vendors are proclaiming their commitment to Windows 95 by promising to pre-install it on new machines. More than half a million copies of the Windows 95 Preview program have been sold to users and developers throughout the world. By the time the product finally appears, expectations will be sky high.

Meanwhile, back at the IBM ranch OS/2 has been revised and refined. If OS/2 is ever going to become important (so the theory goes) then now is the time. Warp, the latest version of OS/2, was released in November last year — it was IBM's last chance to get it right before the release of Windows 95 but despite a multimillion dollar marketing campaign, OS/2 still owns only a tiny portion of the desktop market. Microsoft Windows, on the other hand, has already infiltrated most of the world's hard disks.

Market dominance does not prove technical superiority however, and when it comes to track records OS/2 has the edge over Windows 95 — it has been available in the shops for almost a year now. While Windows 3.1 users look forward to 32-bit operation, pre-emptive multitasking, multithreading and an object orientated desktop, OS/2 users sit back and laugh because they've been enjoying these features for years. The full 32-bit implementation of OS/2 was fixed in version 2.1 along with the Workplace shell user interface, and since then the basic architecture has remained the same. This has left IBM with plenty of time to enhance and refine the system in other



Despite all IBM's efforts, OS/2 still has only a tiny slice of the desktop operating system market

areas such as usability, performance and improved utilities.

Unsurprisingly, both OS (operating system) vendors claim to have superior products. In September last year, the IBM marketing team distributed a document comparing Warp with Windows 95. Predictably, the document presented a full blow by blow account of the failings of Windows 95. Every operating system feature, from performance to network connectivity to application support, was systematically pulled apart. A month later, Microsoft produced a reply entitled "General 'myths' advocated by IBM" which attempts to "address some general incorrect statements IBM representatives have made to the industry press." This

document defends Windows 95, dismissing each of IBM's criticisms one by one.

As far as the average user is concerned, this public bickering serves only to confuse. Each vendor claims they have developed a faster and more reliable platform with a more intuitive interface, superior device support and better application compatibility. Here we examine the new features and capabilities of each OS to give you a better idea of which will best suit your computing needs. Not every user will require all the features which come as standard in either OS so the real added value will differ, depending your needs. The fact that Windows 95 is still a work in progress makes a real head to head comparison difficult. But in a month or so's time, we'll be able to make more conclusive judgments about compatibility issues, performance and stability.

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Installation and usability

The new, friendly, improved version of OS/2 known as Warp appeared late last year with multiple enhancements. These included a better installation procedure, improved performance, and a collection of extra utilities including an Internet access kit and fax software as well as the ability to run with less memory.

There are several options on installation and like Windows 95, Warp conforms to the plug and play standard which makes life a little easier. The Easy Install option attempts to automatically detect all the various hardware components, saving you from endless detailed questions about your system setup. In our tests the sound card, video card, and CD-ROM drive were all identified correctly, but the network card was not recognised and it took a fair amount of tinkering to sort this out.

The device support included within Warp is a major step forward compared with the previous version which had far too few drivers to be able cope with the

massive variety of hardware around, and tended to make mistakes when attempting to identify system components.

There's now a good selection of video drivers including all the major chipsets on the market such as S3, Tseng Labs and ATI, and Cirrus Logic, as well as much improved support for CD-ROM drives, printers, SCSI adaptors and sound cards.

The ultimate plug and play dream is that device installation should be entirely automatic and transparent — that is, no more endless tinkering with system files and jumper settings to get hardware bits to talk to each other. OS/2 and Windows 95 have gone some way towards achieving this goal, but in both cases the procedure is very hit and miss. A Plug and Play BIOS in your system will help matters by resolving device conflicts and these have started to ship on systems from major manufacturers including Dell, Gateway, and Packard Bell.

Our Windows 95 test machine from Panrix came with a Phoenix plug and play BIOS and managed to recognise all

system components apart from the video card — a standard Diamond Stealth 64 with VRAM. In our experience, this is a fairly typical scenario with both OS's. It's rare that all components are successfully recognised and configured. It's more likely that either most bits of the system will be recognised, or that things go wrong "big time". OS/2 users will back me up on this score but we won't know the full story about Windows 95 until it's let loose on millions of hard disks, all with different hardware and software configurations.

Is Windows 95 a true 32-bit OS?

The topic of whether or not Windows 95 is a true 32-bit operating system has been widely and heavily debated to the point where it has become a matter of almost religious importance. The agonising question is this: Is Windows 95 a full blown 32-bit OS like Windows NT and OS/2, or is it just a souped-up version of Windows 3.1?

Andrew Shulman's book, *Unauthorised Windows95*, is responsible

The history of Windows, OS/2 and NT

Windows

November 1983 -1985

Windows 1.0

Microsoft first began development of the Interface Manager (subsequently renamed Microsoft Windows) in September 1981, and the product was finally announced two years later (in November). This was after the release of the Apple Lisa (prior to the Macintosh), but before Digital Research announced GEM, another competing GUI. Windows promised an easy-to-use graphical interface, device-independent graphics and multitasking support. Following long delays the first version hit the store shelves in November 1985. There were few Windows applications at that time, and sales were small.

Autumn 1987- end of the year

Windows 286 and 386

Windows 286 (originally called Windows 2.0) provided significant usability improvements, and established Windows as a viable environment for application development. New features included overlapping Windows and PIF files for DOS applications. When Windows/386 appeared, this version was renamed to Windows/286. Windows 386, released at the end of 1987, provided the capability to run multiple DOS applications simultaneously in extended memory.

May 1990

Microsoft launched Windows 3.0, a complete overhaul of Windows 386 with the capability to address memory beyond 640k and much improved user interface. At this point the development of Windows applications mushroomed and helped Microsoft to sell 10 million copies of Windows 3.0. This made Windows the biggest selling GUI of all time.

May 1992

Windows 3.1

This was the first major upgrade from Windows 3.0, introducing multimedia capability, OLE, TrueType scalable fonts, better inter-application protection and improved error diagnostics. Windows 3.1

became an immediate success, selling over 3 million copies in the first two months.

November 1992

Windows for Workgroups 3.1

This added peer to peer networking and printer sharing capabilities to Windows as well as introducing Microsoft Mail and Schedule Plus. Microsoft originally intended it to replace Windows 3.1, but found itself with a glut of unsold copies.

December 1993

Windows for Workgroups 3.11, Windows 3.11

This is the current shipping version of Windows. It incorporates some 32-bit code, fax capabilities, improved performance and many features which now form the basis of Windows 95, like 32-bit file access.

Windows NT

Summer 1993

Windows NT 3.1

Windows NT was released not as a replacement for DOS and Windows, but as a platform for high-end systems such as network servers and technical workstations. The interface is practically identical to that of Windows 3.1, but it is based on an entirely new micro-kernel design which enables the OS to be portable across Intel x86/Pentium, MIPS R4000/R4400, and DEC Alpha processors. It also has 32-bit addressing for accessing up to 4Gb of memory, symmetric multiprocessor support, and installable APIs for Win32, Win16, MSDOS, POSIX and OS/2. Sadly, this first version was stricken by poor performance, hardware greed and limited application support.

Summer 1994

Windows NT 3.5 "Daytona"

Daytona was designed primarily to reduce NT's heavy resource consumption on desktops and to improve performance on servers. On the client side this includes support for OLE 2.01 which allows the OS to run 32-bit enabled applications with full 16-bit to 32-bit applications

for having fuelled much of this debate. He argues that Windows 95 still relies on several 16-bit DOS data structures and executes old 16-bit DOS code by switching to Virtual 86 (V86) mode. His claims are backed up by numerous nitty gritty references to the system architecture and design. Microsoft claims that Schulman's analysis is based on an early beta release of the operating system and is therefore inaccurate. The company does admit though, that a certain amount of real mode baggage has been left in the OS to ensure compatibility with old DOS and Windows programs.

One of the fundamental weaknesses of Windows 3.1 is that all applications, as well as operating system code, share a single address space called the system VM (Virtual Machine). The single address space model is bad news when it comes to system integrity because applications are not protected from each other, and key portions of the operating system are left exposed to buggy programs which can cause the entire OS to crash.

In OS/2, Windows applications are run

in their own independent sessions or VDMs (Virtual DOS Machines) where they are protected from each other and do not jeopardise the OS itself. When an application fails, the effect of this failure is limited to the session in which it is running. Effectively, what VDMs do is to protect the system against crashes by ensuring that applications do not write to each other's address spaces.

Windows 95 does provide private address spaces for Win32 executables, but all Win16 programs execute as a single process within a shared address space. This means that one faulty 16-bit app can still bring the whole system down, so Win16 programs operate in the same way that they did under Windows 3.1: they can see each other, but they can't see Win32 applications.

Multitasking and multithreading

If you want to be able to use your word processor at the same time as printing out a spreadsheet, downloading a file, or searching your database then the operating system must be able to divide up

processor time efficiently between different active Windows. We're all familiar with the way that Windows 3.1 handles this kind of thing — usually slowly and clumsily. That's because it uses a crude scheduling mechanism called co-operative multitasking. Under this system, applications are never forced by the OS to give up processor time to other applications. Instead they yield voluntarily by continually retrieving and despatching messages (by calling messaging functions in User). This can work reasonably well as long as all applications adhere to the rules: unfortunately, one rogue application having failed to check its messaging queue can hog the processor for long periods of time. Windows 95 solves this problem by using a pre-emptive scheduler: the same mechanism employed in OS/2 and Windows NT. Under this system, the distribution of CPU time is controlled by the operating system (not the application) which evaluates the status of each active thread or unit of execution, and decides which thread gets priority. The fact that a single

integration, and the ability to run DOS and Windows programs in separate address spaces for maximum protection. On the server side, NT 3.5 provides improved security features, automatic TCP/IP configuration and a Netware compatible gateway.

June 1995

Windows NT 3.51

The recently announced Windows NT 3.51 supports PowerPC-based systems, and includes support for additional devices such as PCMCIA, fax software, and Windows 95-compatible applications. It also has a tool to help users manage client access licenses for Microsoft BackOffice products, and a utility that enables over-the-network installation of Windows 95. NT Server and Workstation version 3.51 provide the same feature and API set across four hardware platforms; Intel, Alpha AXP, MIPS, and PowerPC.

Cairo

This is Microsoft's next major revision of Windows NT destined to be released next year. Eventually, Windows 95 and Cairo will become complementary products which provide a consistent user-interface and programming environment across a range of hardware platforms. Along with a Windows 95 style interface, Cairo is also planned to have an Object File System (OFS) to provide native storage of OLE compound files, and a query front end which will allow users to trace files easily via file properties or content. (For more on Cairo, see *OS Futures*, pages 146/148.)

OS/2

End of 1987

OS/2 1.0 - 1.1

The first version of OS/2 was released with task switching accomplished using a character-based shell and limited DOS compatibility. This was followed by version 1.1, the first version to include the Presentation Manager (PM) GUI/API.

OS/2 1.2

Version 1.2 introduced several new features including the High Per-

formance File System, a dual boot mechanism and IBM Extended Services which introduced REXX.

OS/2 1.3

The Procedural Language/2 (REXX) became part of the Standard Edition with this release. It also included Adobe Type Manager (ATM) providing scalable typefaces for screen and printer. This was the last version of OS/2 to work on machines with 286 processors.

March 1992

OS/2 2.0

From version 2.0, IBM started developing OS/2 independently but continued to involve third party PC manufacturers for testing purposes. Several major improvements appeared in this version including an object orientated WorkPlace Shell, Windows support, 32-bit programming interfaces, support for more than 16Mb of physical RAM, and improved device driver support. Version 2.0 required a minimum of a 386 processor.

April 1993

OS/2 2.1

This version added compatibility for Windows 3.1, multimedia support and more support for third party device drivers. After a stop/start introduction to the market OS/2 was finally recognised as a viable operating system. In this version IBM stopped the practice of including extra features in its pre-installed versions which were not in the off-the-shelf package.

November 1994

OS/2 3.0 Warp

This is the most recent and most advanced version of OS/2. It contains many enhancements including a better installation procedure, improved performance, and a collection of extra utilities called the BonusPak with an Internet access kit and fax software. It's able to run in less memory, has improved device support and various interface improvements, too.

thread is not permitted to hog CPU time means that Windows applications can share CPU resources equally.

In Windows 95, true pre-emptive multitasking exists only for 32-bit apps. Sixteen-bit apps are multitasked co-operatively, which means that a single rogue 16-bit task (such as a Windows 3.1 application) can still bring the whole thing down. Consequently, you won't get any performance benefits unless you upgrade your applications to the 32-bit versions. OS/2 provides better protected mode support for 16-bit applications by allowing them to run in separate virtual machines. This allows 16-bit applications to be multitasked pre-emptively in the same way as native 32-bit apps.

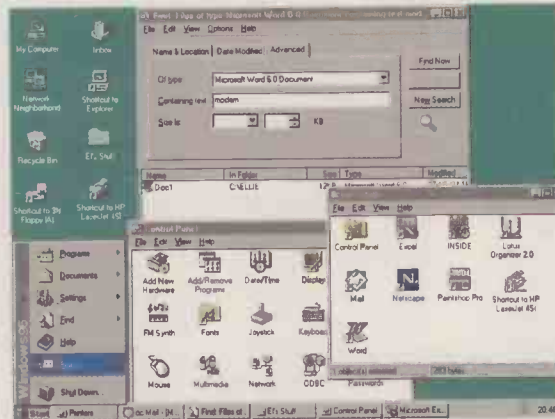
Interface and usability

Both Windows 95 and Warp make extensive use of the right mouse button providing a set of context-relevant options to change the properties of any object. Both OS's additionally provide a file system which allows folders to be set up in hierarchical fashion like the Macintosh, and allow applications to be placed directly onto the desktop. In OS/2 these are called "shadows", and in Windows 95 "shortcuts".

Windows 3.1 and 3.11 run under Warp, and if you get the WIN-OS/2 version of Warp a specially modified version of Windows is built in. Running Windows under Warp is just the same as running Windows by itself, only when you close down the Program Manager you get back to the OS/2 desktop. You can also run Windows applications directly from the OS/2 environment.

Warp has a utility on the OS/2 desktop called the LaunchPad which contains various system controls such as Find and Lockup. The Find dialogue has been made easier to use since the previous version, and allows you to specify simple criteria on the first screen and more complex formulae via the More button. Warp now comes with a series of utilities ("productivity tools") on a separate CD-ROM called the Bonus Pak which includes a basic integrated package called IBM Works, an Internet access utility, CompuServe software and multimedia software. These are all useful tools to have on your system and offer a good deal to any novice users who are looking for a complete system.

The Windows 95 interface takes some getting used to and feels quite awkward at first. The Program Manager no longer exists and the File Manager, although still



To get full 32-bit performance from Windows 95 means upgrading your applications

available, has been more or less replaced by the "Windows Explorer". When you Alt+Tab to move between applications a box appears in the middle of the screen showing icons for all the applications you have open, but you can't move back to the Program Manager to start up a new program because it doesn't exist any more. There are various ways around this, but the most obvious is to use the 'Start' button on the Task bar. This gives you access to all the applications and utilities on your system.

On the whole, the Windows 95 desktop seems more intuitive than Warp when it comes to finding your way around and performing normal copying, printing and searching procedures. Either operating system will take a while to get used to, but Warp will take a little longer, especially if you're making the transition from Windows 3.x.

Making a choice

As the shipping date for Windows 95 draws near there's a lot of pressure on everyone to upgrade their operating systems. In all the excitement it may not occur to you that you don't actually have to do anything at all. It takes a while for most new products to settle down and it will probably be worth your while to sit back for a few months and watch the progress.

If, however, you're thinking of parting with some of your money straight away the standard version of Warp will cost you £70 on CD-ROM and £85 on disk. The Win-OS/2 version costs £110 on CD-ROM, and £125 for disk. Windows 95 will be priced slightly higher at £150 (£80 for the upgrade from Windows 3.x).

Both Windows 95 and OS/2 provide a powerful set of new features and

functions which put them on an equal battleground when it comes to meeting your computing needs. On the whole, the improvements incorporated into Windows 95 make it a more usable, more stable and more fully-featured operating system. If you're looking for a performance upgrade it's unlikely that you'll get this immediately because you'll have to run 32-bit applications to realise the speed advantage. Two things you will benefit from straight away is the improved stability of the system when multitasking, and better handling of system resources. In Windows 3.1, system resources gradually deplete as ill-behaved applications use up memory and do not give it back: when they get to about 15 percent the system usually falls over. Windows 95 sorts this out by making sure that resources are always returned to the system.

The market dominance of MS Windows does cause a few practical problems for OS/2 users. Hardware drivers for OS/2 tend to be given a much lower priority than Windows drivers, and technical support in all kinds of areas tends to be very thin on the ground. For similar reasons, OS/2 lacks the broad application support of Windows 95 although this may be changing soon with Lotus's next generation of applications for OS/2 and Windows. Until this materialises you can run Windows 3.1 applications within OS/2. For an extra £159 you can also get a set of network utilities for Warp, called WarpConnect, which allows you to attach OS/2 clients directly onto Netware.

From an architectural point of view, Warp is far more sophisticated than Windows 95. It allows Windows 3.1 applications to run in separate virtual machines and lets you happily multitask with your old DOS applications. If you have lots of legacy applications, Warp will serve you better than Windows 95.

Microsoft's massive installed base added to the huge amount of Windows software available on the market will influence most people's choice. Newcomers and novices will automatically migrate to Windows 95 but power users and programmers may well decide to re-examine the features and functions they need in an operating system, changing over to Warp for truer 32-bit application management.

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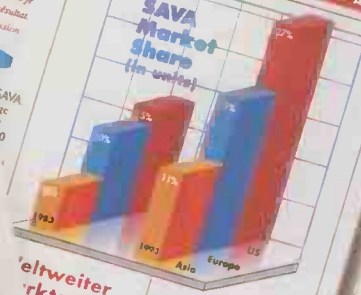
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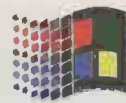
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Windows NT 3.51

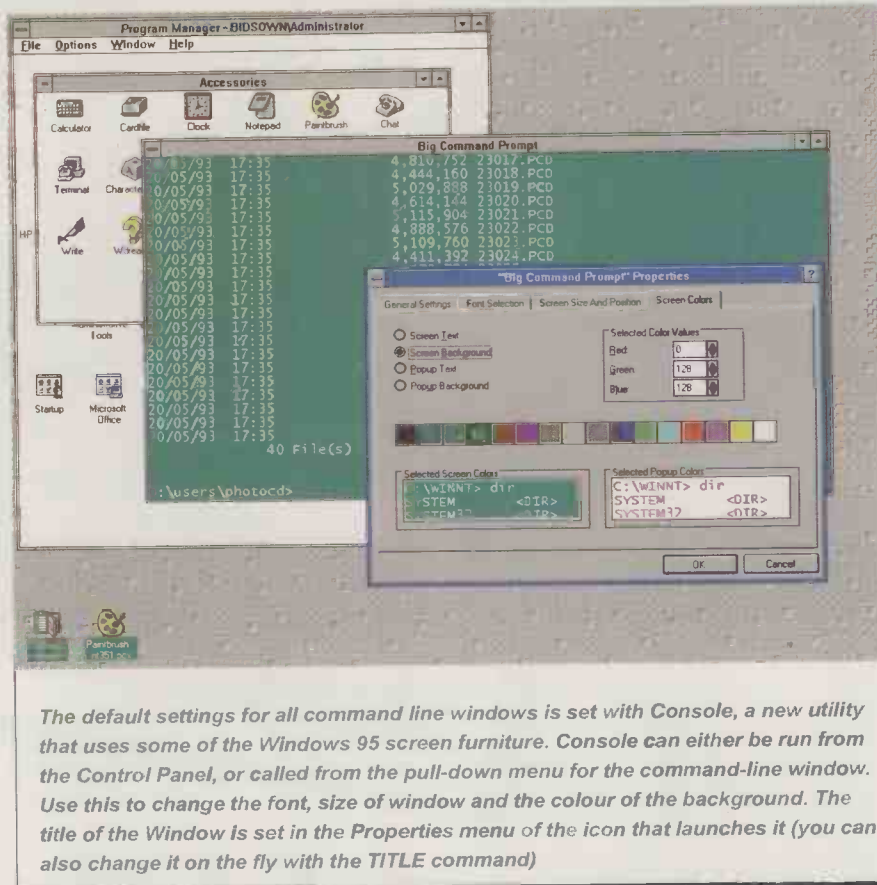


The latest release of Windows NT comes, as before, in two flavours: as server or workstation. The focus of interest is likely to be on Windows NT the workstation, because it looks as though Microsoft is beginning to reach what seemed at first an unattainable goal: Windows NT running comfortably in 16 Mb.

In some respects this is the release that should never have been. Piecing together private information and the evidence of the code itself, it looks as though Microsoft's NT roll-out is slipping well behind schedule. This version contains new elements, like NTFS file compression, that should have appeared in the 3.5 release at the beginning of this year, and omits important features like Plug & Play that are known to be imminent (because its essentially the same code as used in Windows '95), and would probably have been worth holding back the launch for.

Microsoft has made clear that the aim Real Soon Now is to offer a version of Windows NT that has an identical look and feel to Windows 95, and can run all the same applications. Windows NT 3.51 is only half way there. The good news is that it now incorporates Windows 95 Common Controls, like button bars in File Manager and the kind of tabbed dialogue window shown in the picture. This is more than just a cosmetic issue — it means that Windows 95 apps like Office 95 can run. (This isn't going to be true of all Windows 95 apps, because a minority of them will depend on low level device drivers written to the Windows 95 device driver architecture.)

The bad news is that although Windows NT 3.51 now has its long-awaited PCMCIA support, it isn't dynamically configurable: you have to power down the machine each time you change a card. It's not a shortcoming that's going to have much impact on the server market, which is pretty much the whole of Microsoft's NT market at the moment. But NT enthusiasts see great possibilities for it as a workstation operating system. And these days that increasingly includes portables, an area where NTFS compression would be a natural. But without Plug & Play the idea of a portable running Windows NT 3.51 is a non-starter.



The default settings for all command line windows is set with Console, a new utility that uses some of the Windows 95 screen furniture. Console can either be run from the Control Panel, or called from the pull-down menu for the command-line window. Use this to change the font, size of window and the colour of the background. The title of the window is set in the Properties menu of the icon that launches it (you can also change it on the fly with the TITLE command)

One more new feature is the inclusion of full text retrieval features into the help files. Microsoft has changed the format of its index files to achieve this, but older help files can be re-indexed to accommodate the new feature. Expect this facility to spread throughout the operating system — Microsoft has said that the ability to "find anything anywhere" will be a key feature of Cairo, the object-oriented evolution of Windows NT expected to stick its head above the parapet in early beta at the beginning of next year.

At the time of writing I could only get hold of a beta of the new Workstation, but my tests suggest that it's robust enough for production use. As we've come to expect from Microsoft these days, the installation from CD-ROM is highly automated and very smooth, although I'd quibble with the requirement for three boot floppies before the CD-ROM springs into action. The CD holds a full set of binaries for Intel, MIPS, Alpha and — a new addition to 3.51 — PowerPC processors, with autodetection making sure you load

the right one.

The new file compression is built into the NTFS file system, and set up either through the File Manager (the files and directories named in blue in the picture are compressed) or using the command line utility COMPACT. Either way you can compress files that already exist, and/or establish a directory as a compressing directory, automatically crunching any new files as they are put into it.

At first sight OS/2 users will envy the nippiness of Windows NT on the same hardware, largely because the Windows interface, unlike the heavily object-oriented WorkPlace Shell of OS/2, isn't actually doing anything. But the comparative performance between Windows NT and OS/2 tips the other way when you're running more than one application. My distinct impression (with the strong caveat that this is a beta) is that even with completely native 32-bit apps to run, Windows NT 3.51 still lacks the relatively smooth loadbalancing that OS/2 can achieve.

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A visit to Cairo

Windows 95 is the biggest step forward for most Windows users since Windows 3.0 was launched five years ago, but there's still plenty to look forward to.

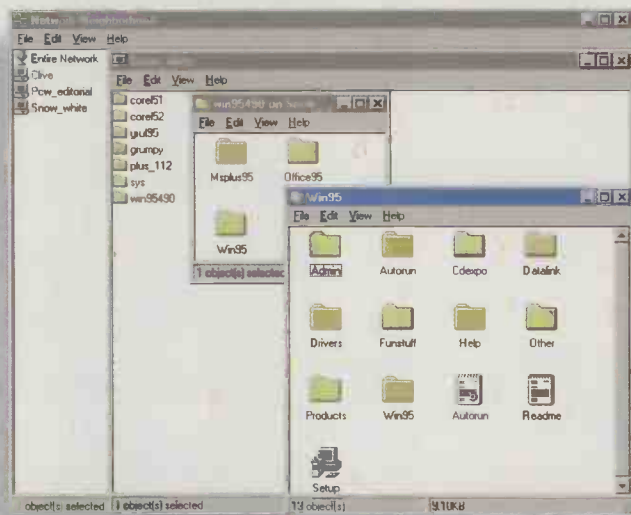
The next big improvement on the Windows horizon will be the arrival of a Windows 95 "shell" for NT 3.51. Originally, NT wasn't going to get the shell until the next major system revision, codenamed Cairo, which is still more than a year away from release, but business users of NT made it clear to Microsoft that they didn't want to wait that long, and as a result an early version of the shell is already available to developers, on CompuServe and on the Internet (at <ftp://ftp.microsoft.com/bussys/winnnt/winnnt-unsup-ed/shell-tech-preview/>). It is now expected to ship as part of the next update to NT, late this year or early next.

More secure

NT is much more "crash resistant" and secure than Windows 95: it gives each 16-bit application its own address space, for example, and it doesn't run DOS or 16-bit Windows device drivers. There is a price for this robustness in speed, memory requirements and in compatibility with older applications, but as Windows 95 spurs the development of more 32-bit applications and drivers, business users who can afford 16Mb or more of RAM may find NT Workstation with the new shell is a better choice for running Office applications.

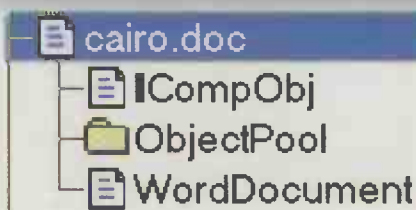
Microsoft has said that it will be developing at least one more version of Windows 95 as well as Windows NT, but it is clear that once RAM gets inexpensive enough, NT will become the operating system for the office, and Windows 9X will be targeted at home users or notebook and subnotebook users, who tend to have less powerful systems.

The biggest innovation in Cairo, the next major version of Windows NT, will be an entirely new filing system — the "Object Filing System" or OFS. NT was



Left Instead of seeing multiple servers, as here, and navigating them to find files, Cairo will make all machines on a network searchable as a single resource

Below left As a look at this document in DocFile viewer shows, a single Word file contains several objects



designed to be modular, allowing Microsoft to change parts of the operating system without having to rewrite it. This made it easy for Microsoft to change NT's user interface, and should also allow existing versions of NT to work with OFS with minimal changes.

"Information at your fingertips"

Although Microsoft claims it started work on Cairo first in 1989, it is still almost a year away from the expected shipment date of the first beta, so details are still sketchy; but the objective is clear. The OFS is designed to conceal the complexity of large company-wide or even global networks. Finding information using the present system in Windows 95, involves clicking on the "Network Neighbourhood" to see servers and (rights permitting) search them for files. Cairo will replace this with what Microsoft calls a "single system image", a kind of freely-searchable collection of all of the data that is available to a user. Microsoft's marketing machine has already started to plant this idea in the minds of the IT community with its "information at your finger-

tips" slogan.

Instead of a collection of files, Cairo will see disks as collections of OLE objects. Indeed, most modern OLE-enabled applications create files that are collections of OLE objects already — that's why the size of Word files has expanded so much in the last few years. Every element in a document, whether it's text, a chart or a sound file, will be treated as an independent object, and background processes on Cairo servers will be able to keep track of all of these objects wherever they are on the network.

At present, OLE is designed primarily to be used between applications on a single machine. If you set up a link to a file somewhere else on the network and that file moves, the link is broken. When Cairo comes in, this should not be a problem. This should also help companies to create applications which distribute processing across the network. OLE is only available on Windows and the Mac at present, but Microsoft is encouraging third-party developers to develop OLE links in Unix, and is also participating in various standards bodies like CORBA so that if OLE is not adopted as an official open standard, it will at least work with the ones that are.

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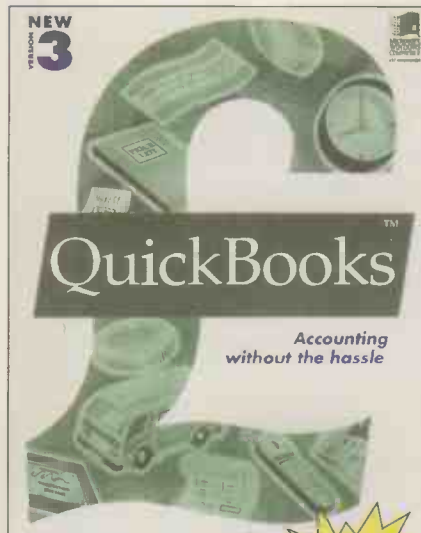
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What **Apple** has in store

Windows 95 brings the PC much closer to the Mac in many respects. So what will Apple do next? PCW outlines Copland, Apple's planned operating system for the future.

One of the first things everyone says on seeing Windows 95 is that it makes the PC look and feel more like a Mac. Many of its features like nested folders, plug and play, shortcuts and the Recycle Bin, are alarmingly similar to those currently available in System 7.5. Some might even argue that, pre-emptive multitasking aside, the Mac OS is already at the Windows 95 stage. So what does Apple have planned for the Mac's future?

The next version of Mac OS, codenamed Copland, is already under development and builds on Apple's investment in RISC technology. The company is aiming to have 95 percent of it written in native PowerPC code, and this will come as a relief to existing PowerMac users who are having performance hampered by system software that runs around 80 percent of its calls under an emulation of the Motorola 68LC040. It also means that Copland is unlikely to appear on 68K based Macs.

As well as overall speed improvements, Copland will have a revamped, customisable interface that allows it to be tailored for what Apple calls "an individual user experience". Selectable desktop "Themes" will let you change the style and colour of menus, icons, windows, and backgrounds, and users will be able to set their desired level of interaction. For example, a novice user can choose a desktop with huge button icons and limited access to complex features such as memory settings, while a more experienced user could choose to have everything to hand. General interaction will remain the same across all Themes, so that those just starting out on the Mac can take what they learn to a more complicated setup later on.

Copland also promises a new microkernel with pre-emptive multitasking for



Copland's interface can be changed to suit the user, and the OS now has more intuitive file handling

application sub-processes and low-level services including the I/O system, file system, networking and system extensions. Co-operative multitasking will be maintained for applications, and the Finder for backward software compatibility. A new memory protection model insulates the microkernel and other critical OS functions from interfering with applications, which in turn can spawn their own protected spaces for spin-off tasks. The upshot of all this is better system stability and less chance of data loss if a program crashes.

Apple claims memory requirements will be dramatically reduced with Copland, and that a Mac with a minimum of 8Mb will be able to take full advantage of all the features on offer. Improved virtual memory goes some way to explaining this, as does the ability to load applications in small segments, as required.

Destined for release as a system update in early '96, the component software architecture OpenDoc will be standard. OpenDoc lets users work in a task-centric rather than application-centric manner. The idea is that instead of moving from application to application to build up parts of a document, you stay with one

document and just change the tools around it to suit your needs. Tools are provided by small plug-in "part editors", available from vendors, which can be mixed and matched to suit individual requirements.

Other key improvements include OpenTransport, which provides developers with a unified set of APIs that allow them to write a single application that automatically supports all major networking protocols. Active Assistance will take Apple Guide to new levels with the ability to perform tasks for the user rather than just showing them how to do it themselves. QuickDraw 3D will appear for 3D OS level 3D graphics support, and a Hardware Abstraction Layer (HAL) will provide improved code portability.

On paper Copland compares favourably with the features and functions of Windows 95, although PCW has yet to see the software in action.

Looking ahead to the future: after Copland comes Gershwin — a fully native pre-emptive OS that will be entirely component based. Details of this are sketchy at best, but include Pro Active Agents (intelligent bits of software that learn what users need or like and perform tasks for them automatically), and support for Taligent Object Frameworks.

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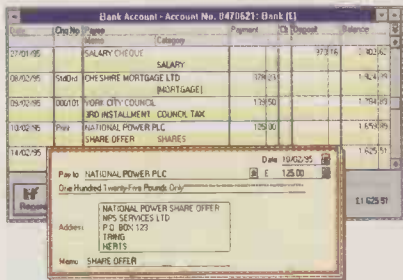


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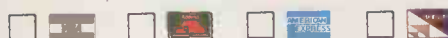
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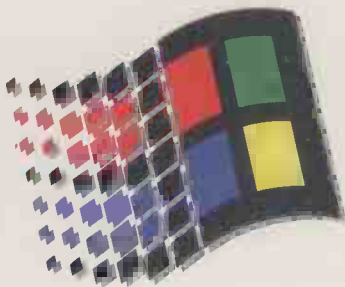
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Although lesser-known than his now legendary boss, Steve Ballmer was equally instrumental in making Microsoft the global phenomenon that it is today. The Microsoft Number Two, in charge of marketing since 1983, he has a no-compromise approach to his job which sweeps all before it, as Michael Hewitt found.

PCW Photography by Mark Mather

By the time you read this, IBM's bid to forcibly woo Lotus may well have received a firm, but polite, knee in the groin. On the other hand, it's equally possible that both of them could by now be in the "Was it good for you, too?" stage of post-coital pillow talk. If so, then the fruits of their union could constitute a major challenge to Microsoft's position in the software market. By happy coincidence, I was interviewing Microsoft's Steve Ballmer the very second the news came through. So how did he rate the blue-stained threat?

"This is amazing!" he cried, clutching the fax. "Notes and SmartSuite in the hands of big, bad IBM! To me it's potentially... (short pause, then an ear-splitting shriek)... the greatest thing that's ever happened!" And with that, he took off on a circuit of the room, fist waving triumphantly in the air, like one of those quiz show contestants who's just won a Hotpoint Automatic and a year's supply of Daz. "They could get totally distracted in this thing, both companies! Even if it's actually consummated, it could be very good for us, because IBM might be able to screw up Lotus, too!"

When he's not extremely excited, Ballmer is merely excited. "What does it feel like to know that your software is being used in virtually every town and city in the world?" "Very exciting." "How do you think NT is going?" "I couldn't be more excited." "What are Microsoft's prospects for the coming year?" "Pretty



exciting." Et cetera. It's the enthusiasm of a super salesman who has supreme confidence in what he's selling.

At this point, some of you are probably asking, "Steve *who?*". To give an example of his status within the Microsoft pantheon: whenever a Microsoftlet says "Bill", you automatically know he means Bill Gates. By the same token, when that same employee speaks of "Steve", he can only mean Steve Ballmer. Ballmer sits at the right hand of the Father, Number Two at Microsoft, the executive vice president, sales and support. If Bill Gates is the visionary, Ballmer is the one who makes it happen. He cajoles, inspires, evangelises, and above all, sells.

A meeting of minds

Ballmer was born in Detroit, 40 years ago. Following high school, he went to Harvard to study mathematics and economics. There — in the propitious manner of Rolls bumping into Royce, Hewlett first encountering Packard, and Little meeting Large — destiny took a hand, when he met and befriended Bill Gates. After graduation, Ballmer served a two year marketing apprenticeship with Procter & Gamble. In 1980 he left, intending to do a year at Stamford Business School, but soon dropped out, at Gates' behest, in order to join the fledgling Microsoft. Gates needed a business brain and, conveniently, Ballmer had one to hand. He's been with the company ever since and, among other notable achievements, was instrumental in bringing Windows to the market. Aside from that, he works from 8.15am to 6.30pm ("My wife would tell you it's later"), spends about an hour each evening answering email, and jogs five miles every morning. He probably ought to do eight, but that's by the bye. Certainly, he isn't your stereotypical, gangly West Coast computer geek. More your stereotypical, balding, billionaire.

The usual boring, predictable questions first. Yes, Windows 95 *will* actually ship in 1995. To be specific, 24th August, in both the USA and the UK. So why the delay? "All the usual last-minute things one needs to fix in order to make a great product." OK. And what about a Windows 95 interface for NT? "Early next year, but in beta by the end of this year. As it happens, I'm already using the interface myself, so I'd say even now it's very stable."

Next, from the present day, I took him to 1980. Back then, did Ballmer have any inkling as to how successful Microsoft was going to be? "None whatsoever. I

knew that this was a fast moving business, of course, so I knew there was bound to be growth. But I would never have anticipated the extent. To this day, really understanding the key elements — what drives the sales of software, what's critical — is still very hard to fathom."

Ballmer was Microsoft's first non-programmer. The other employees, although arguably the *crème de la crème* of software engineers, didn't really have what it took to market their products successfully. So, once installed, Ballmer set about changing things. He trawled America's élite universities, recruiting the best, brightest, and most ambitious students — not just in the programming field, but other areas, too.

"The ideal Microsoft employee should be very smart and incredibly motivated. They should be the sort of people who are always thinking, thinking, thinking: 'How can I do this better?' It doesn't matter what job within the company they're doing, they've got to be very bright relative to that job, and to their equivalents in rival companies. When we hire a janitor, I want him to be smarter than the janitor at Lotus."

To help encourage them, Ballmer employs a cheerleader management style, honed to perfection during his days as Manager of Harvard's football team. He'll stand at a podium before the multitude and exhort them, at the top of his voice, to sell, sell, sell. (I'd been forewarned about the volume by an aide: "You've got to understand that Steve is very loud.") Simultaneously, he karate chops his palm to re-enforce the point, like a market trader flogging Granny Smiths. Although his palm is still holding out, his vocal chords succumbed three years ago and had to be surgically repaired.

Okay, I can see this sort of TV evangelist style going down well with the Americans, I said, adjusting my tape recorder's gain control, but doesn't it just embarrass — deafen — other, less excitable nationalities, such as the British and the Japanese? "I'm different in different contexts," he replied. "Granted, what's right for a sales meeting in the US isn't right for a speech to our employees in Japan or the UK. Over here, I think I'm maybe a bit less goofy."

Anyway, it was this sheer force of personality and "can do, will do" attitude that undoubtedly saw Windows through. Indeed, aside from the birth of his son, Ballmer rates the successful introduction and marketing of Windows as being his

greatest achievement to date. He reckons that, even if one day Microsoft kick him out, his portrait will nonetheless remain on their wall thanks to that victory.

But the success story certainly couldn't have been predicted at the time. Windows 1.00, although announced in 1983, was still vapourware even a year later. So although Ballmer wasn't a programmer, Gates nevertheless asked him to take over as Development Manager and personally kick ass.

"That was quite a haul. For years people were saying Windows couldn't work. For years, it didn't. When Version 1.00 came out in 1985, people just scoffed." I among them, I said. Openly. "Justifiably so," he agreed. "It wasn't ready. But we did eventually get Windows to a stage where it became very successful, the core asset of our company." Did he, at any point, ever feel inclined to just throw in the towel? "Never. We're a company of great patience. The only discussion we had of that ilk was to ask ourselves if there was a better strategy *vis à vis* the relationship between Windows and IBM's OS/2. How quickly would people take to one over the other?"

Taking on Big Blue

Ballmer gleans a certain amount of pride over having taken on IBM ("We had to do battle against the biggest company in the world!") and, especially, over having thrashed them — for the moment, anyway. IBM, on the other hand, was thoroughly pissed off (and by all accounts, still is); hence the two companies' well publicised and acrimonious divorce in 1991. "If I could go back in time, I'd try to handle things much better in that area," Ballmer says, reflectively. "For me personally, the split wasn't so much of a blow, more of a major change. It was a funny, ego, competition thing. Somehow, we made our choice with Windows, and managed to really antagonise IBM because of it. Yet today, our businesses are fairly complementary."

Another, more notorious spat, was of course with Apple, over the "look and feel" lawsuit. Indirectly, Ballmer himself did very nicely out of it. In 1989, when it appeared as though a federal judge was tilting in Apple's direction, Microsoft's stock plunged. However, keeping a cool head, Ballmer paid out \$46 million of his own money for a million shares in the company. Three years later, following Microsoft's courtroom triumph, they were worth \$350 million — a 600 percent return. But supposing the judgement had

gone the other way?

"I don't know what we would have done. It would have been a disaster, for us, for our customers, and for the industry. It would have been a terrible thing. But we deserved to win, and it would have been a terrible miscarriage of justice if we hadn't."

It seems that Apple are still smarting: "They loathe us. They think we are a fundamental threat to their business. We may or may not be. I don't think they're a fundamental threat to *our* business. Whatever they've been doing has been so low-key and faceless, it doesn't even register on the Richter Scale. It's stunning to me, frankly, that Apple's not doing more — or if they are, it's stunning how poorly informed our own people are about it." Do Microsoft loathe Apple in equal measure? "Not at all, not even in a corporate sense. It's possible to have people loathe you whom you don't loathe in return." Suppose the two companies' board members suddenly encountered one another in the same bar? "I'd say 'How are you doing?' and buy them a drink. They might even buy me one." Maybe. But I get the impression they'd probably piss in it first.

Microsoft do have this habit of putting people's backs up. Why?

"Maybe I live a sheltered life. I read about all this hostility towards us in the computer press, but when I get out into the field, I don't see it. Certainly not from our customers. If they're unhappy with us, it's not because they wish Microsoft would go away, that we would do fewer things, but that they wish Microsoft would do more. Yes, people are upset with us when we make mistakes. People didn't like MacWord 6.0, for example. That's because it was bad. It was wrong. We had to fix it. I can understand that. But generally, I find people are fairly positive."

What about this perception that Microsoft is crowding all the competition out of the market? "Actually, since 1990 the number of software related businesses in the US has grown from 5,000 to 70,000. That's a huge expansion. I'd agree that there isn't much opportunity for a new spreadsheet or word processor product. On the other hand, the range of places where people

can innovate — custom development, salesforce automation software, games, multimedia, and so on — is growing. A lot of that has come from small software houses. And far from trying to stifle them, I think Microsoft technology, such as OLE, is their best friend. It means they don't have to re-invent the wheel. They can take advantage of the best features, not only of Windows or Microsoft Office, but other people's applications, too, and build their own stuff in."

So explain the Anti-Trust suit, then. "The US Federal Government has effectively created a platform where our competitors, who understandably don't love us, can shout the fact to the world. The Anti-Trust suit has focused media discus-



sion and debate. Yet, at the same time, it's been a great opportunity for us. They've spent five years investigating us, and after five years have found essentially nothing. That sounds like the cleanest bill of health you can have. We're operating lawfully, we're encouraging innovation and, most important, we're building a lot of great products."

I'm actually quite happy with the old ones, I said. So how would he sell me Windows 95 and its ilk? "Okay — I would talk to you about enhanced ease of use. I would talk to you about things like long filenames. I would talk to you about multi-tasking. I would talk to you about remote connectivity. I would talk to you about Network. I would talk to you about the range of new applications that haven't been available before..." And so on for five minutes, each accompanied by an enthusiastic slap of the palm into the fist. But would he talk to me about the increased memory requirements needed, allegedly, to run Windows 95 satisfactorily? "You've currently got a 486 with 8Mb RAM, right? I believe you'll find that if you're happy today running Windows 3.1 under that setup, you will be equally as happy with Windows 95. More so. Sure, there are

people around who won't be — the same people who say "Ha! Word and Excel on 8Mb under Windows 3.1? Impossible!" But for someone, like you, who's comfortable with his present hardware configuration, I think it's going to be a pretty compelling upgrade. Honestly."

Is the globally accessible Network, integral to Windows 95, going to be difficult to push? "It's very hard to predict what's going to happen in the online service business. Thanks to the Internet, everyone — CompuServe, America Online, Prodigy — is going to have to rethink their strategy. The old model of what an online service might have been will change dramatically. We're therefore focused around the question: what should an online service offer when

everyone can get access to the Internet free of charge? Proprietary contents? Additional reference services? Wait and see."

So, all in all, Ballmer is confident about persuading the user-base to upgrade to Windows 95? "We don't expect to upgrade 100 per cent of them. If we can get

30 percent over two years, that will be fine. Or if we got 40 percent, that would be a phenomenally successful upgrade for us. We know there will be some people who will never get around to it because of hardware, inertia, or whatever."

Looking to the future

And for the more general future of Microsoft — say, 20 years hence? "I think we'll call the platform thing Windows, because there will be a continuity of applications and user interface. Otherwise, I believe we're in the middle of a major sea shift in the personal computing business. The first 20 years was about standalone personal computers; the next 20 years will be about information access, communications, and shared information. Relative to this, I think our core businesses will be the same, but everything else — the technology underpinnings — will have evolved. If the things we do in the interim lead to product lines and products that people like, I think we as a company will succeed. And if Microsoft succeeds, the industry as a whole will prosper."

PCW

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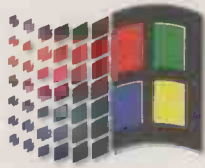


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BOOKS

If you want a really sycophantic guide to the delights of the new Windows 95 system, you might enjoy *Introducing Microsoft Windows 95*. Considering that the author shares his byline with the Microsoft Windows 95 team, the tone of the book is not surprising. They even offer you a way of testing their claims: ask a novice to try starting programs in Windows 95 as well as Windows 3.1 and then compare the difference in the time taken to figure it out. Once you get past the fan club-style introduction however, there's some fairly useful information aimed at MIS departments and network administrators to explain how the operating system works.

This is not an instruction book you could hand out to users — it's more of a guide to the program's features. So there are chapters on topics such as DOS support, device support, multimedia, comms, networking, systems management, printing, system architecture, and access for the disabled. At least that means most of the information should still be accurate — you can judge the book's timeliness (as well as the author's abilities as a prophet) by its announcement that Windows 95 is expected to ship "in the first half of 1995."

If you do want a step-by-step instruction book, Que's *Windows 95 Preview User's Guide* should do the trick. This aims at experienced Windows users who have got their hands on a copy of the Preview release: the idea is to cover the basics. So you get a tour of the program and how to set it up and customise it. There are chapters on printing, Windows 95 accessories, DOS and multimedia. There are sections on running Windows 95 on a laptop, and running it on a network. Comms, and technical issues are covered too, and there is an installation, hardware, and upgrader's guide at the back of the book. Most of the information in this book is general enough that it won't be completely useless when the final version of Windows 95 comes out. But still there's something bizarre about spending £23 on a book about software that hasn't yet been released.

At least *Windows 95 Preview User's Guide* is relatively up-to-date; *Windows 95 Revealed* is based on what was

Introducing Microsoft Windows 95

Author: **Brent Ethington (and the Microsoft Windows 95 Team)**

Publisher: Microsoft Press

Pages: 344

Price: £11.99

ISBN: 1-55615-860-2

Rating: ●●●●●○○○

Windows 95 Preview

Author: **Allen Wyatt, Gordon McComb, and Marty Wyatt**

Publisher: Que

Pages: 417

Price: £22.99

ISBN: 0-7897-0191-X

Rating: ●●●●●○○○

Windows 95 Revealed

Author: **Jack Nimersheim**

Publisher: Random House

Pages: 214

Price: £17.49

ISBN: 0-679-76177-2

Rating: ●●●●●○○○

Understanding Windows 95, Pre-Release Edition

Author: **Jim Boyce**

Publisher: New Riders Publishing

Pages: 352

Price: £22.99

ISBN: 1-56205-359-0

Rating: ●●●●●○○○

Developing International Software for Windows 95 and Windows NT

Author: **Nadine Kano**

Publisher: Microsoft Press

Pages: 743

Price: £32.49

ISBN: 1-55615-840-8

Rating: ●●●●●○○○

Unauthorized Windows 95

Author: **Andrew Schulman**

Publisher: IDG Books

Pages: 593

Price: £28.99

ISBN: 1-56884-169-8

Rating: ●●●●●○○○

known about the software at the end of September, 1994. It's still a pretty good basic guide as to how the software works, although the author, Jack Nimersheim, is one of those unfortunates who confuses writing in an entertaining style with making really dumb jokes —



like describing the loss of a file as "Little Bow (*sic*) Peep syndrome." But it's very helpful for disorientated people who don't like change that for every feature or function he introduces, he identifies the matching DOS feature or command, too.

There are sections on hardware, Windows 95's handling of DOS, customising the workspace, the Explorer, the control panel, using Windows 95's shortcuts and built-in mini applications to manage a project, as well as some technical background. It all seems perfectly sound, although the more recent books tend to be more complete; this one's rather thin (in actuality, too).

Understanding Windows 95 (flagged on the cover "Pre-Release Edition") is similarly intended to help you explore the new software, but it is far more complete and covers much the same ground as the Que book. Boyce has a subtle sense of humour: if you follow his instructions, your first move on the desktop will lead you straight into playing FreeCell (the Windows 95 version of Solitaire). He's right, though, at least for new users since it's good way of getting mouse practice. From there, Boyce heads straight into WordPad. New users may find confusing, though, the number of screenshots towards the beginning of the book that show many icons on the desktop, because at that stage they won't know how those icons got there.

But what's good about this book is the way it's organised. You don't have to wade through chapters on the anatomy of dialogue boxes, or the care and feeding of task managers: you install the software, fiddle around a bit with the mouse, and boom — by page 36 you're writing a letter. The interface stuff, as well as printing, managing files and folders, running DOS programs, networking, adding new hardware, and customising the software, comes later. Windows 3 *cognoscenti* will be glad of an appendix: the book assumes computer literacy but aims to pull in those who have migrated directly from DOS. This is a departure as the author pointedly, but correctly, says: "Most other books aimed at new users of a program unfortunately assume that you're either a dummy or an idiot." A series aimed at the intelligent computer user who looks for guidance, rather than smart pills, is a welcome addition to the market.

Developing International Software for Windows 95 and Windows NT is not what you'd choose for light reading. About half the book's bulk is taken up with tables:

code pages, punctuation symbols, country information, character tables, keyboard layouts, and date and time formats. The first half covers how to use this stuff to support local languages, conventions, character sets, and input techniques. This book is the 1995 revision of Microsoft's internal *International Handbook for Software Design*, first circulated in the late eighties and later released on the Microsoft Developer Network CD-ROM.

The most interesting book of this bunch, *Unauthorized Windows 95*, is also primarily aimed at developers, but the first few chapters make interesting reading for anyone who nurtures a secret longing to support the Washington-based crank group The Campaign to Fight Against Microsoft. Author Andrew Schulman is not a crank, nor does he accuse Microsoft of lying. What he says is that authors are often surprised by the behaviour of their own programs and that his goal is to aid understanding of how Windows 95 actually works in order that better applications can be developed for it.

His purpose is not, he says, to criticise it: if anything, he seeks to neutralise some of the prejudices about what constitutes correct operating system architecture, that lead people to criticise DOS and Windows. After all, he argues, if these are the most successful operating systems in history maybe there's something we've overlooked. Windows 95 should not be ashamed of its origins. Nonetheless, the US computer press reported shortly after his book came out that he had been (at least temporarily and unofficially) banned from Microsoft's CompuServe Windows 95 Beta forum.

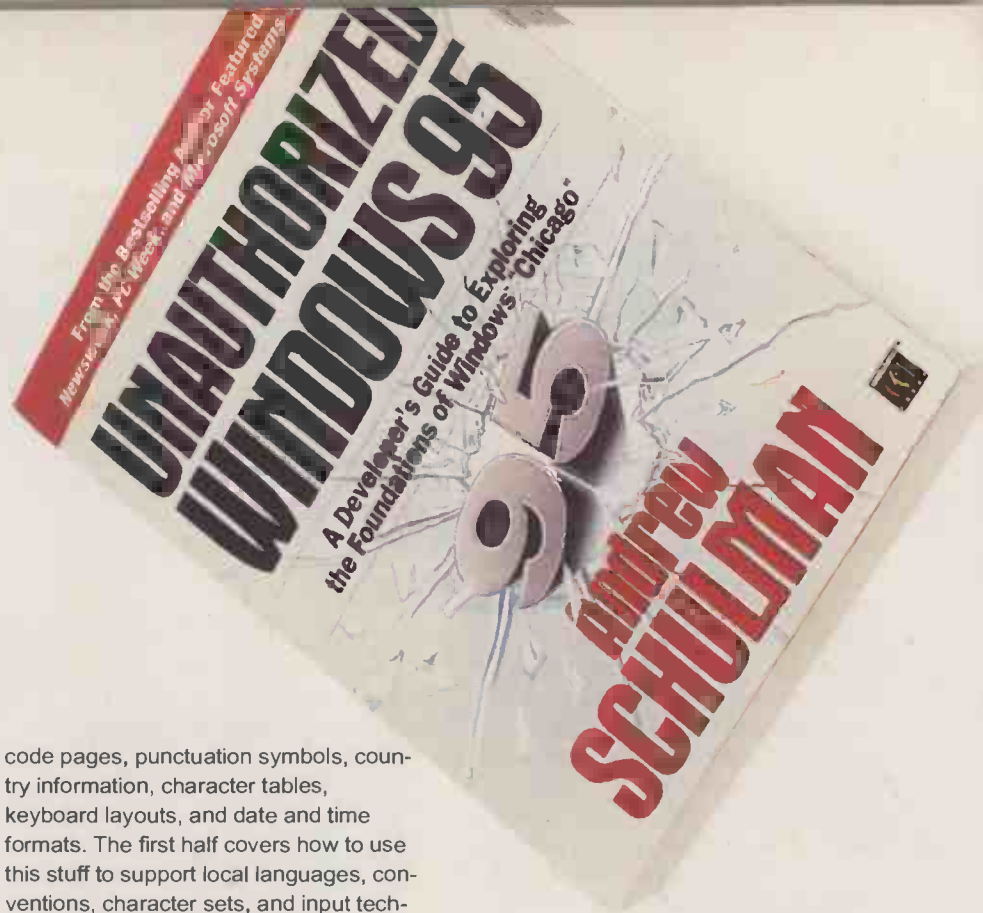
The bone of this contention is Schulman's focus on several commonly reported notions about Windows 95: that it does away with DOS; that it has been

completely rewritten from the ground up; that it is fully "integrated"; and that it has a 32-bit kernel. According to Schulman, none of these things are true, but he doesn't see this as a bad thing because backward compatibility and familiarity are important. Much of the information he uses to bolster his arguments stems from technical things like memory maps, and analyses of interrupt handling and system calls. It's not, in other words, the sort of book from which you could extract a simple press release.

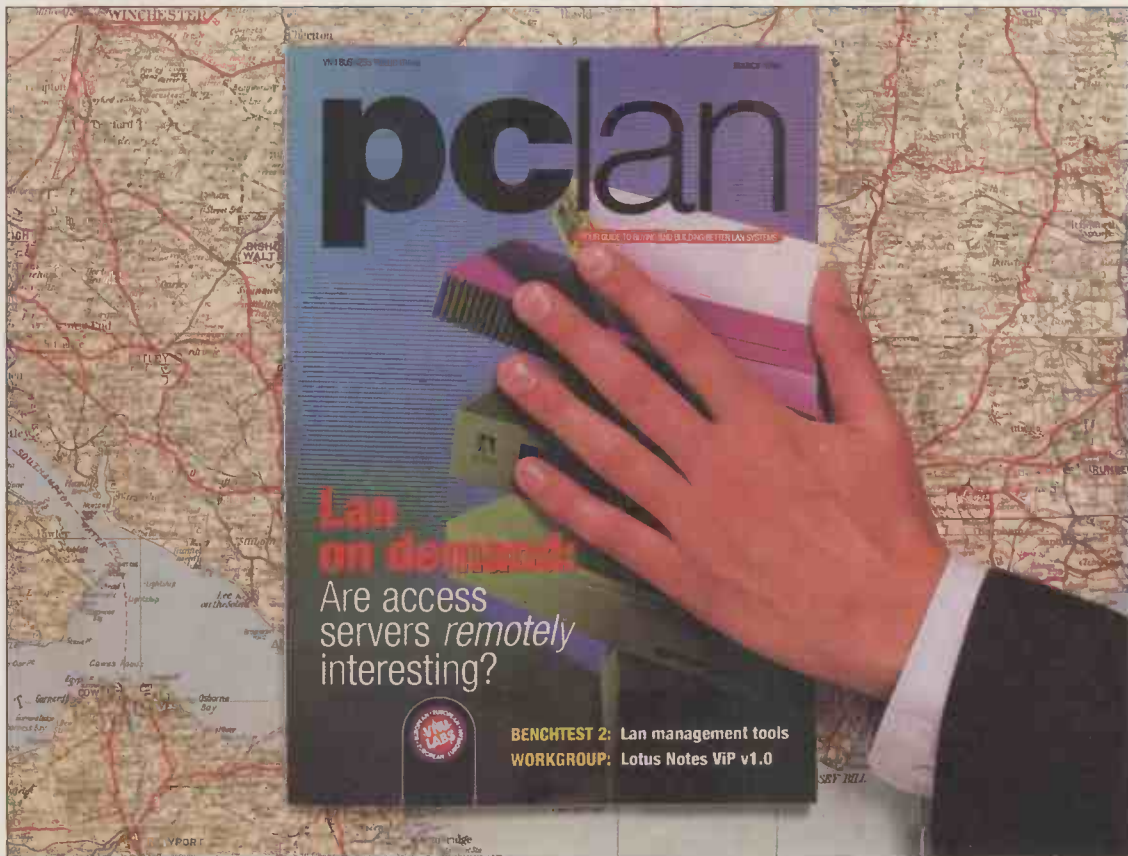
But it's fascinating nonetheless, partly because the detail is not provided for the purpose of showing off, and partly because it's larded with discussions about Microsoft's position in the overall PC industry. He draws parallels, for instance, between the effect on utilities companies of the bundling of utilities with DOS 5 and the future of other software companies (such as the suppliers of fax and email software) as Windows 95 becomes a reality. He believes the prognosis is not good. His reasoning seems perfectly fair, but one can understand where Microsoft might be a touch uncomfortable with a writer who looks at the future for developers (of even such seemingly independent applications as word processors and C++ compilers) and says: "Windows supports general-purpose non-Microsoft applications in the same way that a rope can be said to support someone who will soon be hanged."

Wendy M Grossman

PCW



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gives outstanding results, this is the ideal modem for getting through on noisy telephone lines where other modems fail. - Ideal for heavy use situations.

*Supports the latest error correction standards including MNP10 on the V34 version, ideal for cellular use and where line conditions are very poor.

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*Fully Hayes AT compatible including Hayes extended AT.

The telephone line is constantly monitored and circuitry within the modem will dynamically equalise the line to compensate for noise, if line conditions continue to deteriorate the speed will automatically drop down and automatically fall forward when the line conditions improve.

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*Free 9 & 25 pin serial cable and AC power supply.

*V34/VFAST/32bis/32/22 bis/22/21/bell 212A/ 103 28800,14400/9600/2400 /1200/300 bps

*V17 - 14400 bps S/R Fax

*Group 3 Class 1 & 2 Fax

*V42 / MNP 2-4/10 error correction

*V42bis / MNP 5 data compression

*Asynchronous / Synchronous

*Lease line operation 2 wire

*Auto self test modes

*Auto dial / Auto answer

*Pulse and tone dialling

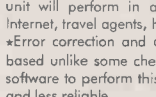
*9 & 25 Pin serial cable

▶ V32bis BAPT INTERNAL FAX MODEM £87 DS1414I

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*High speed built-in 16550

serial port ensures maximum data throughput even on "old technology" computers. A maximum of 57,600 bps throughput is achieved on the V32bis version while the V34 boasts 115,200 bps!

*Designed for continuous use operation ensures this unit will perform in any situation - ideal for bbs, Internet, travel agents, hobby and support services.

*Error correction and data compression is hardware based unlike some cheaper modems that rely on the software to perform this function which can be slower and less reliable.

*Support for independent IRQ and COM port settings enables you to install sound cards, CD's etc and still be able to use your modem, unlike some modems that only support two IRQ's and fixed COM port settings.

* Continuous line monitoring automatically drops the data speed to allow error free communications and unlike some other modems automatically increases the line speed when conditions improve.

*V34/VFAST/32bis/32/22 bis/22/21/bell 212A/ 103 28,800/14,400/9600/ 2400/1200/300 bps

*V17 - 14400 bps S/R Fax

*Group 3 Class 1 & 2 Fax

*V42 / MNP 2-4 MNP 10 error correction

*V42bis / MNP 5 data compression

*Lease line operation 2 wire

*Auto self test modes

*Auto dial / Auto answer

*Pulse and tone dialling

▶ VOICE FAX MODEM/SOUND CARD* £149 VC1414SC

*All the features of the VC1414 plus a high quality professional sound card and voice speaker phone system.

*Sound Blaster 16, Soundblaster Pro and Microsoft Windows Sound System 2.0 compatible

*Full stereo FM synthesis, 16-bit sampling resolution
*Supports mixed recording from CD, FM synthesizer, microphone or line input

*Concurrent sound and modem operation, full MPU401 (UART mode) support - 32 level volume control

*Windows 95 Plug and Play ISD rev 1.0a support

*Full-duplex speakerphone with DSP echo cancellation allows you to conduct a telephone conversation hands free.

*Full voicemail system with automatic voice, fax and data detection

*Data rates supported include: 14400 / 9600 / 2400 / 1200 / 12-75 / 300 bps

*Hardware error correction MNP 2 - 4 and ITU-T V.42

*Hardwage data compression MNP 5 and V42bis

*Support Group 3 V17 14400 class 1 and 2 fax commands

▶ V34 VOICE FAX MODEM* £199 VC2834I

*Rockwell's latest release - Blistering fast data modem combined with all the advanced voice features of the VC1414 voice fax modem.

*Supplied with the Cheyenne Communications BitWare fax, voice and data communications suite.

*Supports ITU V34 / V.FAST / 32bis / 32 / 22bis / 22 / 21 / bell 103

*Hardware error correction and data compression

*Supports IRQ 2 - 5 and COM ports 1 - 4

*Supports ITU V.42 and MNP 2-4 error correction standard

*Supports ITU V.42bis and MNP 5 data compression

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▶ PCMCIA VOICE FAX MODEM NEW VC1414PC

*PCMCIA 2.00 version of the VC1414i including BitWare Voice Fax Modem software

*Low power consumption - ideal for notebook users

*Phone for the latest details of this new product including a V34 version available shortly.

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▶ 1414 FCC PCMCIA FAX MODEM* £139 PCM1414F

▶ V34 BAPT PCMCIA FAX MODEM £199 PCM1414P



*V32bis/V34 PCMCIA v2.0 14.4/28.8k bps fax modem.

*Available in BAPT and FCC versions - supplied with

Winfax and COMIT LITE DOS and Windows fax and communications software.

*Supports V34/32bis/32/22bis/23/22/21/bell 103

*Group 3 class 1 and 2 V17 14400 send/receive fax

*Hardware error correction - MNP 2-4 and V.42

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Transmit Manager: Fax from any Windows application (including Win95), broadcast fax to groups of recipients, combine documents from several Windows application into a single fax, automatically dial outside line numbers and Mercury codes etc, fax preview mode, schedule faxes to take advantage of low telephone rates, address faxes with a single click with Quick Dial buttons, advanced cover page generation with logo and signature, DDE "drag and drop" support for fast faxing.



Voice Manager: A powerful module that gives you remote access to your PC, allowing you (and your customers) to receive faxes and voice messages from any touch-tone phone. Create more than a thousand individual mailboxes, each with its own greeting message. Setup Voice Manager to call your pager automatically when you receive an important message. Create your own Fax -On -Demand mailboxes (more than a thousand!). Create your own Voice - On - Demand mailboxes (ideal for premium rate and after hours support). Remotely change messages. Protect your system from unauthorised callers with passwords. Copy, move and delete voice messages. Optionally play back and record messages with a Windows compatible sound card.

Receive Manager: Automatically receives faxes, answers and records voice calls and allows remote modem access all in the background while you continue to work in other applications. Forward received faxes automatically to another number. Automatically compresses and "cleans" fax images.

Data Communications: The Bitcom module connects your PC to the world of online computing. You can send and receive files, exchange electronic mail and log on to online services including CompuServe and Datatech's BBS. This full-featured program features popular file transfer protocols, including Y-modem-G, Zmodem, and Kermit. Terminal emulations include ANSI and VT100. A powerful script language for automating logons and routine communication tasks. A host made so that you and other callers can exchange files remotely.

Phonebook: A powerful module, ideal for mass faxing, dBase compatible, index-card interface, import ASCII, dBase or WinFax Pro 3 phone book. Easily create mailing lists using the group filters, search by name or company, links to existing dBase phonebook and share information with BitCom.

View Fax: Zoom in and out and rotate received images, rotate faxes that were sent upside down. Enhance the readability of faxes with anti-aliasing. Export faxes as BFX, BMP, DCX, PCX and TIFF files

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- MNP 2-4 V42 Error Correction
- Pulse and tone dialling
- 57,600bps max throughput
- On-board non volatile memory
- Self diagnostics and test modes
- 14400/9600/2400/300bps
- Auto dial - Auto redial
- 16C550 High Speed UART
- MNP 5 V42bis Compression
- On-board speaker monitor
- Hayes compatible commands
- Auto speed sensing
- IRQ 2-5 COM 1-4 supported

Tools for Windows 95

Norton Navigator, Utilities, and Anti-virus

The move to 32-bit operation demands a new raft of upgrades. Moreover, Win95 doesn't do everything, and much of what it does can be improved upon, so the latest products from Symantec are all the more interesting for highlighting the limitations of Win95.

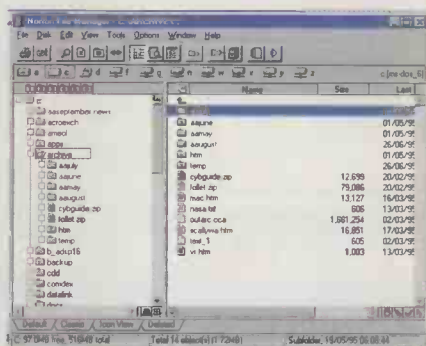
Symantec has three main products: Norton Anti-Virus, Norton Navigator, and Norton Utilities. The first of these addresses the fact that unlike Windows 3.1, Win95 has no anti-virus software: Microsoft evidently decided that third-party developers are best left to mess with the need for constant updates. (Incidentally, do disable the old Norton Anti-Virus before upgrading to Win95 because it gets upset at the system file changes. If you forget and you get a NAV alarm box, choose the Continue option.)

Navigator is a follow-on from Norton Desktop, but differs in that it augments rather than replaces the Windows Shell. This should avoid the problem Desktop had with programs that expect the standard front-end. (These include Win95's Setup, so if you use Desktop or another alternative Windows Shell, change the shell= line in your SYSTEM.INI to shell=PROGMAN.EXE before upgrading to Win95.)

One of the most useful of Desktop's features was the provision of disk house-keeping facilities within standard Open and Save dialogue boxes which despite appearances stem from the Windows environment rather than the host application. Inexplicably, Win95 has gone only half way in this direction, allowing you only to delete and copy from an Open or Save dialogue (by right-clicking the filename box).

Navigator adds three mini-icons to file dialogues: one with a list of recently used folders, another with a list of recently used files, and a third with nearly all file facilities including compress, decompress, viewing and even mailing facilities.

The Navigator File Manager is an alternative to Win95's Explorer, and has some very nice touches such as tab-accessed customised listings, file tagging across directories, file type listings,



The Navigator File Manager allows you to set up tab-accessed customised views. The icons at bottom right access useful facilities such as multi-directory tagging

encryption and the ability to view ftp sites as if they were local.

The viewer in Desktop's file manager was another of its outstanding features allowing you to browse a listing as if flicking through a book (albeit more slowly). Navigator does little more than extend the file-type range of Win95's viewer; but it gives you the choice of stacking up views or browsing in sequence.

Explorer scores over Navigator in one respect: you can rename a file simply by clicking it twice and overwriting. A tricky piece of programming Symantec has been unable to duplicate, but Navigator is almost as easy; you click F2 and then overwrite.

Navigator also caters for multiple desktops. Win95 incorporates former utility-pack standbys like disk defragging and easy Undelete, and Microsoft packs others into its \$49 Plus pack: if you still need other features of the old PC Tools and Utilities then you will simply have to upgrade — they are liable to do nasty things to your disks if used under Win95.

The new Utilities tries to automate tasks as much as possible and to spot trouble before it occurs. A System Doctor checks your system on start-up and warns of possible problems: lengthy tasks such as disk checking can be done in the background, and a Space Wizard checks your disk for defunct files that can be discarded.

Prices will not be announced until these products are launched simultaneously with Win95, so we cannot judge them on value. But they show at least that Win95 can be improved upon. Symantec 01628 592222

LapLink for Windows

LapLink scores points over Win95 on direct connections. DCC only works with '95-equipped machines: LapLink is happy with any combination of Microsoft operating systems, including DOS — even allowing Windows 3.x machines to screen Win95 file listings (albeit with long file names truncated).

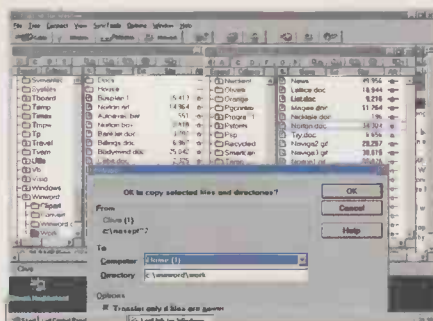
It also retains its ability to install itself on a linked PC and allows simultaneous modem, cable and network links — DCC forces a guest, though not a host, machine to disconnect from a Netware server.

Making a remote link is almost as simple as setting up a phone number. You can have the familiar LapLink file transfer screen open at the same time, allowing you to download files in the background while you check your email by remote control. There are the usual security options, including a call-back facility which, incidentally, allows you to link to your office at the firm's expense.

LapLink can work with all your hardware drivers except one: it replaces your video driver with a version which supports full-colour SuperVGA, but it caused DOS programs to stall on our test machine.

A feature called SpeedSync speeds up remote database updates by transferring only that data which has changed.

LapLink for Windows is available now, with an update promised if necessary when the Win95 code is finalised. *Traveling Software 01753 818282*



Far-side view Files can be copied between home and office machines by drag-and-dropping between windows. Peeping behind the listings shown here is a window allowing remote control of the remote machine



**BE TWICE AS SAFE IN WINDOWS 95.
ONLY NORTON UTILITIES PROVIDES AUTOMATIC DATA
RECOVERY AND CONTINUOUS SYSTEM PROTECTION.**

If you're moving to Microsoft's new operating system, and you haven't installed the new Norton Utilities for Windows 95, think again.

**IT'S A 32-BIT WORLD
OUT THERE.**

You already know Norton Utilities provides the best set of tools for system protection, hard disk optimisation and data recovery.

You probably also know that your current 16-bit utilities won't run in the new world of Windows 95.

And that the utilities provided by Windows 95 don't offer you the level of data protection that you require.

That's why you need the new 32-bit Norton Utilities for Windows 95.

Norton Utilities' "Space Wizard" will run a pre-installation tune-up (PIT) on your system prior

to loading Windows 95, optimising your hard drive and cleaning out redundant files.

Once installed, Norton Utilities runs continuously in the background, monitoring your system and automatically launching tools to maintain system performance and avert crashes.

But should the worst happen,

**NORTON UTILITIES
FOR WINDOWS 95**

PRE-INSTALLATION TUNE UP (PIT):

SPACE WIZARD

Frees up disk space and provides a comprehensive pre-installation physical.

NORTON SYSTEM DOCTOR

Continuously monitors all vital resources and data integrity. Alerts you to impending disaster and recommends action or fixes problems automatically.

32-BIT NORTON DISK DOCTOR

Automatically diagnoses and repairs file system problems using the speed and safety of 32-bit technology.

UNERASE

100% protection of erased files. The new wizard-like interface leads you through file recovery step by step.

SYSTEM INFORMATION

Diagnoses potential conflicts and configuration problems with detailed system information and performance testing.

NORTON RESCUE DISK

Provides an easy one-step recovery by automatically restoring all necessary boot-up files and drivers, including the Windows 95 Registry.

Norton Utilities provides you with the capability to retrieve your valuable data.

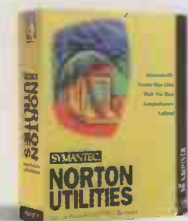
No other utilities offers you this level of protection.

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GUARANTEE.**

Norton Utilities for Windows 95 comes with a full 60 day money-back guarantee.

You've nothing to lose - except your data. Get your special trade-up edition of Norton Utilities for Windows 95 today.

Call 0800 526459 for more information about this exciting new product.



Also available from Symantec for Windows 95 are Norton AntiVirus and Norton Navigator. Outside the UK, please call (0) 1734 662969

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 PCM 8/95

WINDOWS 95 THIRD PARTY SOFTWARE

PRODUCT	PHONE	LAUNCH DATE	COMMENTS
ADOBE			
Photoshop	0181 606 4000	November	Logo compatible within six to nine months
Illustrator		November	
Pagemaker		November	
Persuasion		November	
Acrobat		November	
ATM		November	
AUTODESK			
AutoCad 13	01483 303322	"Shortly after Win95"	Upgrade free to current Autocad 1.3 users
BLACKWELL			
Idealist	01865 206206	September	
BORLAND			
Delphi	01734 320022	January	
C++ Compiler		January	
Paradox		January	
dBase for Windows		January	
Interbase		expected before January	
COREL			
Corel 6.0	0800 581028	September	
CAERE			
Omnipage Professional	0171 630 5586	No date available	
DATAEASE			
DataEase 5.0 for Windows	0181 554 0582		
LOTUS			
Smartsuite	01784 455445	November	
LotusScript 3.0			
Notes 4.0		1996	
NOVELL			
PerfectOffice	01344 724000	By the end of the year	
PerfectWorks		By the end of the year	
MACROMEDIA			
Director 4.04		TBA	"We don't want to promise until we know what the code is going to be like. Latest release is 32-bit but will not be optimised until Win95 is launched."
Authorware		TBA	
Freehand 5.0 for Windows		TBA	
MICROGRAFX			
Publisher Publisher	01483 747526	September	
ABC Flowcharts		September	
Designer		September	
MICROSOFT			
Office	01734 270000	September	
Works 4.0		Early September	
Money		This year	
NETMANAGE			
Chameleon	01734 306060	"Mostly 95 ready already"	
Chameleon NFS		Win95 launch day	
TRAVELING SOFTWARE			
LapLink for Windows	01753 818282	Available now	Update after Win95 release if necessary
SAS			
Dr Solomon's Anti-Virus Toolkit	01296 318700	October	
STARFISH			
Sidekick for Windows		With Win95	
Dashboard		With Win95	
SUPERSCAPE VR			
Visualiser for Windows	01256 745745	Before December	
SYMANTEC			
Norton Navigator	01628 592222	With Win95	
Norton Utilities		With Win95	
Norton Anti-Virus		With Win95	
XEROX			
Textbridge Professional	01734 668421	32-bit now. Win95 "soon"	



One step beyond

When Windows 3.0 was launched in July 1990 it was a breakthrough. It presented the PC community with a common way of using computers: the same function keys did the same things regardless of which programs you were using. You could buy your word processor from WordStar, your spreadsheet from Lotus and Harvard Graphics as your presentation graphics program. So it seems odd that most people buy software in suites. About 80 percent of Word for Windows sales are the result of people buying Office, and the percentage for Excel is even higher. Beyond the basic Windows integration there's a way of doing things favoured by the software house producing a particular package.

Office for Windows 95, also known as Office 95, will have version 7.0 of the various applications and has a head start. Despite Microsoft's insistence on Chinese walls, it must be easier to get things right if the latest beta of Windows 95 is always on your network. And in the late stages of development there was at least one beta release a day.

Office for Windows 95 has all the features Microsoft expects from third-party Windows 95 applications; to use the Windows logo on the box a program submitted after September this year must be 32-bit, must use long file names and must conform to the Windows 95 look — even though this has been something of a moving target since the first details were

announced nearly two years ago.

Fundamentally Office for Windows 95 consists of the existing applications with the necessary modifications for the new version of Windows, and those aspects of the applications which were in development and which were easy to bolt-in. There will be no changes for the NT or Macintosh versions, although these versions will work under NT. Only PowerPoint has undergone enough changes to justify new file formats, but annoyingly Microsoft says that there will be new formats for other programs with the next releases.

Simon Rockman rolls up his sleeves and finds that the Office for Windows 95 suite of programs transforms the working environment into a friendlier, more productive place.

Excel's Visual Basic for Applications has been added to Access, but not, as promised, to Word (which still has the VB-like WordBasic) or PowerPoint. The preference for Access was influenced by Microsoft's corporate clients, many of whom use Office to build custom solutions. VBA in Word and PowerPoint will come in time.

A new addition to Office is Schedule Plus, which has been significantly enhanced. Mail has been moved into Windows 95 itself as part of Exchange and, as with Office 4.3 there will be an Office Professional version which

The answer wizard

The answer Wizard is the first fruit of Microsoft's research into natural language. It works surprisingly well

Microsoft Excel Help Topics: Microsoft Excel

Contents | Index | Find | Answer Wizard

1. Type your request, and then click Search.
(Example: "Print more than 1 copy of a time.")

hide columns Search

2. Select a topic, and then click Display.

How Do I

- Hide rows or columns
- Group and ungroup data in a PivotTable
- Show or hide detail data in a PivotTable
- Show or hide detail data in an outline
- Ungroup rows or columns in an outline
- Display hidden rows or columns
- Display or hide outline symbols

Tell Me About

- The -, +, and 123 symbols in an outlined worksheet
- Sorting data in an outline
- How subtotal and grand total values are calculated
- Examples of criteria for Advanced Filter
- Automatic subtotals

Programming and Language Reference

Display Exit Cancel

Tip: In a macro, you can transverse an array and locate only the

includes an upgraded release of Access soon after the main version ships.

All the programs in Office 95 benefit from better memory management but you will need 8Mb to do anything at all and some features, such as the Word Internet Assistant, will require 12Mb. Microsoft blusters that anything you do today will not be any slower under Windows 95, but in practice there is no point in upgrading unless you are going to use new features and that will often mean more memory.

A typical install is now 55Mb, a minimum install 27Mb. If you try hard with esoteric filters and a lot of the extra software on the CD ROM you might be able to consume 100Mb. There will be more emphasis on the CD ROM version of the software than with previous versions of Office, and for the first time CD Office gets the full paper documentation. This has been substantially cut down, so that all the common functions are described only once, replacing the old system of putting all the manuals for the individual applications in the same box. Individual versions of the four packages will ship at roughly the same time as the full version of Office 95.

Answer Wizard

New to all the Office 95 applications is the Answer Wizard, a result of Microsoft's research into natural language. It is supplied in addition to standard Windows Help and you can ask it questions as if it were a person. A line like "how do I do calculations?", for example, produces information on the arithmetic functions.

Microsoft likens this to having an expert down the corridor. Just like a human expert, the expert within Office gives several answers even if the software is pretty sure that it knows what you want. Similarly, if it doesn't understand what you are talking about it gives an answer to a different question.

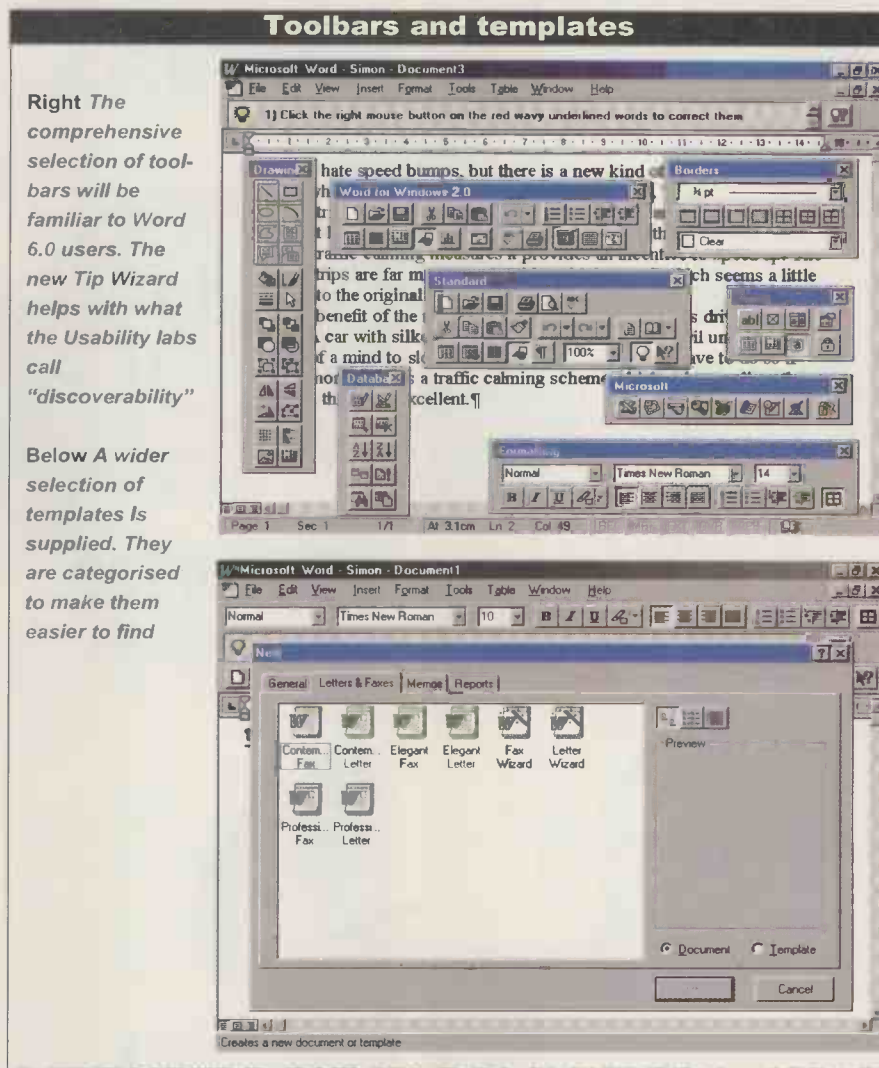
Chris Peters, Word guru and one of the longest standing Microsoft employees, is excited about the potential of natural language work. The Answer Wizard is the first concrete product and there will be others. Peters feels, for example, that simple communication, the sorts of things people send by email, is ideal for translation from one language to another.

Word for Windows 95

Word for Windows 95 doesn't look very different until you start typing. If you make a spelling mistake, the word is underlined with a squiggle. You can correct it right

Right The comprehensive selection of toolbars will be familiar to Word 6.0 users. The new Tip Wizard helps with what the Usability labs call "discoverability"

Below A wider selection of templates is supplied. They are categorised to make them easier to find



away with a right click of the mouse or wait until you've finished the document.

Windows 95 is the first version of Windows to be properly multitasking but the Word program has only one independent thread: printing. You can print a document and rapidly go back to work. There is scope for multi-threading more areas, such as the import filter, but these are not yet explored, and even the implementation of the printing thread is only experimental. When later versions of the software hit the streets we should see more threads in Word as well as in the other Office applications.

File handling has been improved, and there is a much better file dialogue box. You can create folders from within the save box and you can open multiple files. There is a file preview and the find file program has been greatly accelerated thanks to a system which keeps a sorted index of all the files held on the disk. This will be of interest to anyone with a large amount of Word 6.0 data since the file format has not changed. However, the Windows 95 style interface can be very

confusing if you have a lot of files in one directory since there are no sort options for the view.

A lot of work has gone into the additions. There is a more advanced Internet assistant which allows Word to be used as an off-line editor for sending email, a mail-specific toolbar and support for HTML.

Microsoft has given all the standard designs throughout Office 95 a thorough spring clean. Word and Powerpoint in particular benefit from new template designs, although again the resulting dialogue boxes are quite confusing.

The mail merge software is integrated with the Schedule Plus address book. But perhaps the biggest change is the improvements to Intellitype, made as a result of research conducted in the Microsoft usability labs. Under version 6.0 the Intellitype features were smug and annoying, concerning themselves with things like converting MHz to Mhz. The new version now leaves any words without a vowel alone, and also realises

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*Source: ABC November 94 audit issues



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that there is more than a space to denote the end of a word: quotes, brackets and dashes are all acceptable. If you frequently use a term to which Word is likely to object to, such as dBase, you can set up an exception.

Word for Windows 95 can even spot when people have left the Caps Lock on by mistake and converts the text, then turns the caps lock off.

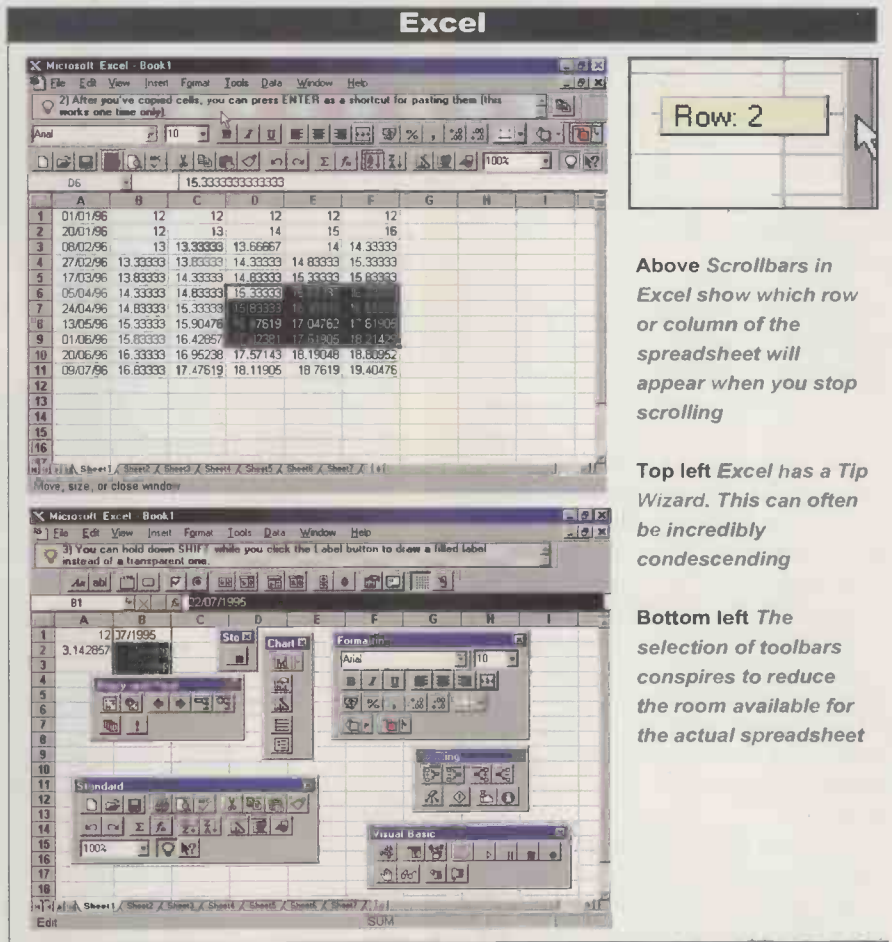
If you are trying to create a numbered or bulleted list, as you type in the numbers or bullets the software will spot this and put the next marker in for you automatically. Microsoft is keen to extol the virtues of 'discoverability': if the software spots you doing something the hard way — drawing a line by using dashes for instance — the tip wizard will light up, a box explaining the best way to do the job will appear and the software will do the job for you. Some of the intelligence is so useful that you soon come to take it for granted; for example the letters in 1st, 2nd, and so on are automatically superscripted. This second pass at Intellitype is much more sensible, and using Word 6.0 without these features feels like a retro-grade step.

Excel for Windows 95

In the past Microsoft only worried about Excel users in financial institutions and other organisations taking hundreds of copies. With Excel 7.0 the focus has shifted towards small businesses. There are custom tools for using Excel for invoicing, and because 80 percent of users exploit only 20 percent of the features, there are tool tips and tip wizards to introduce new features and get people to use them.

The Excel group had a major advantage over the other applications groups in its ability to make the program faster. Everyone uses the recalc function, so by re-coding this in optimised assembler the speed with which Excel calculates has vastly improved. The programmers are keen to point out that while making their code 32-bit helps, the real solution to making programs run faster is better coding. The new Excel recalc has also been Pentium-optimised. Switching the Pentium optimisation on in the C compiler helps the 486 performance, and proper Assembler programming with instruction pairing has resulted in radical performance improvements.

Ease of use has been given priority. One problem addressed by the usability labs was that of users getting lost in acres of unused spreadsheet when they



Above Scrollbars in Excel show which row or column of the spreadsheet will appear when you stop scrolling

Top left Excel has a Tip Wizard. This can often be incredibly condescending

Bottom left The selection of toolbars conspires to reduce the room available for the actual spreadsheet

become over-enthusiastic with the scroll bar. The scroll bars now only handle the active area. When you are moving the slider, a tool-tip appears to show the row or column number the sheet will scroll to when you let go of the mouse button. If you are inserting or deleting a row or column the change is animated to make the change more obvious. And as with the other Office for Windows 95 applications there is an autocorrect feature to weed out the most often mistyped words.

A high proportion of Excel users do not undertake heavy calculation. They use the program for managing stock lists, projects and general list management, which often means retyping the same text. Excel for Windows 95 tries to guess which text and 'fill in' the rest of the cell. There is also a 'pick list' which shows all the entries already used.

In the course of visiting clients to see how the software was used, one of the things which upset the developers most was the number of people who used Excel and still had a calculator on their desks, or who used a remote area of the spreadsheet for a minor calculation such as totting up sections of the spreadsheet. The result is a new box, known as a scratch calculator, at the bottom of the

screen which shows the average, sum or number of anything which has been highlighted.

An exceptionally useful feature of Excel was the ability to add notes to a cell but reading the text afterwards was difficult. Now the text just pops up if you pass the mouse pointer over the cell.

Shared lists allow more than one person to edit the same spreadsheet. All the handling is intelligent. If you are working at the bottom of a list the extra rows are added. Typically people 'own' areas of a sheet and the conflict manager tracks a history of conflicts. You only see the changes other people have made when you save the file because everyone has a copy of the whole 'database' which is the spreadsheet.

The prettiest improvement is the mapping. This looks at the data in the spreadsheet and intelligently suggests the right maps. Data is put straight into the map with bigger numbers shaded darker and mini-pie charts are put straight onto the map.

Despite Microsoft's recent purchase of Nextbase which produces AutoRoute, Mapinfo will supply geographic maps. It was chosen in preference to Autoroute

because Mapinfo is a OLE object and allows the user to customise maps.

Integration with Access has been improved. You can now enter data using an Access form and use its reports, Excel will analyse the data and turn it into an Access relational database. Filtering prevents mistyped data from corrupting the database.

PowerPoint for Windows 95

Electronic presentations are still only a small part of what people use presentations graphics programs for. A year ago eight percent of presentations were made using a notebook on a desk or large screen watched by an audience, and this has risen to 14 percent. But most presentations still consist of monochrome slides or printouts produced by the program.

PowerPoint for Windows 95 has been designed to improve both types of presentation. It is faster for electronic presentations — particularly at going backwards which was a problem with previous versions — and has better backgrounds, including photographic backgrounds and textures.

For users who have only a mono printer there is a mono view; shapes which look great in colour might mask the text when printed in black and white. It is also possible to set up the program so that colour slides have different contents. Slides can be edited in colour with a mono insert or vice versa.

Presentations can be made interactive: you can place a button on a slide to jump to another or to run a video. Slides can be animated and there is an option to jump to any other slide. The slider bar shows the slide number which will be displayed when you let go of the bar.

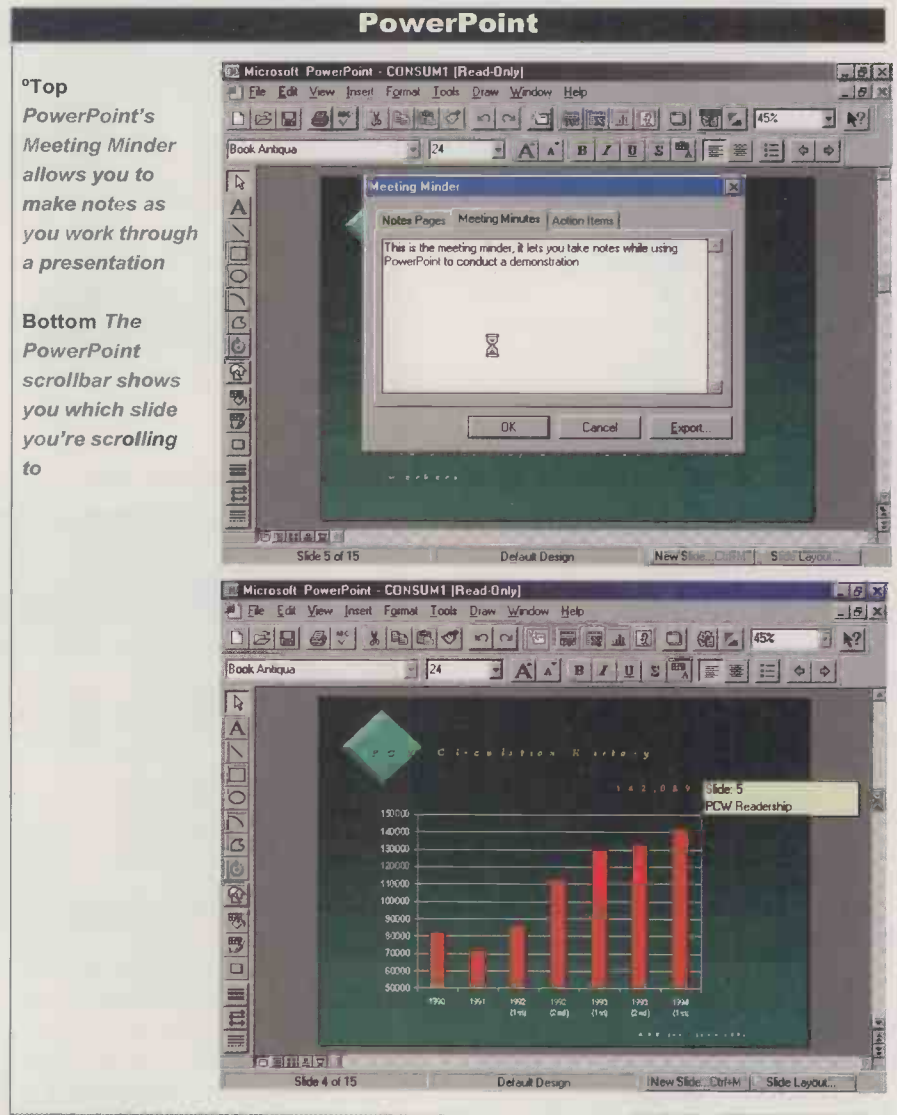
For presentations over a network, slides can be sent to remote machines and shown simultaneously. This presentation conferencing system supports up to 65 machines. For informal presentations there is a program called Meeting Minder, which allows you to make notes as you go along. The notes are then assembled as action points and can be shown as the last slide.

Clever additions include automatic clip art which scans the text for keywords and will suggest clipart. The auto content Wizard takes into account the length of the presentation and the type of audience and checks language. For building slides there is a custom toolbar tailored to complex builds. The program also has better templates and eight different multimedia styles.

Top

PowerPoint's Meeting Minder allows you to make notes as you work through a presentation

Bottom The PowerPoint scrollbar shows you which slide you're scrolling to



Schedule Plus for Windows 95

The new addition to Office 95 is Schedule Plus. Formerly part of Windows For Workgroups, it has been substantially upgraded and now includes a comprehensive contact manager. It supports the Timex Datalink watch and other personal organisers, but these have a distinctly American bias and Microsoft remains cagey about support for the Psion Organiser.

Schedule Plus can be used either as a personal organizer or, if you are using Mail or Microsoft Exchange, as a workgroup scheduler. You can see as much or as little of your week ahead as you want, and there is control for multiple time-zones; if a colleague in Japan arranges a meeting the software will know that 6pm there is 10am for you.

There is full control over recurring appointments and it is possible to link the software to Project for Windows 95. For group meetings, there is the facility to manage resources as well as people.

Conclusion

Office for Windows 95 is the result of a U-turn so sharp you can still smell the burning rubber. When Microsoft launched 32-bit applications for NT there was much talk of common code, interworking between Mac, NT and Windows, parallel development cycles, and many other things which made it easier for Microsoft to develop programs which were not necessarily the best for the user of any platform. And there was a strong implication that OS/2 wasn't worth the effort.

Office for Windows cuts right across that. It is custom written and optimised for Win95, and Win95 needs good software to justify its delay of more than a year. Here we have a suite of programs which makes the most of Windows and thus makes the user more productive. It offers no earth-shattering improvements, just a general warming-over of the software and a few small steps forward in usability. But if you have the memory to use it, it's irresistible.

Overall Systems Test Results

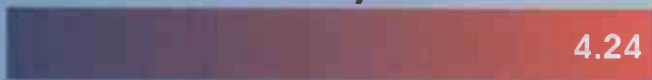


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What the public think

Behind all the marketing hype, the Windows 95 beta program has given thousands of people access to the new operating system. Several of them, including Paul Ockenden, Managing Director of Effective Design & Communication, a small software house and consultancy, talked to *PCW*:

"It's incredibly stable. I've been on the beta program since almost the beginning and it hardly ever falls over compared to previous version of Windows. I have a number of products I use which the manufacturers recommend you don't run under Windows, and with Windows 95 I've yet to find a DOS product that won't run reliably.

"From a software development point of view it's nice because you don't have the silly restrictions which you have if you're developing 16-bit software. You can develop proper 32-bit code.

"I hope it's going to be a great success. It's nice to have been on the beta program from the beginning and feel I've had some input into how the product is today."

His experiences are echoed by David Allardice, who recommends software for departmental use in the financial sector. "I find its stability quite refreshing; it's a lot more stable than 3.1 even using 16-bit applications." But Allardice is also one of a large number of people who are cautious about making the move.

"As an experienced 3.1 user, I find the interface quite confusing. I think new users will find it easier as long as it is set up for them — if things like the start button are set up. However, I've just managed to take the people I work with through Program Manager. I think moving to the desktop will be quite confusing to them."

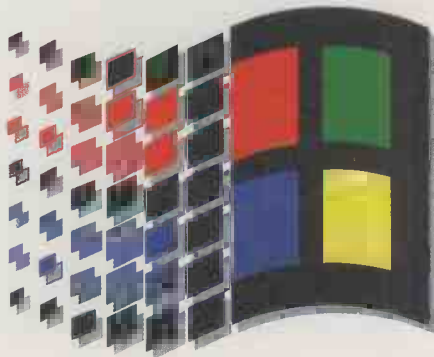
It's not just users who feel this way. Jez Deacon, Technical Director of Carrera, told *PCW*: "We will very probably have it available as an optional purchase initially, and we'll gauge the reports and customer reception when we decide whether to make it the initial product on all systems.

"We're positive with a modicum of caution. Generally speaking, I'm looking

forward to it. I think it's going to be a fairly exciting time.

"We've tried it out on a few new users. Our initial impressions are that it is better. We believe that the amount of first user support could be reduced. We also believe that the advanced user support may initially increase, but only for a brief period."

This view's shared by Alan Jay, Director of the PC User Group, who says: "Everything you knew about DOS you can throw out of the window. You'll also have to throw out all your utilities. It's going to be very interesting to see how it goes out there. For new users it has a lot of advan-



tages. For the installed base it has a lot of disadvantages and the take up may not be as fast as people imagine."

He's also aware of potential hardware problems, telling us: "Any machine made two or three years ago is not going to have enough disk space, enough processor or enough memory," also a worry of Andy Elvers, a network manager in the civil service:

"I'm confident enough with Windows 95 that I'm now using it all the time, and there's already some applications where suppliers are coming to us saying that they would like us to move on to 95 as a solution for further integration.

"In a way I'm quite positive, but corporate-wise Microsoft may have a problem. I still think there are a lot of 386s out there. A lot of our users just do simple word processing, or log into a mainframe. With those people it's very difficult to justify a machine greater than

a 386. How do you justify it, especially when you're a government department?"

Not everyone is reporting good experiences with the beta, however. According to Angus Hamilton, a partner in JP Malnick & Co, a firm of London solicitors, "The problem was I installed it as a dual boot, and I was wasting huge amounts of time when I should have been working just fiddling around. I never want to hear the words Windows 95 again. I should have left it alone. Curiosity killed the cat. I should have waited for it to be perfected. When it's out in its proper version, when it's been reviewed, then I might consider it, but only if it gets really positive reviews."

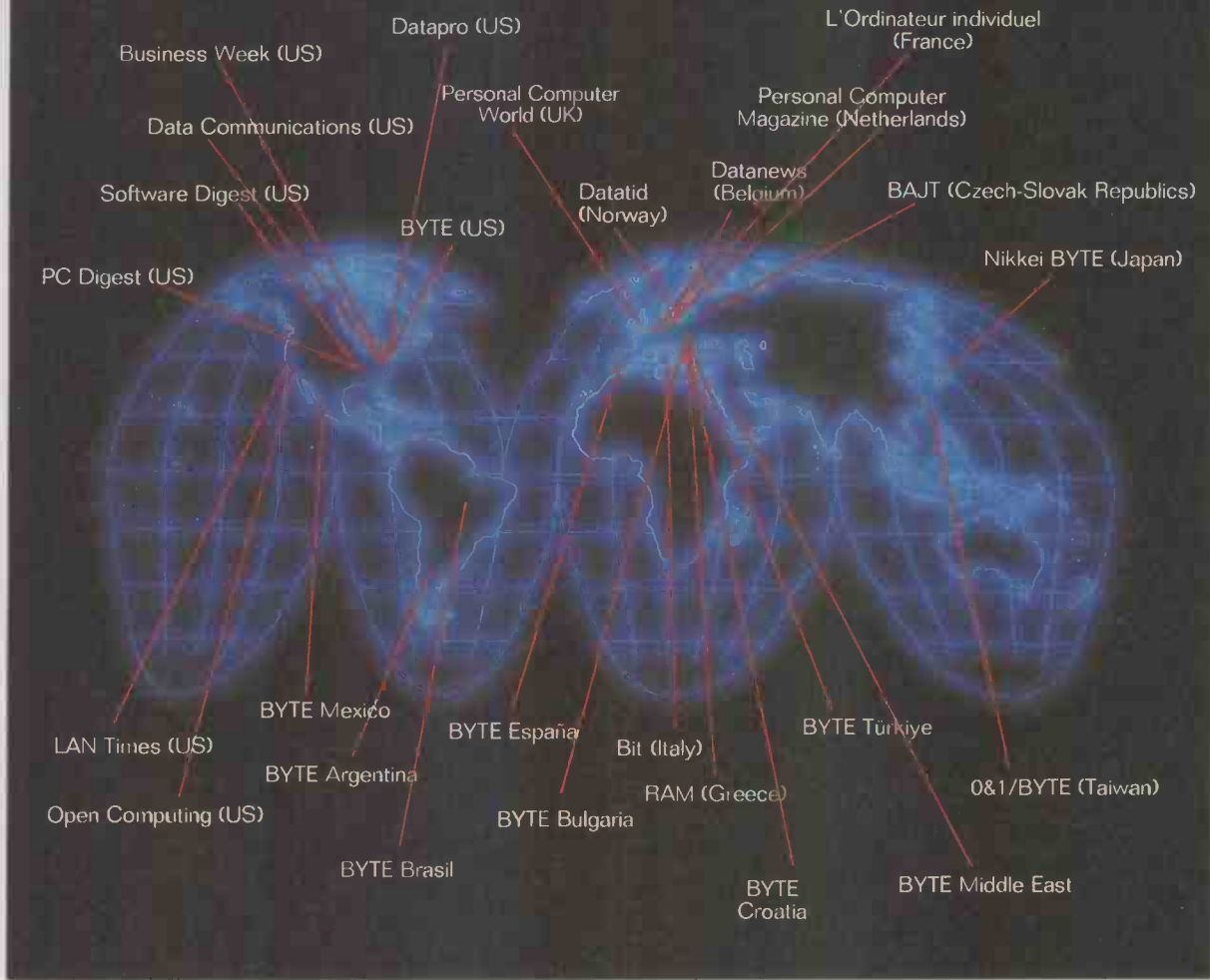
Hamilton may be the exception that proves the rule. Almost all the people that *PCW* spoke to were positive, and they all believe that it's going to be a success — though Jeremy Spiller, Marketing Manager of Ashmount Research, a London-based software house, states the views of many when he says: "Yes, it will be a success; I think it will take time, but I don't think it will take very long, because of the pro-activity that Microsoft are currently involved in. It's clearly a step in the right direction."

Windows 95 is even winning friends from the OS/2 camp, including David Eccleston, a consultant, who told *PCW*: "I'm impressed, thus far, and I'm an ex OS/2 man. With Warp, somehow the machine seemed to run a lot slower." He too believes that take up may be slow, and upgrading not as smooth as some people expect. "A lot of hardened 3.x users are going to find it a culture shock. The fact that MS have brought in outside support teams indicates that they expect hassle, or at least a lot of queries. The big blokes will hold back."

The last word, from Simon Chapman, a Cardiff-based software developer, sums up many of the feelings about Windows 95.

"I think it's very good; much, much better than Windows 3.11." **PCW**

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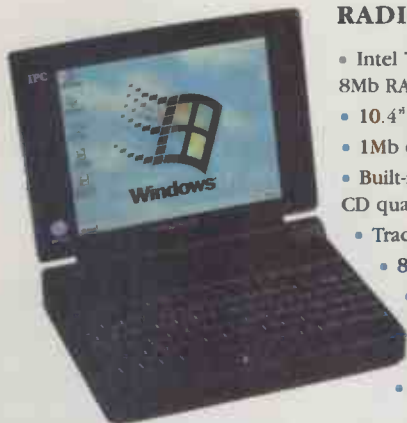
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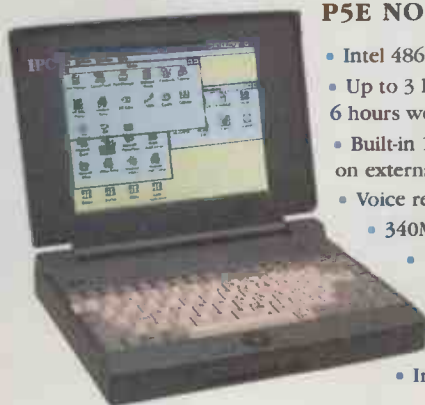
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Lucky Jim

Jim Clark was professor of computer science at Stanford University, but this wasn't enough. So he founded the immensely successful Silicon Graphics, but got bored. Now, as joint founder of the triumphant Netscape Communications, he talks to Clive Akass about how it all happened.

Jim Clark has been called the Bill Gates of the Internet, which is an exaggeration, but not a large one. Netscape Communications, which he launched just over a year ago, may never get as big as Gates' Microsoft but it is already a leader among the many companies that have jumped on the Internet bandwagon.

Netscape Navigator, winner of *PCW's* Most Innovative Software award for 1995, is by far the most widely used Web browser. Visa, Mastercard and the Bank of America have all endorsed Netscape technology as a secure payment conduit, helping to plug the Internet into the money system.

This is part of a general drift towards electronic cash,

which could prove to be the biggest change to the world economy since the invention of banks. In the shorter term, Clark warns, it is going to force big changes in companies like CompuServe which have been taking hefty rake-offs by acting, in effect, as billing agents for information providers.

Netscape stemmed from a kind of mid-life crisis. Clark, a former professor of computer science at Stanford, was a classic success story even before he launched the company. He had founded Silicon Graphics, and built it up to a turnover approaching \$2bn a year. It was a realisation of the Great American Dream in more senses than one: Silicon Graphics workstations produced special effects in films like Terminator II and Jurassic Park, and turned Clark into Hollywood's favourite computer man. He was rich. He was successful. He was famous.

But it was not enough. Early last year, he threw it all in and started again. "I was getting frustrated with the ongoing march of the personal computer... Silicon Graphics is a wonderful company — one of the best in the world — but the volumes it dealt with are minuscule compared to those of a PC (company). There are more PCs shipped during a coffee break than Silicon Graphics ships all year. I wanted to deal in high volumes, so I thought it was time to move on," he said in a keynote address at last month's Internet World show in London.

A clean break

He decided to found a new software house, which involved making a clean break with Silicon: "That probably sounds peculiar because it was a company I was the chairman of, and the founder of, and it was approaching a \$2bn preliminary in revenue. But I decided that the only way I could be in a software company, and be considered in any way neutral, would be if I were not affiliated to Silicon Graphics."

His first problem was how to staff the new company. "I had a personal commitment not to recruit from Silicon Graphics because I had spent 12 years building that company. I had no desire to try and tear it down... But I knew no good engineers, because all the good engineers I had known I had recruited to Silicon Graphics."

But he had heard of Marc Andreessen who, at the age of 22, was then already well known as leader of the Illinois University development team who developed the phenomenally successful Mosaic

browser. The day Clark left Silicon, he asked Andreessen by email if he would be interested in starting a company. Andreessen, who had just moved to California from Illinois, responded within ten minutes.

"We had dinner pretty much every other day for two months and mapped out a strategy for our new company. Initially it had nothing to do with the Internet. It was more interactive television, computer games."

Clark says that before talking to Andreessen he was "pretty oblivious" to the exploding interest in the Internet, which at the time was growing at about eight percent a month. "Marc indicated to me that he had gotten close to a million and a half users of his program [Mosaic] in less than a year. So I said if you can regroup the entire team... if you could recruit all these people, then I would finance the company and we would find some way to make a business. And that was really the totality of the business plan at the time."

Early on they decided that their new browser would be designed to enable electronic commerce, which involved developing data encryption techniques for the exchange of personal and financial details. But the youthful Andreessen clung to some of the Web's idealism, born of the improbable marriage of hippy-generation computer pioneers to the nuclear-proof networking technology of the Pentagon.

The result was that Clark was persuaded to give Netscape away, as evaluation shareware. Within four months, six million copies were in operation. "I don't think anyone has been able to achieve that kind of software distribution in that short a period of time," Clark said.

It was also a prime example of how the software market is like no other in the world. Money poured in from the "free" program because a huge number of companies bought site licences after finding that most of their employees were using it. "That was the marketing genius behind the company," said Clark. "It wasn't my idea — I wish it was. It was Mark Andreessen's. He said we had better give it [Netscape Navigator] away because that is the tradition of the Internet."

Of course, that was just the half of it. They wanted to capture a wide market share before rival browsers got a foothold: more dangerously, Microsoft was incorporating Internet technology

into Windows 95.

But Netscape's secure payment system, if it proves as secure as promised, could outflank even the mighty Microsoft by offering a direct route between online services and their customers. Clark calls this "disintermediation" — cutting out the intermediates. The situation is complicated because the likes of CompuServe, America Online, and the forthcoming Microsoft Network act in a triple capacity as network operators, service providers, and vendors of third-party content.

Until recently, they were free to charge a huge percentage on these third-party sales. Clark claimed that last year America Online was taking up to 90 percent of the fees for the use of online Time Magazine. These rake-offs have been dropping in the past year, but the Microsoft Network is still pitching for 50 percent, says Clark.

Open market

"This is where disintermediation comes in. The Internet is this wide-open network that everyone can get on to, as an information provider or as an information consumer. And because it is ubiquitous, and because it is competitive, its pricing is going to be forced into an open market. This is going to lower the cost."

In fact, Clark predicts that network operators are going to be hard put to charge any percentage at all. He likens them to a telephone company trying to get a percentage of business done over the phone. "For example, if I get on the phone and do a \$1m transaction, then the telephone company is taking \$30,000 dollars of it back. This, in my view, is what the traditional online services have been doing. So I don't think it's going to survive as a business model."

Netscape charges a flat licensing fee for its software, which can offer all the billing facilities a network operator can provide. "So, if you as an information provider want to run an online catalogue, or any online service, we have complete turnkey packages that will allow you to do that. The cost depends on the number of boxes you are going to use for your servers, but it is still a fixed price, and if you do a billion dollars' worth of business we are not going to get ten percent of it. Or 20 percent. Or 50 percent."

The analogy with telephones is exact, he says. "A lot of people ask me: 'How do you make money out of the Internet?' I say: 'How do you make money out of the phone system? It's a tool.'"

PCW



Computer games



The Olympic Games are the pinnacle of sports achievement, and often a testament to a lifetime of dedication, hard work and disciplined training. Next year, as the "modern Olympics" celebrate their 100th birthday with a \$1.58 billion, 17-day extravaganza in Atlanta, Georgia, the Olympic Games

take a leap into cyberspace.

The 1996 centenary games will be the most computing-intensive event in history, with an unparalleled array of hardware, software and networks used to support everything from time-keeping to score-keeping to the instant broadcast of that information to journalists, broadcasters

and the many millions expected to monitor the progress over the World Wide Web — as well as a multi-billion viewer TV audience.

IBM leads the way

Leading the technological charge in Atlanta is IBM. According to Bob Neal,

Next year, Atlanta, Georgia will see the most computing-intensive event in history: the 1996 Olympic Games. Costing £1.58bn, the Games will involve 6,000 computers of all sizes, tied in with every aspect of covering the Games, and some of the most sophisticated security systems ever seen.

Geof Wheelwright awaits the starting gun.



the Atlanta Committee for the Olympic Games' director of information systems, a great many refinements have been added to the system IBM helped to develop for the 1992 Olympic Games in Barcelona.

He says, for example, that information on judges' scores would not be "posted"

onto the system until it is released by the judges. In 1992, an error by one judge, who had incorrectly entered his score, cost Canadian swimmer Sylvie Frechette a gold medal. After two years of wrangling with the International Olympic Commission, the medal was restored — but Neal wants to prevent such problems from ever occurring in the first place.

Wireless communications technology will also get some heavy stress-testing at the 1996 Olympics. Journalists covering the events, for example, will be able to wear personal alphanumeric pagers to which results will be broadcast continually throughout the 17-day event. This means that sports writers will be able to stay current with the results, whether they are in the press room filing copy, out interviewing, or participating in their own arm-raising competitions at one of Atlanta's many watering holes.

This technology was given a test at last April's Spring Comdex/Windows World computer trade show in Atlanta, where all registered reporters and broadcasters were offered alphanumeric pagers to keep them abreast of breaking news (such as where all the best Comdex parties were to be held) and in touch with their offices.

A helping handprint

One of the most impressive uses of computer technology lies in the accreditation and security system for athletes and coaches staying in the Olympic Village. April's bombing of a government building in Oklahoma provided the security staff at the Olympics with a grim reminder of the importance of site security, and a great deal of planning and technology has gone into reducing such threats in Atlanta.

Developed by a US company called SensorMatic, the "access control" system is almost futuristic in its design, employing "handprint recognition" as a frontline defence against terrorism. "One element of the system is hand geometry,"

explains Neal. "An RF [radio frequency] chip will be in each badge, and each chip will have stored on it an image of the owner's handprint. Then athletes will have their handprint read by a hand-reading machine [when they want to enter the Olympic Village]. This means that sharing of badges will not get you through. There's an antenna on the hand-reader access device that will activate the RF transmitter on the badge, to send an image of what the hand-print should look like, so when an athlete puts his or her hand in the hand-reader, it will be compared directly to the information on the badge. If it doesn't give a positive ID, you'll be asked by security to step aside and they will want further information from you."

Sensormatic will also provide remote surveillance systems, to help security and law enforcement personnel monitor and control activity in all venues and secured locations.

The basic registration system will also be fairly high-tech. Olympic organisers say the accreditation application supports the registration and identification of all individuals who have a responsibility associated with administering, performing, or conducting the games. It will support the registration preparation and process, including actual badging and sports registration. The system will run on an IBM mainframe using a wide range of IBM's database, communications and systems software including DB2, CICS and MVS, DB2/2 and OS/2, all integrated with Kodak photo-identification systems.

In short, according to Darby T Coker, director of communications for the Atlanta Committee for the Olympic Games, the 1996 Olympic Summer Games promise to be the most technologically advanced sporting event in history.

"Olympic Games organisers and sponsors are working closely together to build an array of computer, video and telecommunications systems that will feature some of the latest data capture, high-

1996 Olympic Games Broadband television distribution system

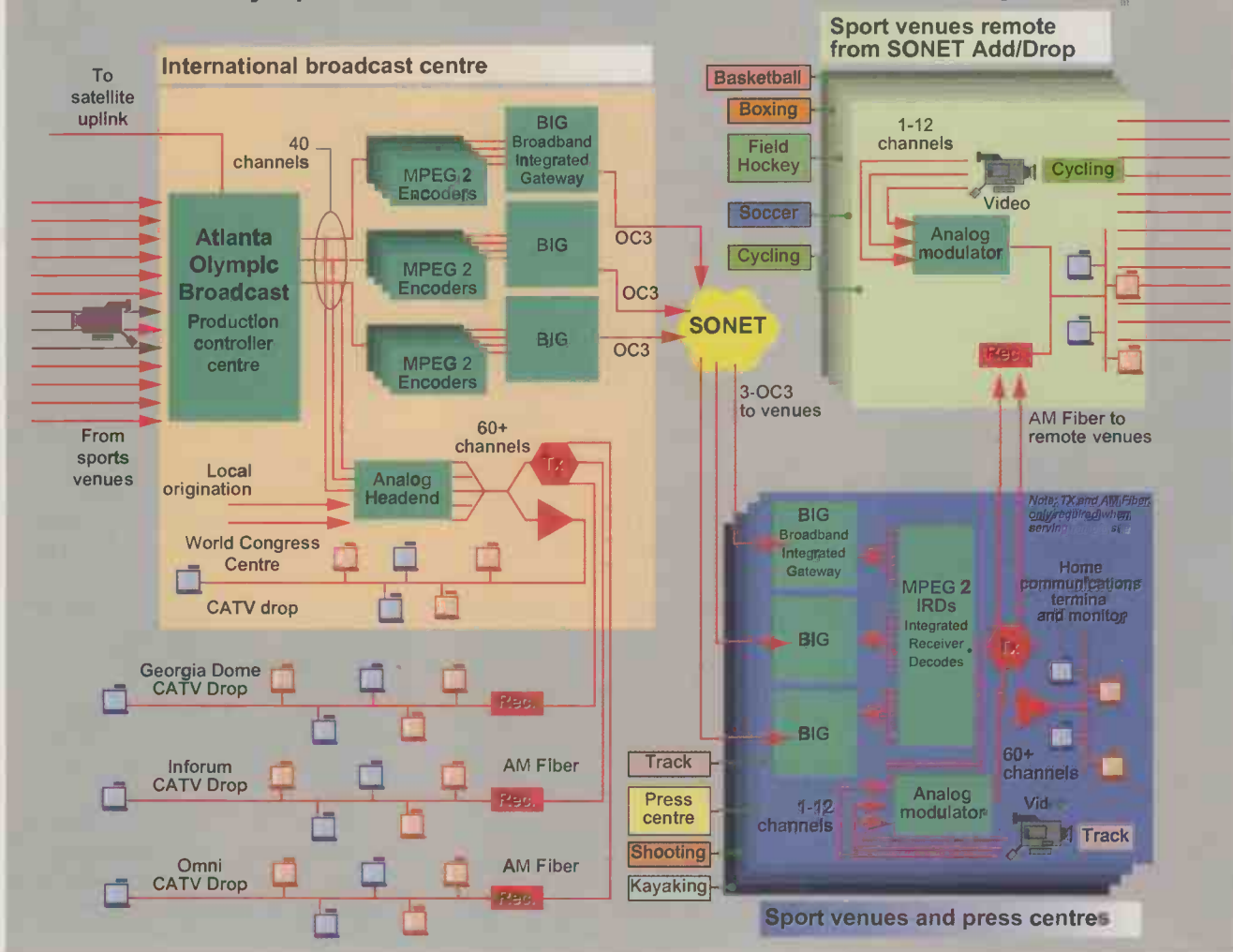


Diagram explaining what will happen to the video images between leaving the arena and arriving on home TV screens

capacity networking, wireless communications, digital video distribution, controlled access and surveillance, multimedia, and cellular technologies available in the marketplace," he says. "They will measure and report competitive results, enhance athlete and spectator security, help facilitate administration and logistics for two million visitors, and communicate voice, data and video signals to provide almost instantaneous connections between the athletic fields of play and the media who will report Olympic activities to a worldwide audience expected to exceed 3.5 billion people."

He reports that the 1996 Olympics' technology shopping list required to achieve these capabilities is as large as that of a mid-sized Fortune 500 company: 13,000 telephones; more than 10,000 televisions; 6,000 pagers; 9,000 mobile and handheld, two-way radios; more than 6,000 computers (from main-

frame systems to minicomputers to workstations, PCs and networked notebook computers) in a multi-tier, client/server configuration along with related software; and some 2,000 laser printers.

All this technology is used to carry out a wide variety of applications, including things as basic as an "arrival and departure" application that will use IBM's CICS communications and DB2 database technology to capture and report the arrival and departure information for planning services such as accommodation and transportation. Running under the IBM MVS operating system, this system will be used daily for the tracking of arrivals and departures, and other scheduling plans.

And the winner is...

The 1996 Centennial Olympic Games Results system is a new system specially developed by ISSC, an IBM subsidiary, in partnership with the Atlanta Committee

for the Olympic Games. To make sure there are no big screw-ups this year, all results data will be captured, recorded, maintained and distributed through IBM personal computers running the "results management system".

Swatch scoreboards, television broadcast interfaces and local Commentator Information System (CIS) terminals will be updated from data captured at the local venue. The system will send the realtime information to an IBM IES/9000 mainframe, which will in turn distribute results information worldwide. IBM pen-based ThinkPad notebooks and wireless LANs will be used in temporary venues such as the World Congress Center or "difficult to wire" venues, which should make installation and information-gathering faster and easier.

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The security at the 1996 Olympic Games will be among the tightest and most technologically advanced ever used

In conjunction with IBM, ACOG is also providing millions of people around the world with official information about the games through the 1996 Olympic Games World Wide Web server on the Internet. This server is accessible by anyone on the Internet and will provide a wealth of continuously updated facts, figures, photos, illustrations, video and audio content.

Listed at www.atlanta.olympic.org, the 1996 Olympic Games Service presents an array of information under nine headings: Welcome, Sports & Venues, Official Programme, Travel Information, Tickets, Official Products, Sponsors, Cultural Olympiad and What's New.

Keeping in touch with Info96

Info96 is what IBM calls its touch-screen information system for the games. It runs on a client/server environment using an AS/400-based computer network of around 2,000 touch-screen workstations. It will provide accredited Olympic participants, journalists, TV commentators, athletes, coaches and volunteers with "complete and accurate Olympic Games-related information including sports competition results, athlete biographies, historical records, news releases, weather forecasts, transportation schedules, ACOG services, Olympic Village activities, Olympic sponsor sites, and Cultural Olympiad and Paralympic Games event information".

A list of the various other high-tech sponsors involved with this Olympics provides a stark reminder of what a commercial venture these games are. Despite suggestions to the contrary, this commercial involvement is also nothing new. Xerox, for example, is providing

document management services at the games, continuing the work it has been doing at the Olympics since 1964.

Through its document-processing equipment, Xerox in Atlanta says it will provide its one billionth document since becoming involved in the Olympic Movement, in preparation for and during the 1996 Summer Olympics. Xerox also supported Atlanta's bid to host the games by providing equipment and services, and is now working closely with ACOG to provide document-processing equipment needs.

During the last Winter Games at Lillehammer, more than 1,100 Xerox copiers, fax machines and other equipment were used to produce more than 30 million pages of documents

including competition results.

SMH/Swatch is both a sponsor of and the official timekeeper of the 1996 Olympic Games. Swatch Timing says it is working closely with the planners of the 1996 Games "to ensure the most accurate, precise timing of Olympic events".

Swatch is also a licensee with the rights to affix Olympic marks directly to its Swatch, Omega and Longines brand watches. SMH subsidiaries Swiss Timing, Omega and Longines have been involved in the timing of 20 Olympic Games, beginning with the 1932 Olympic Games in Los Angeles.

Telecommunications giant AT&T is providing many new data and telecomms facilities at the Games, including Olympic Calling Centers for athletes and spectators; a special intelligent network connecting Olympic and sports organisations; interactive voice response systems answering up to 20,000 calls for information daily; online translation services in more than 140 languages; and fibre-optic systems to handle calls, faxes and images at high speeds.

In addition, some 3,700 AT&T employees, retirees and family members are working throughout the 1996 Games as volunteers. AT&T's Centennial volunteers have apparently been serving their communities since 1992 to qualify for these prestigious assignments.

PCW

★ ★
The IBM mainframe at the Olympics

IBM says it has shipped one of its most powerful mainframe computers to help the Atlanta Committee for the Olympic Games prepare for the 1996 Olympic Summer Games. This IBM System/390 will be the server at the heart of the networked computing system used by 150,000 athletes, coaches, officials, media and other participants during the 1996 Olympic Games.

This mainframe will run IBM's MVS/ESA operating system. Data requirements will be supported by IBM's DB2 database software and its RAMAC Array information storage systems. In addition, many of IBM's systems and applications will be tested in a series of sporting events in Atlanta this summer, such as swimming, diving, volleyball, badminton, handball, weightlifting and wrestling.

The multi-tiered client/server information system used during the Games will include four large System/390 servers, 80 AS/400 business computing systems, and RISC System/6000 advanced workstations and servers linked together with IBM's networking technologies supporting over 6,000 IBM personal computers.

The primary client/server applications will use IBM's OS/2 operating system and local area networking technologies to support the workstation. Three of the major applications include accreditation, results and Info '96, a high-tech, touch-screen application that will provide event results, news flashes, athlete biographies, historical Olympic information, and more. The System/390 will act as the server for data and query requirements on the accreditation and results applications.

The results system delivers real-time information to the worldwide broadcasters who are estimated to reach two-thirds of the world's population. IBM says the 1996 Olympic Summer Games in the Southeastern U.S. are expected to be three times as large as the 1984 Los Angeles Games and five times as large as the 1994 Lillehammer Games.

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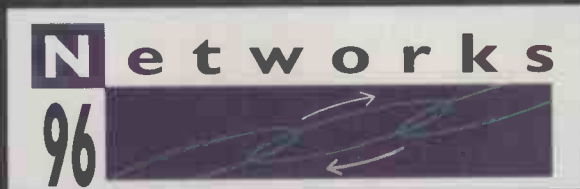


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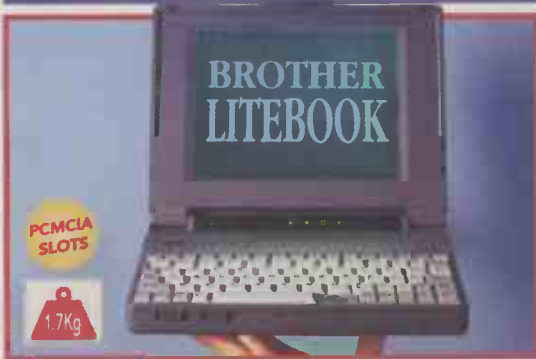
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Do-It-Yourself CD

The prospect of making your own CD has suddenly become more attractive, now that the price of some recordable CD products has fallen. **Steven Helstrip** reviews a selection of popular hardware and software to set you on the right road, while **Gordon Laing** looks at software for Mac users.

How does the ability to write data for less than 1p per megabyte sound? Well, that's just what recordable CD, or CD-R, is offering. Each CD-R disc can hold up to 650Mb of information: that could be the entire contents of the Encyclopedia Britannica; 1,300 floppies, hundreds of high-quality photographic scans, 74 minutes of digital audio, over an hour of compressed-digital video, or even a combination of these.

Philips was the first to introduce recordable CD just over two years ago, and although it was just as capable then as it is now, the drive alone would have set you back a staggering £5,000. Along with the cost of discs at around £17 per piece, you can begin to appreciate why CD-R has taken so long to take off.

Much has changed since then and the cost of making your own CD is now considerably less — as cheap as £5 in fact, once you have the hardware to do the writing. With a handful of products falling into the sub-£1,500 bracket, CD-R is suddenly looking very attractive. In this round-up we have taken a look at drives from Philips, Sony and Yamaha. With the exception of the Yamaha CDE100, which is capable of writing at quad-speed (600Kb/sec), each can write at double-speed.

There's slightly more to mastering your own CD than the hardware alone, though. You also need CD writing software to complete the package. But worry not, we've also looked at some of the most popular packages that enable you to write a variety of data formats.

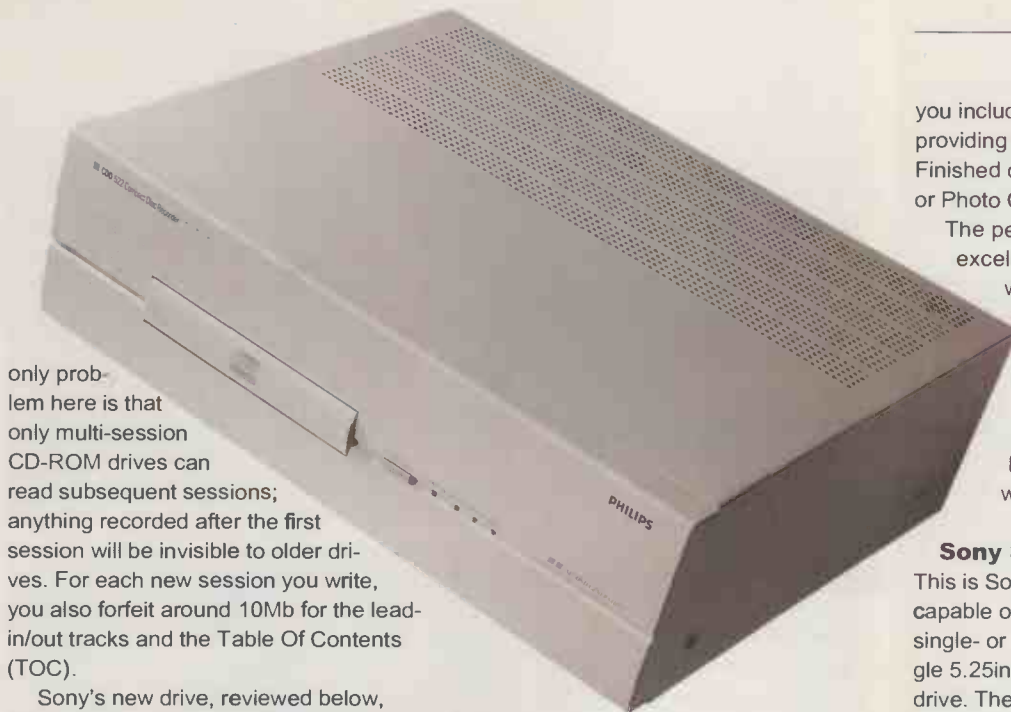
The most critical area when writing a CD is the transfer rate



sustained from the hard disk. If, for any reason, this drops below 300Kb/sec when writing at double-speed, there is the risk of a buffer under-run, leaving the recorder with nothing to write. This is more than likely to damage the disc, and too many mistakes can be expensive as well as time consuming. Installing a dedicated SCSI adaptor for the writer will help, and both the Philips and Yamaha drives were supplied with an Adaptec 1505 for this reason. This becomes even more important when writing at quad-speed. Our test machine was an Elonex P90 fitted with 16Mb RAM. We didn't encounter any buffer under-runs, due mainly to the fast disk sub-system — a Micropolis 1.7Gb AV drive which sustained just over 2Mb/sec.

There are several advantages, as well as several drawbacks, of Recordable CD depending on the purpose for which it's used. CD-R is a WORM (Write Once Read Many) technology which means once the data has been written to disk, it stays there — it is not possible to erase it afterwards. This is essential for archiving since there is no chance of data being accidentally erased. It also means data cannot be infected with viruses.

CD-R isn't strictly WORM, though, since it is possible to write multiple sessions, although not to the same part of the disc. The



only problem here is that only multi-session CD-ROM drives can read subsequent sessions; anything recorded after the first session will be invisible to older drives. For each new session you write, you also forfeit around 10Mb for the lead-in/out tracks and the Table Of Contents (TOC).

Sony's new drive, reviewed below, has support for packet writing. This enables incremental data storage for files between 45Kb and 1Mb. When writing packets of data there is no need to record lead in/out tracks until the disc has to be finalised. The disc cannot be read, however, until the lead tracks have been added.

One other small problem is that, at the time of writing, there is no software available to support packet writing. But Sony is confident that manufacturers will add support in later software releases.

Hardware

Philips CD522

The CD522 looks identical to Philips' first CD writer (the CD521) and uses a motorised disc tray rather than caddies. To the right of the tray is the open/close button, and four LEDs to indicate Power, Ready, Busy and Error. At the rear are two SCSI-2 connectors with dip switches to configure SCSI ID, but disappointingly, no audio outputs.

The drive was supplied

with CeQuadrat's WinOnCD ToGo PC authoring software, an Adaptec 1505 SCSI interface, a SCSI terminator and two 74-minute discs. Setting up both the hardware and software was straightforward, although it was quite frustrating looking for the serial number to allow me to install the software. I did find it in the end: on the inside cover of the user manual.

Inside the unit are two SIMM slots occupied with 1Mb modules, which are used to buffer incoming data. This can be upgraded to 8Mb or 32Mb. Other than the power supply, CD transport and small circuit board, there's little more than fresh air inside the case. The drive will write data formats including CD-ROM, CD-DA, Multi-Session tracks, CD-i and Photo CD. To write Photo CD images, though, you will have to upgrade to WinOnCD Professional with Photocopy, which costs an extra £399. Photocopy will also let

you include sound clips for each image providing they are recorded as WAV files. Finished discs can be played on any CD-i or Photo CD-compatible player.

The performance of this drive is excellent, helped along by the buffer which allowed us to write audio tracks at double-speed without problems. WinOnCD ToGo is an excellent package (reviewed on page 184) and there's also a Mac equivalent: CeQuadrat Vulkan which will be supplied if requested.

Sony Spresa-920

This is Sony's first internal drive, and is capable of writing and reading discs at single- or double-speed. It fits into a single 5.25in bay and is a caddy-loading drive. The front is modest, with just one LED to indicate read/write activity, a headphone socket, and a disc eject button. SCSI ID is selected with jumper switches at the back of

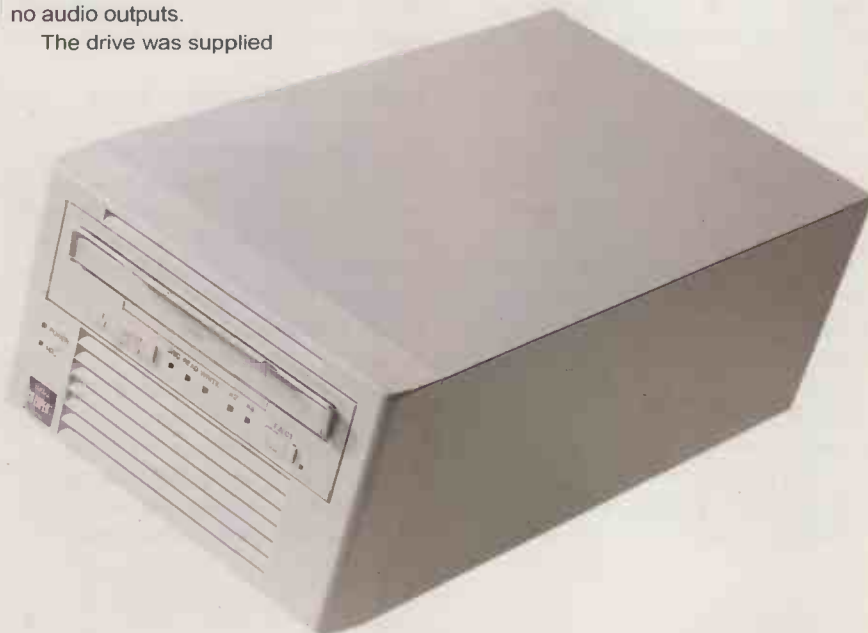


the drive.

The drive was supplied direct from Sony and arrived with an internal SCSI cable, an audio cable enabling you to connect it to a sound card, Corel CD Creator software and three 74-minute discs. The drive was not supplied with a SCSI adaptor.

You install the drive in much the same way as a standard CD drive: connect the SCSI, audio and power cables and ensure the drive is recognised by the SCSI host adaptor. Installing ASPICD.sys will allow you to use the drive as a standard player. Drivers to support the writing of CDs are selected upon installation of CD Creator.

The Spresa is one of the first drives to support track recovery — a standard SCSI command that allows the drive to recover from a buffer under-run or bad disc. CD creator supports this, too. The



ability to write packets of data from 56Kb to 1Mb enables incremental archiving but, as I write, no software is available to test this.

This drive is well worth considering if you plan to take advantage of Packet writing when software support becomes available. Otherwise, it's slightly overpriced when compared with some other bundle deals that are available. The track recovery feature is a nice touch, although realistically is only likely to be useful should somebody trip over the power cable during a writing session, or if you come across a faulty disc.

Yamaha CDE-100

The CDE-100 is available either as an internal or external drive, and is capable of single, double- and quad-speed performance. The external drive comes in a double-height case with enough room to store an optional SCSI hard drive. The back of the unit carries rotary switches to select SCSI IDs, and a dip switch to apply SCSI termination. Two RCA connectors for audio output, and a high-density SCSI-2 port can be found at the back as well. The on-board buffer is 512Kb and is not upgradable.

The drive looks just like any standard CD-ROM drive and has a headphone socket and volume wheel. The only giveaway is a group of five LEDs which indicate read/write speed and drive status. The drive uses caddies to load discs which also helps to protect them. CD-Revolution offers a similar deal to that of the Philips drive and bundle WinOnCD ToGo and an Adaptec 1505 SCSI host adaptor. Alternatively, Mac users can opt for the Vulcan software.

When writing at quad-speed, 650Mb of information can be written in under 20 minutes. This is an asset if you need to record large volumes for distribution. But to write reliably at this speed requires a special type of disc that uses a more durable dye. Since the disc passes the laser four times faster than with a single-speed drive, the laser has less time to form the pits. To compensate, Yamaha has developed a more powerful laser. Along with this comes more heat which can damage, or even warp, a standard CD-R. Thus, quad-speed discs are required that bear the 4xS brand, costing around £6 per disc. When writing at single, or double-speed standard, Orange Book-compatible units can be used.

Yamaha is hoping to develop an eight-speed writer: the most problematic area will be sustaining the data

transfer rate at 1.2Mb/sec from the hard disk.

There's no doubting this drive's performance, but for reasons of reliability it requires a dedicated SCSI adaptor and fast disk sub-system like the Micropolis AV drives.

With a street price of around £1,700 why consider double-speed when you can have quad-speed? This is an excellent drive with a sensible price tag.

Software

Corel CD Creator

Corel is best known for its drawing packages, but some months ago the company released CD Creator as an entry-level CD authoring package. It has drivers to support most CD writers, and was bundled with the Sony Sprespa 920.

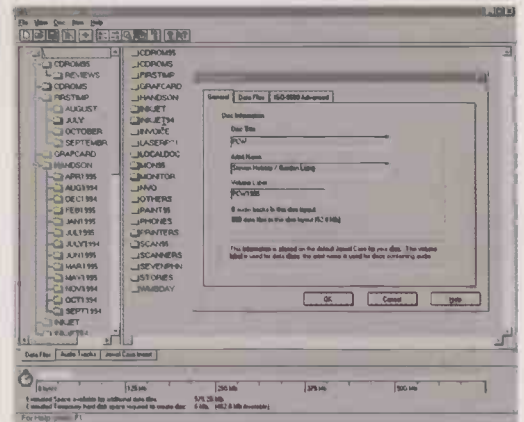
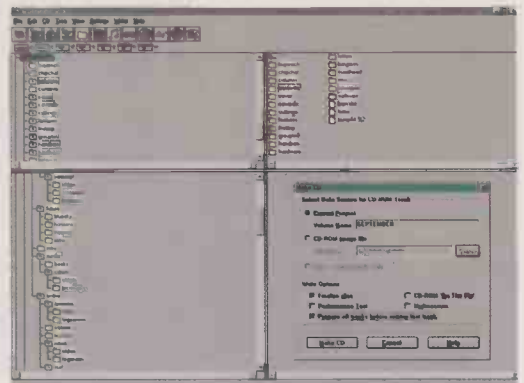
As well as providing the ability to write data and audio tracks, Creator allows you to make CD inserts, too. The software was supplied on CD-ROM and installed without effort.

There are two ways you can go about creating a disc layout: work with the Disc Wizard, which prompts you to point to the files you want to include; or work on your own and drag and drop files from File Manager, or Explorer, into the CD tree.

Working with the Disc Wizard guides you through every stage of the writing process, although once you get to grips with the package, it's much quicker to create discs manually.

Creator is compliant with the ISO-9660 file system that ensures discs can be read on all platforms. There are limitations, though. Firstly ISO-9660 only allows for eight levels within sub-directories, and further limits the use of characters in filenames to A to Z, and the characters 0 to 9, and underscores. When writing the disc, Creator warns you if you exceed the ISO-9660 specification, but does allow you to enforce MS-DOS filename conventions if required.

Files which are written to the disc first, or written towards the centre of the disk, can be accessed more quickly than those written towards the outer edges. Creator allows you to specify the priority of files to reflect the physical order in which files are recorded to the disc. For example, if you are writing a disc with a file that you need to access regularly, it can be positioned in the optimum position.



Top WinOnCD enables you to create a virtual image of the CD before writing to check data integrity
Bottom if you can use File Manager, you've already learnt CD Creator

We had problems writing audio tracks with this package as it left an audible tone between tracks. This was not the case with other packages we have tried. CD Revolution told us it is aware of the problem and that it will be fixed in the next release.

CD Creator is a great package for backing up and archiving, although not ideally suitable for pre-mastering multimedia discs as its features are limited.

CeQuadrat WinOnCD ToGo

CeQuadrat is the largest manufacturer of CD writing software and has several packages for the PC and the Mac. WinOnCD ToGo is a cut down version of WinOnCD Professional and is bundled with writers from CD Revolution. Upon installation it scans the SCSI bus and installs appropriate drivers for the CD Writer(s) you have on the system.

The interface takes a while to grasp, but the basic principle is similar to Windows File Manager. The screen is split into two sections: the top shows the currently selected hard drive, while the lower screen shows the file structure to be written to

the CD. You build up the CD by simply dragging and dropping files from the top window. You can copy single files, folders or entire drives.

Writing an audio CD works in much the same way: drag the wave files from the hard drive, and drop them onto the CD tree. An icon on the push button bar allows you to toggle between audio and data tracks. It is also possible to write mixed-mode discs.

WinOnCD can write a disc in several ways. Writing on the fly records the disc in realtime directly from the hard disk. This works well when recording one-off discs at single speed; otherwise it's safer to first create a CD image. This is another push-button operation that generates a virtual image of the CD on hard disk. In this way, all the processing is carried out before the laser has a chance to start doing its stuff, and offers a more reliable way to write the disc. The image requires the same amount of space to what is about to be written, therefore a large hard disk is required. Depending on the speed of the hard drive, creating a 650Mb image can take as long 90 minutes — particularly if you are writing audio tracks which first have to be converted.

You can test or preview the entire disc before actually writing it, to verify that the files you need are present. By selecting the preview function, a Virtual Disc Image file (VDIF) is created. You then access the virtual disc as a regular drive. In order for this to work you must first make several amendments to your system files, and this is explained in detail in the manual. Once you're familiar with WinOnCD ToGo, preparing a disc is quick and painless.

Unfortunately, there is much more to the program than space allows us to cover here. This package offers a great deal for the money (£139), and has greater functionality than CD Creator.

Mac Software

Astarte Toast CD-ROM Pro

This feature has predominantly covered the creation of ISO-9660, audio, or mixed mode discs. Any Macintosh users out there may be wondering how to create CD-ROMs which retain the long filenames, icons, nested folder structure and general appearance of their familiar System 7 operating system.

The answer lies in the Mac HFS format, readable only by Macs. You'll need similarly specced hardware to the PC side: that is, a sufficiently fast disk and I/O system to supply the constant stream

required by your writer, and a suitable software application.

We found two options for Macintosh: CeQuadrat Vulkan, costing £139; and Astarte Toast CD-ROM Pro, costing £299 and reviewed here. Both prices are from CD Revolution and apply when the packages are purchased separately.

Toast supports an ever-expanding array of writers that includes models from JVC, Pinnacle, Sony, Kodak, Plasmon, Yamaha, Ricoh and Philips. We toasted with the lovely Philips CDD 522 Recorder, also reviewed within these pages.

Installation is dead easy — copy the three files from the single floppy disk onto your hard drive; drop the Multisession mouter into your control panels folder; and drop the Toast CD Reader into the System Folder where it is placed as an extension; and restart. The remaining file on your hard drive is the application which demands a serial number on first launch.

Toast, like the other CD writing applications we've tested, is very straightforward to use. The main screen requests a source of data, and a CD Writer (which was automatically detected in our system). The data source can be any non-network drive apart from the startup volume. If you only have the one hard drive you must create a temporary partition using Toast.

Before any writing can take place, Toast tests the speed of your data source drive. We sourced from the standard 500Mb internal SCSI drive of a Power Macintosh 8100/80 which, despite being fairly fragmented, sustained over 1Mb/sec, easily fulfilling the 300Kb/sec required by the double-speed Philips writer. Interestingly, Toast supports quad, and even six-speed writers too, automatically selecting the top speed supported. It is possible to override this if necessary.

A pulldown menu allows the format to be selected. Toast supports HFS, ISO 9660, Mac/ISO hybrid, generic format, mixed mode and audio CDs. Hybrid format should be used for CD-ROMs that are to be read by Macintosh and ISO file systems: common data to both systems may be shared on the same disc. Generic format is used to create exact copies of any volume, such as those not visible for the Macintosh file system like A/UX and ProDOS partitions, or ISO volumes.

A point worth noting about creating HFS ROMs is that the appearance of the original volume, opened folders, and the

position of icons within windows will be exactly the same, and of course unmodifiable on the disc once written. If you're fussy, make sure your icons are arranged as desired before committing to disc.

Support for audio on Toast CD-ROM Pro is fairly standard, asking for a playlist of tracks and only demanding that they be recorded in 16-bit, 44.1kHz in either Sound Designer II or AIFF formats. If they are of the former, text markers or numeric markers may be transformed into index points which are recognised by CD players. If you're after more advanced audio features, you may want to check out the dedicated Toast CD-DA package.

Astarte Toast CD-ROM Pro is a fully-featured package that supports every writer we've seen, with the absolute minimum of fuss. Setting up, testing, simulations and the actual writing process itself is a breeze. The interface is simple and intuitive like most Macintosh software.

If money's tight, consider CeQuadrat Vulkan, but if you can stretch to the Astarte package, you'll be in for some good hot toasting.

PCW Details

Philips CD522

Price £1,599 (including software, SCSI adaptor and two 74-minute discs). Street price £1,499

Contact CD-Revolution 01932 562000
Fax 01932 571999

Sony Spresa-920

Price £1,525 internal (Spresa-920) £1,699 external (Spresa 921s). Street price, around £1,500

Contact Sony 0181 760 0500
Fax 01932 817001

Yamaha CDE-100

Price £1,899, internal. £2,099 external (including software, SCSI adaptor and two 74 minute discs). Street Prices £1,699 and £1,899 respectively

Contact CD-Revolution 01932 562000
Fax 01932 571999

Corel CD Creator

Price £169

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Fax 01932 571999

CeQuadrat WinOnCD ToGo

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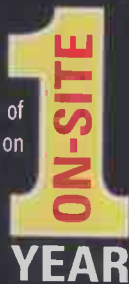


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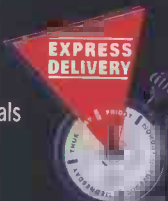
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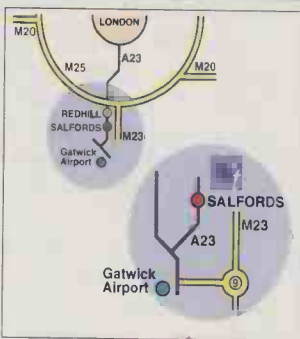
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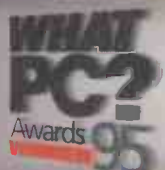
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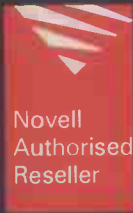
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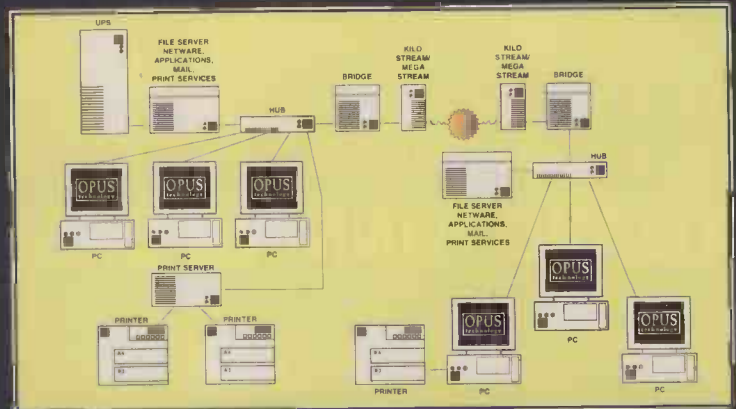
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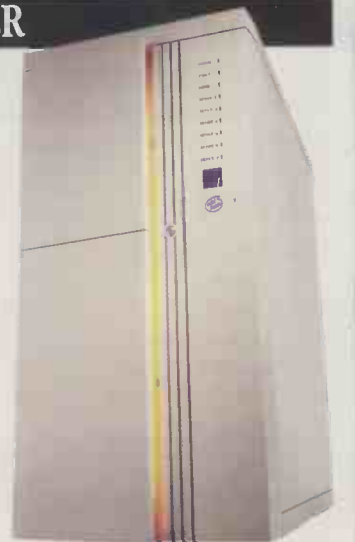
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90MHz Pentiums

With Windows 95 close at hand, and multimedia fast becoming *de rigueur*, the powerful but affordable Pentium 90 looks set to become the chip of the moment. Nick Lawrence and Adele Dyer tested 21 of the latest P90 PCs to see exactly what the chip is capable of.

An inevitable law of modern PC computing: what Intel gives, Microsoft takes away. You've got a DX2/66 with 8Mb RAM and 350Mb hard disk? Install a couple of heavyweight Windows apps and the power suddenly seems to have dissipated. We therefore decided on a group test of well specified SoHo machines, all fast enough, and with enough disk space, to be able to cope with anything Microsoft will produce (for the next couple of years, at least).

The 90MHz Pentium (P90) is very much the processor *du jour*. You can go up to a P100, 120 or even 133, but they are far more expensive. The P90 is the one that strikes the best balance between reasonable pricing and decent power, and because of this, looks certain to become *the* Windows 95 chip.

In the bad old days of the 386SX, many manufacturers would advertise cheap systems which were badly under-specified, but these days more and more people are realising that the processor isn't the only important consideration.

Memory is undoubtedly one of the most important factors in the speed of a system, and these days you'll need more than 4Mb to

run at a decent speed. You should find 8Mb adequate for many applications, but 16Mb is better, and this is what we have specified. You can never have too much memory, and many users will think seriously about jumping up to 32Mb.

You can never have too much hard disk space either, particularly given the mysterious law that whatever the size of your hard disk, and however few applications you intend to put on it, it will become full within six months. The latest generation of 1Gb hard disks are affordable, and that's what we asked manufacturers to supply.

We also decided to ask for quad-speed CD-ROM drives and 16-bit sound cards, to take full advantage of all the multimedia applications which are now available. Corporate buyers will generally choose to avoid full multimedia kits, but SoHo users will often find them useful.

Finally, a 15in monitor and graphics card with 2Mb RAM should make for good screen drawing performance, and allow anyone to use Windows comfortably at 1024 x 768 resolution or better.

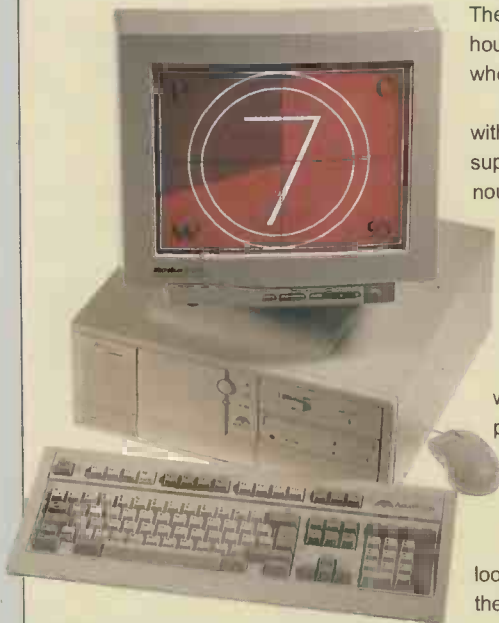
Read on to discover which of the 21 Pentium 90s we looked at scooped the honour of the *PCW* Editor's Choice.

PCW Pentium Photography by Bruce Mackle

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Adams Accura Professional 586 WS



The Adams Accura Professional is built in a desktop case which you open in the usual way, by loosening a few screws at the back. The top drive bay has the 3.5in floppy disk drive housed in a 5.25in drive bay, and underneath this is the CD-ROM, a Mitsumi FX-400, under

which is space for a further 5.25in device. The hard drive, a 1Gb IBM DPEA-31080, is housed opposite these, on top of the PSU, where there's also room for another.

The motherboard is a Micronics M54HI, with the new Intel Triton chipset. This supports the 256Kb pipeline burst synchronous cache which is soldered onto the motherboard. It also supports EDO RAM, which comes in the form of four 60ns SIMMs filling all four sockets.

There are four PCI slots and four ISAs, of which one is shared. One ISA slot has a Sound Blaster 16 Value, which is adequate for basic games and the playing of wav files. One of the PCI slots holds a Diamond Stealth 64 VRAM with 2Mb, upgradable to 4Mb.

The inside of this PC has been very cleanly designed. There are no loose cables, which makes it easy to access the necessary components.

The monitor is a MicroScan 4V, made by ADI. It is probably the second best in this group test, after the Samsung supplied with the EuroAsia (ESL) system. It has a crisp display, with controls for trapezoid effect and pincushioning/barrelling, as well as rotating the display.

This was the only machine to be supplied with OS/2, in the form of Win-OS/2 with the BonusPak and Lotus SmartSuite for OS/2. A standard DOS/Windows configuration is also available.

In our performance tests, the Adams was narrowly beaten into second place. Given its price, which is around the middle of the pack, it is obvious that this is absolutely fantastic value — particularly when one realises that the same price now includes a 1.2Gb hard disk and, incredibly, a new Matrox Millennium with 2Mb WRAM (a new kind of memory for graphics cards which looks set to take the market by storm). The Adams Accura is our Editor's Choice.

Nick Lawrence



PCW Details

Adams Accura Professional 586 WS

Price £2,099

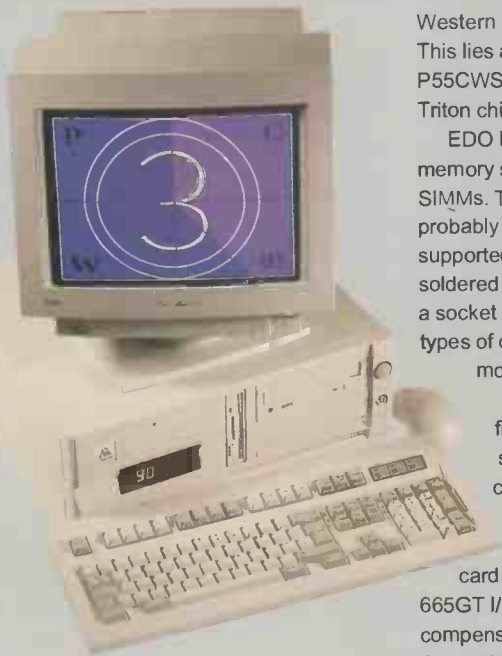
Contact Adams Technology
0161 877 8822

Good Points Excellent speed, very reasonable price.

Bad Points SB16 Value, all four SIMM sockets are filled.

Conclusion A fantastic computer.

Armari Triton VRM



The Armari Triton VRM is housed in a neat desktop case. A Toshiba XM-5302B CD-ROM drive sits at the top of the drive bays, accompanied by a 3.5in floppy disk drive and, inside the case, a 1.2Gb

Western Digital Caviar 31200 hard drive. This lies above part of the Super Micros P55CWS motherboard, which supports the Triton chipset.

EDO RAM is used in two of the four memory sockets, in the form of two 8Mb 60ns SIMMs. There's also pipeline burst cache, probably the most important of the features supported by Triton, but unfortunately this is soldered onto the board rather than sitting in a socket designed to be able to take different types of cache. However, few users will need more than a 256Kb pipeline burst cache.

The lowest of the three ISA slots is filled with a full AWE 32, an excellent sound card with full WaveTable capabilities. These are connected to two large 80W speakers. The shared ISA/PCI slot has an 8-bit

card in the ISA side. This is an SMC 665GT I/O controller card, which compensates for the lack of I/O capability on the motherboard. Armari claims that the next version of the board, available by the time you read this, will include the I/O. The top PCI slot has a Diamond Stealth 64 Video VRAM with 2Mb.

Apart from the standard DOS and

Windows 3.11, the supplied software includes Microsoft's Encarta 95, Works for Windows 3.0, Golf, Dangerous Creatures, and Scenes, all on CD-ROM. The hard disk is partitioned into two drives of 500Mb and 721Mb, to get around the problem of large cluster sizes which Armari claims can use up 20 percent of the space on a 1Gb drive.

An Iiyama 15in monitor with MPRII specifications rounds off what is a decent system, assembled by capable people and with a very respectable score on our VNU European Labs tests. Armari is likely to be the first manufacturer in the UK to ship a much awaited Pentium with EDRAM, hopefully in September, and you will probably be hearing a lot more of them around then.

Nick Lawrence

PCW Details

Armari Triton VRM

Price £2,199

Contact Armari 0181 810 7441

Good Points The Socket 7 and VRM make upgrading to much faster processors possible when they appear.

Bad Points I/O controller card.

Conclusion Definitely a company to keep your eye on.

Carrera Panther P90 Multimedia



This mini-tower is designed to keep out fiddling-fingers. A door which can be locked on the front of the case prevents unauthorised access to the drive bays, as well as making it a look a bit of a smoothy.

Inside, the drive bays comprise the usual 3.5in drive, a Mitsumi quad-speed CD-ROM drive and a Seagate 850Mb hard drive. There are two free front-facing slots and an extra one inside.

Once inside we were surprised to find one of the nicest extras: a US Robotics 14.4 Sportster modem, included for no extra charge.

The other cards included are two of the most common choices of the manufacturers in this test: the Creative Labs Sound Blaster 16 and the Diamond Stealth 64 Video VRAM. However, the peripherals aren't put together in the most economical manner. Two of the PCI slots are blocked by the port card, as this sits in the shared PCI/ISA slot and blocks the PCI slot next to it. All this leaves you with only one free PCI slot and one free ISA.

Sitting on the Triton motherboard, the 4 x 4 RAM is hard to reach. The SIMM slots are hidden between the IDE I/O and the CD-ROM drive. Upgrading to 128Mb is possible, but be prepared to fiddle to get the SIMMs in and

out. Once again, this is obviously designed to discourage users from messing around with the machine. However, in time you can upgrade the processor to a P6 overdrive chip, as the current processor is fitted with a VRM and a socket 7.

The monitor is a GoldStar 1520DM, rebadged for Carrera. It has the standard set of adjustments, although it is a little grainy.

It comes loaded with all the usual software: DOS 6.22, Windows 3.11, Microsoft Works 3.0, and a multimedia pack of CDs consisting of Encarta and Fingers for Windows, a combined typing and language tutor. Also included is a diagnostic kit, PC Check, which has been customised for Carrera.

Adele Dyer

PCW Details

Carrera Panther P90 Multimedia

Price £1,995

Contact Adams Technology
0161 877 8822

Good Points Internal modem included in the price.

Bad Points Bad construction — difficult to get to the SIMMs slots.

Conclusion Reasonable performance at a reasonable price.

Compaq ProLinea 590 5/5



Compaq's revamp of its SoHo ProLinea range has led to features from the corporate-orientated DeskPro XL range filtering down.

This model is a large minitower case, with space for two 5.25in devices at the top. Underneath them is a 1Gb Western Digital Caviar 31000 hard drive, and under

that is the 3.5in floppy drive whose fascia is built into the case so that a slot for the disk is all that shows.

Venturing inside the case, on the left-hand side the main board holds six expansion card slots: two PCI slots and four ISAs, of which one is shared. None has a card. Also on this side of the board are three connectors, one of which controls the floppy disk drive, while the other two (EIDE) attach to the hard drive and CD-ROM drive.

The system board continues on the other side. Here it holds a proprietary slot, perhaps best described as "ISA with an extra connector", which can hold a Compaq Token Ring adaptor or — as in this model — a Compaq Business Audio card attached to the internal speaker.

On the riser board lie all the chips one would expect to find on the main board. These include the processor, six SIMM sockets and the on-board graphics controller. This is a Cirrus Logic GD5434, with a piggy-back card to take the video memory up from 1Mb to 2Mb.

The chipset is Compaq's Triflex, which has filtered down from servers, through DeskPro XLs, to all desktops. Its theoretical advantages over the Neptune and Triton are

numerous, but unfortunately much of its functionality regarding PCI bus-mastering devices and the way it writes to devices is lost in such a tightly integrated system as this.

This explains the Compaq's apparently poor performance. It would be interesting to load up the machines on test here with lots of cards and then retest them, as it seems likely that the Compaq would finish much higher, having a chipset built for heavy loads.

Without this test we must be content with gazing longingly at the ProLinea's wonderfully clean design. It is easily the best of any machine here, and the excellent build quality puts this machine in a different league from the others here.

Nick Lawrence

PCW Details

Compaq ProLinea 590 5/5

Price £3,090 (RRP) — dealers will give discounts

Contact Compaq 0181 332 3888

Good Points Fantastic design.

Bad Points Would suit a different kind of application from the others here.

Conclusion Aesthetically lovely, but not ideal for general SoHo applications.

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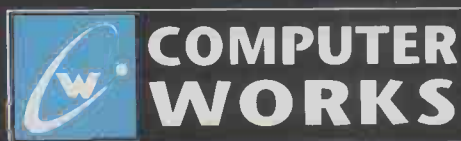
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Compusys Business MT90



Due to the length of time it takes to put together a group test, the Compusys machine we tested is not the machine currently on the market. Other manufacturers have made improvements, but Compusys is now selling a completely different machine.

Since we tested the MT90, Compusys has upgraded the motherboard, chipset

and cache. We tested an Elite motherboard with a SIS chipset and asynchronous secondary cache, but the new model has a Zappa motherboard, Triton chipset and pipeline burst cache. The only similarities are the RAM, which stays the same with two double 36-bit SIMMs, and the IBM hard disk. The results of the test should not, therefore, be taken as a gospel, since this machine was competing against some others which have already upgraded to better motherboards, chipsets and cache.

The 16Mb RAM supplied can be upgraded to 128Mb, although the double SIMMs were quite hard to get at. The other disadvantage of this machine is the configuration of PCI and ISA slots. The I/O port card sits in the shared ISA slot, blocking the shared PCI and so cutting down expandability unless you reposition the card. Another reason the machine was one of the slowest in the test was that the CD-ROM and the hard disk were linked on the same EIDE channel, which is never a recipe for high speed.

The multimedia aspects are low key — a Creative Labs Sound Blaster 16 and a Diamond Stealth 64 DRAM, as opposed to the VRAM chosen by many of the manufacturers in this group test. This is matched by a Mitsumi

CD-ROM drive and a Hyundai monitor. The latter has all the standard adjustment features, as well as being Energy Star-compliant.

Compusys has included Monologue for Windows, an audio capture package which comes with Sound Blaster — if you write a letter, Monologue will read it back to you. The other software included depends on the bundle you choose, but will contain between ten and 20 CDs, and from August all machines will ship with Windows 95.

It was a shame we tested a machine which has now been superseded. It did not compare well with others in the test, but this should not be taken as a reflection on the current Compusys P90.

Adele Dyer

PCW Details

Compusys Business MT90

Price £1,739

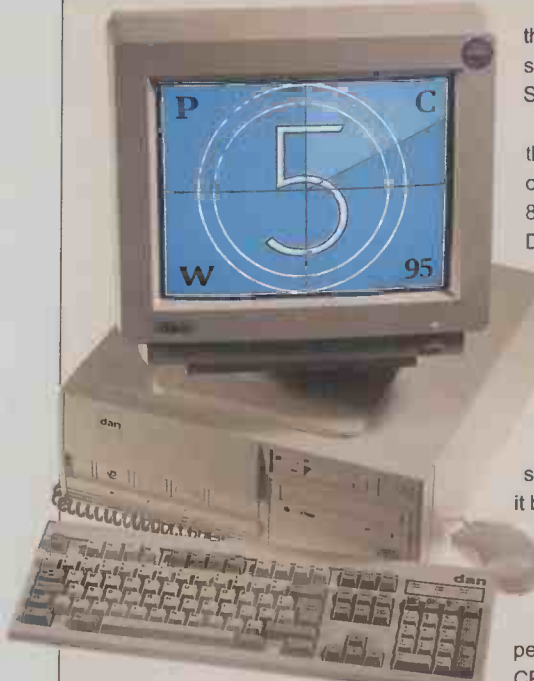
Contact Compusys 01296 395531

Good Points Good monitor, good selection of pre-installed software.

Bad Points Poor performance, which should be improved by the upgraded circuitry; poor build quality.

Conclusion Don't judge the performance of all Compusys machines by this one.

Dan Dantium 95/590MM



The Dantium is a desktop PC from one of the UK's biggest vendors. It has the usual array of drive bays: at the top is the floppy disk drive, followed by the Toshiba XM-5302B CD-ROM drive, and

then a spare 5.25in bay. Mounted on the side of this array is the hard disk, a 1.2Gb Seagate ST31220.

The motherboard is made by Asustek in the Far East. It includes: four ISA slots, one of which has an AWE 32 Value, set off with 80 watt speakers; three PCI slots, one with a Diamond Stealth 64 Video VRAM with 2Mb; and it has a proprietary slot. For the moment it can be used as a fourth PCI slot, shared with an ISA, but in the future it will become possible to include Asustek-specific cards if desired. This will function in much the same way as Compaq's proprietary card slot, in that special cards will be available for it but you can use industry-standard as well.

Although there is a socket 5 and no VRM, Dan has included a pipeline burst synchronous cache. The two SIMMs are 70ns.

Dan has stayed faithful to CTX, its perennial monitor supplier, and the CPS1560/LR monitor is perfectly adequate.

Dan's Chris Bakolas must surely be recognised as a walking tribute to OEM software deals. This machine comes with Lotus SmartSuite (Organizer, 1-2-3, Ami Pro, Approach, Improv, Screencam and SmartPics),

a Microsoft Home bundle, the Grolier Multimedia Encyclopedia, Megarace, FIFA Soccer, Dragon Lore, Theme Park, several training packages for the Lotus applications, a typing tutor, a Windows 3.11 tutor and various other freeware programs such as Adobe's Acrobat Reader.

The finishing touch is a sticker on the back which lists the DMA channels, IRQ interrupts and base addresses of the installed expansion cards. This makes it easy to install expansion cards without generating unknown conflicts.

In short, the Dan is an excellent machine, narrowly beaten into third place overall in terms of performance, and with a reasonable price tag to boot. It therefore deserves its Highly Commended award.

Nick Lawrence



PCW Details

Dan Dantium 95/590MM

Price £2,027

Contact Dan Technology 0181 830 1100

Good Points A brilliant performer, at a reasonable price, with loads of extra goodies.

Bad Points None to speak of.

Conclusion Highly recommended.

Dell Dimension XPS P90



Housed in a very good-looking desktop, the Dell was equally interesting once the top was off. Apart from the EIDE cables cluttering up the space, everything is easy to see and reach.

The first the thing you notice are the

SIMMs slots — three of the four slope off to the side, making them quite easy to get in and out. They sit on the Intel Zappa motherboard with 256Kb asynchronous cache, while the processor is fitted with a ZIF socket. The Western Digital hard disk and NEC CD-ROM drive are both on EIDE.

There are only three PCI slots, one of them shared, and five ISA slots. Interestingly, the shared slot has been put at the far end of the bank of slots. As with the SIMM slots, this makes it easier to get cards in and out. A Number 9 Motion FX771 graphics card takes up the shared PCI slot and the Creative Labs Vibra 16 sits in one of the ISA slots.

There are only two free bays, one of them front-facing, nestling under the NEC CD-ROM drive. This particular drive was highly rated in PCW's quad-speed CD-ROM

drive group test last April.

In contrast to the desktop box, the monitor is disappointingly unappealing in looks. The surround is bulky and lacks refinement and the controls are only of the most basic kind — for positioning, brightness and control.

However, the screen itself is reasonably flat and was one of the few to run 1600 x 1200 at 76Hz.

The machine we looked at was only loaded with Windows 3.11 and DOS 6.22, although Dell does offer a variety of bundles, including Office 4.3 Professional or Word and Excel at the entry level.

This machine may not have the fastest results of this group test, but it does have excellent build quality and is easy for anyone to get in and install their own upgrades. Considering that the same price will now get you a P100 with pipeline burst cache and EDO RAM, the Dell represents good value.

Adele Dyer

PCW Details

Dell Dimension XPS P90

Price £1,919

Contact Dell 01344 728000

Good Points Good CD-ROM drive and price.

Bad Points Only three PCI slots, RAM not EDO-compatible.

Conclusion Good value.

Elonex PC 590/1



Elonex is one of the few PC vendors which uses its own motherboard design, as well as manufacturing and building its own systems. Like most of the company's machines, the PC 590/1 comes

in the B-model case, a trade-off between compactness and expandability.

The 3.5in floppy drive is housed above the Philips quad-speed CD-ROM drive, which, like the 1Gb Seagate hard drive, is controlled by EIDE on PCI. The connectors are situated on the riser board, which can also hold a SCSI connector if you plan on daisy-chaining lots of devices. Three PCI and three ISA slots are also on the riser board, with the middle of each shared. The shared slot is filled with a Sound Blaster AWE 32, a great sound card, which could have been placed in one of the other ISA slots. The top PCI slot holds a Stealth 64 VRAM with 2Mb.

It seems few can avoid the might of Intel altogether, and the main system board holds a Triton chipset. There is a socket 5 — although the company promises a socket 7 and VRM for the very near future — and the 256Kb pipeline burst synchronous cache, as well as two 70ns EDO SIMMs, make good use of the chipset's features.

A good-quality rebadged Philips monitor features nothing special in the way of controls, but has a perfectly usable display.

It's a shame that no bundled software is included (other than DOS and Windows), but then this machine is aimed more at the "So" than the "Ho".

The Elonex's overall position of fourth, (it came second under our Windows tests), puts it easily among the top performers. Its price tag of £2,100 isn't as low as some, although the price premium is perfectly acceptable for its build quality. Elonex's ambitions to get into the all-important American market will look eminently achievable if it can keep building computers like this.

Nick Lawrence

PCW Details

Elonex PC 590/1

Price £2,100

Contact Elonex 0181 452 1111

Good Points Great performance.

Bad Points No bundled software.

Conclusion A good deal if you want well made kit.

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Obodex Computers Ltd, Unit 1, Belvue Business Centre
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EuroAsia ESL P90



This is EuroAsia Systems Limited's first time in a PCW group test, and we were eager to find out how it compared to the more established names.

The components are similar to those used by many of the other companies here. A Mitsumi FX-400 CD-ROM drive and 1.2Gb Western Digital Caviar 31200 form the hard storage, with the 3.5in floppy disk drive taking up another bay. There are

bays left for a 3.5in front-facing device and possibly another hard disk.

There's quite a lot of unused space between the Intel Zappa motherboard and the far edge of the case, which is good for cooling but not so good for those wanting to maximise the space. The Zappa is a big improvement on the Plato boards supplied with some other computers, largely because it uses the Triton chipset instead of the slower Neptune.

Unfortunately, the Triton's support for EDO RAM and pipeline burst cache aren't used. Instead, there's 256Kb asynchronous cache and 70ns 8Mb SIMMs.

Of the three PCI slots and four ISAs, with one shared, the top of the former contains a Diamond Stealth 64 Video VRAM with 2Mb, upgradable to 4Mb. This helps MPEG playback better than a standard VRAM, though not as well as one of the cards with an MPEG upgrade. One of the ISAs holds a Sound Blaster 16 Value, which is adequate for the light usage demanded by games or wav files.

The speakers supplied are 15W Trusts, and the bundled software is limited to DOS and Windows, with an odd but useful package started on bootup which can tell you all about your system and contains a handy

glossary of technical PC terms. It also includes instructions on how to build your own PC.

The monitor is the best reviewed in this group test. It's a 15in Samsung SynchMaster 15GLi with everything you could want from even a 17in monitor. As well as giving a crisp display, it has controls for pincushion/barrel, tilt, degaussing, trapezoid and "sail" effect, as well as being plug and play-compatible. This alone makes up for the lack of bundled software with this system.

The initial price we were given for this system put it as the cheapest on test, but later confirmation revealed that it was in fact no cheaper than many here. This, along with its mediocre performance, makes it run of the mill rather than outstanding.

Nick Lawrence

PCW Details

EuroAsia ESL P90

Price £2,019

Contact ESL 0171 498 7816

Good Points Excellent monitor.

Bad Points Not so great extras.

Conclusion A reasonable performer.

Evolution EV PRO 90T



The Evolution EV PRO 90T is a minitower, with plenty of room for extra drive bays. The top two, both 5.25in, are unused, and below the EIDE Wearnes quad-speed CD-ROM drive lies a spare 3.5in bay. There's also an 850Mb Seagate ST5850A and a 3.5in floppy disk drive.

The Super Micros P55CWS

motherboard, with its accompanying Triton chipset, takes up less room than is allowed for it. An unusual feature is that it has a VRM and a socket 5, a

combination which, Evolution claims, allows upgrades to the level of the predicted P180 but not up to the P6.

Super Micros' belief that Win95 will function better with I/O on an expansion card rather than on the board has led to one of the four ISA slots being filled with a Winbond I/O card. However, like the

Armari's Super Micros board, the EIDE at least is taken care of on-board, sitting on the PCI bus. If you would

prefer the I/O to be taken care of by the motherboard, an Asus TP4XE board is available instead for no extra cost.

Another ISA slot is filled with a Creative Labs Sound Blaster AWE 32, which has full WaveTable capabilities as well as the ability to download sounds to be played as General MIDI (if you install memory in the two SIMM sockets). The top PCI slot holds a Diamond Stealth 64 Video VRAM with 2Mb.

A ten-pack of CDs, including such unusual

titles as a Sherlock Holmes game and Battle Chess, makes up the bundled software. Also included is a pair of mains-powered Zydec speakers, 15W ZYFIZ Pros, with individual bass and tone controls. The monitor is a Samtron UXL 15in model, with EPA Energy Star compliance and degauss and pincushion/barrel functions.

For such a small company, with only ten employees, Evolution has done well to build such a competitively priced computer for its speed. It stays within the top of the pack, weighing in at fifth place in the Windows tests and overall. It's particularly suited to large DOS applications such as AutoCAD, since it came in second in our DOS tests.

Nick Lawrence

PCW Details

Evolution EV PRO 90T

Price £2,150

Contact Evolution 0181 944 6222

Good Points AWE 32, very nippy, particularly under DOS.

Bad Points Price slightly above average.

Conclusion A good choice for DOS-based applications, it is also pretty quick under Windows.

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Express Micros Rapier P90



You may not know of Express Micros, but with a staff of 54 and a claimed turnover of £10 million it is making for the big time. Its Rapier P90 is positioned at the budget end of the market, being one of the

cheaper machines on test here.

It's built in a minitower case, with a Toshiba XM-5302B at the top of the drive bays, followed by a spare 5.25in bay, the floppy disk, a spare 3.5in bay, and a 1.2Gb Maxtor 71260AT in the only blind bay.

The bays obscure part of the motherboard, which features an SIS chipset and a socket 5 with no VRM. There are four sockets; the two SIMMs are standard 70ns and the cache is standard 256Kb asynchronous, although Express Micros claims that pipeline burst synchronous cache

and EDO RAM are possible.

There are four each of PCI and ISA slots, with one shared. One of the ISA slots holds a Reveal Sound FX sound card, and the shared slot is free.

But things are less rosy with the PCI slots; the Diamond Stealth 64 DRAM (upgraded to 2Mb from the standard 1Mb) has to fit in the second top slot, as the top one is not usable. This is because the I/O ports are connected to the blanking plate hole which should be

used for the top PCI slot.

The monitor has a label proclaiming it to be made by Smile, and it supports Energy Star specifications. Like the sound card and CD-ROM drive, the 20W speakers are made by Reveal. Grolier's Multimedia Encyclopedia is included as well.

The prices in this test tend to hover around the £2,000 mark. This system, though, weighs in a good deal under that, and for this it can be forgiven a lot. If you really can't or won't spend the extra to get one of the better-performing systems, this could be well worth a look.

Nick Lawrence

PCW Details

Express Micros Rapier P90

Price £1,775

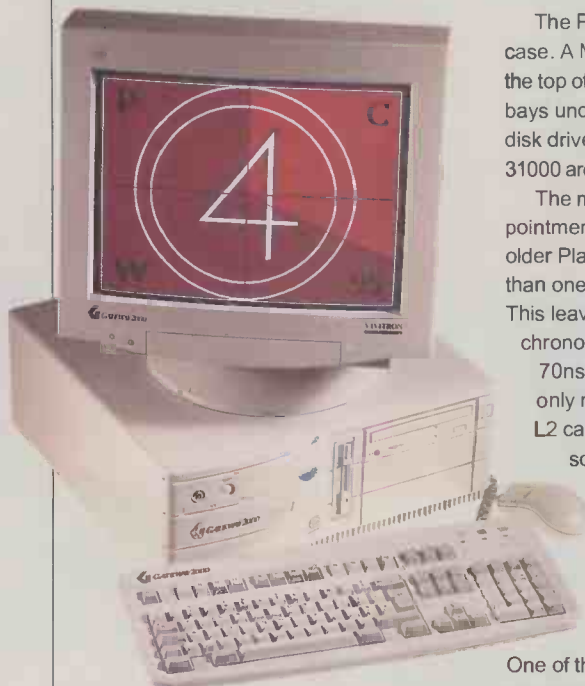
Contact Express Micros 01909 530242

Good Points Cheap.

Bad Points Poor performance.

Conclusion Worth looking at if cost is your primary concern.

Gateway 2000 P5-90 Premium



Along with Dell and a few others, Gateway 2000 practically rules the single-user market, and is noted for its cheap systems and willingness to deal with one-off orders.

The P5-90 Premium is built in a desktop case. A Mitsumi CD-ROM drive is situated at the top of the drive bays, with two spare 5.25in bays underneath. To the side a 3.5in floppy disk drive and a 1Gb Western Digital Caviar 31000 are mounted vertically, opposite the PSU.

The motherboard is something of a disappointment. It's Intel-manufactured, but is an older Plato, with the Neptune chipset, rather than one of the newer Zappas with Tritons. This leaves no option for pipeline burst synchronous cache or EDO RAM, and two 70ns FPM SIMMs are used. This is the only machine on test without any kind of L2 cache. The processor is housed in a socket 5 and there's no VRM.

Nevertheless, the internal design is neat, with few cables trawling across the case. An Ensoniq SoundScape sound card, featuring WaveTable samples, is housed in one of the five ISA slots.

One of the three PCI slots is filled with an ATI Mach 64 which is roughly equivalent to a Diamond Stealth 64 DRAM.

The bundled software consists of Microsoft Office 4.3 Professional, which contains Word for Windows, Excel, Powerpoint, Access and a licence for MS Mail. Also

supplied is a Gateway 2000 System CD, which contains all the drivers necessary for any of Gateway's add-in boards.

Unfortunately, Gateway supplied a 17in monitor instead of the 15in we had asked for, so no direct comparisons are possible, but since it is a rebadged Sony Vivitron there are sure to be no complaints.

The main disappointment with this system was its lacklustre performance, which was almost certainly due to its Plato motherboard. A company which is used to being in the top few, Gateway is bound to be disappointed with 17th place. But this shouldn't reflect on Gateway as a company, or indeed on any other of its PCs, as this is an anomaly.

Nick Lawrence

PCW Details

Gateway 2000 P5-90 Premium

Price £2,099

Contact Gateway 2000: 0800 602000

Good Points Office Professional, Ensoniq SoundScape.

Bad Points Disappointing performance.

Conclusion Don't let it put you off Gateway in general.

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Hi-Grade Winputer P5-90



Don't be put off by the name, which has to be one of the naffest ever given to a computer. Also, try to overlook the clunky seventies-ish exterior, for under the bonnet, the Hi-Grade is extremely well put together

Inside, everything is well laid out and

easy to get to. On the current Pentium PCI motherboard, a 512Kb cache is crammed in, more than any other manufacturer managed. At the moment this is a standard, asynchronous cache, although Hi-Grade has plans to up the spec to pipeline burst cache.

Hi-Grade is using an SMC chipset, although this may be upgraded to Triton, and Socket 7s will be used on later boards. The 16Mb RAM on double SIMMs runs at 60ns. The SIMM sockets are within easy reach and allow the memory to be upgraded to 128Mb. They are capable of taking EDO RAM which will cost you an extra £40 per 8Mb SIMM.

The sound card is a Gravis Ultrasound, a step up from Creative Labs Sound Blaster 16, the most common card in this test. It has connectors for Sony and Panasonic CD-ROM drives, as well as for the Mitsumi CD drive supplied with the machine. Another safe choice was the removable hard drive, a Seagate ST3100A based on EIDE, which is in a removable case so that data becomes transferable between machines.

The software that comes with the machine is slightly limited — only DOS 6.22 and Windows 3.11 and drivers for the multi-

media peripherals are supplied on floppy. Hi-Grade can sell you Office 4.3 Professional separately.

The Hi-Grade comes with the ADI Microscan 4V. It has all the standard controls, plus pincushion and trapezoid. It has good resolution and a pleasantly flat screen.

This turned out to be a very good deal, a machine that was extremely well put together and easy to upgrade. It is full of safe and proven choices, which paid dividends in both price and performance. It is a mere 0.06 points behind the Carrera, at the head of the middle pack, and at £1,795 is just £100 dearer than the cheapest PC in the group test. The Hi-Grade Winputer therefore comes Highly Commended.

Adele Dyer



PCW Details

Hi-Grade Winputer P5-90

Price £1,795

Contact Adams Technology
0161 877 8822

Good Points Well-constructed, with great performance for the price.

Bad Points Poor software bundle.

Conclusion Highly recommended for the budget user.

Mesh Elite95 P90



The Mesh Elite95 90, housed in a minitower case, is aimed at the budget market. Costing £1,699, it is the cheapest PC here, if only by £31. It also provided one of the few interesting front fascias in this test. They may not do anything, but the black grilles at the top and bottom of the case look decidedly flash and could add some sparkle to your desktop.

Like the Western Systems machine, this one is unlikely to be found in bits all

over someone's desk, as there is a sticker warning "Warranty void if removed", which must be broken to get into the case.

Once inside, you're greeted by a Teac CD55 CD-ROM drive at the top, followed by a spare 5.25in drive bay, then the floppy disk drive, a spare 3.5in drive bay, and an 850Mb Western Digital Caviar 2850 hard disk.

This is the only PC on test here whose CD-ROM drive is not controlled by EIDE on PCI. Instead, it uses a Creative Labs Sound Blaster AWE 32 — an excellent sound card — as the controller. If you're likely to want to connect several EIDE devices this is a way to reduce some of the load. The

AWE 32 sits in the bottom of the four ISA slots, one of which is shared with one of the four PCI slots. It's a shame that this shared slot was chosen as the location for the Diamond Stealth 64 VRAM video card, when all the others are available.

The motherboard is an Asustek PCI//P54TP4, which uses the Triton chipset. Sadly, there's no support for the Triton's memory architectures on the board, so there's a 256Kb asynchronous cache and

standard 70ns FPM SIMMs. All four SIMM sockets are used, when two would have been sufficient and would have left room for expansion. The next release of the board, coming soon, will have support for EDO memory, pipeline burst synchronous cache and a socket 7 and VRM, instead of the socket 5 as is currently fitted.

The monitor is fine, though nothing special, and the Aiwa active speakers let you get the full sound from the bundled software: Works for Windows, Money, Encarta 95, Golf, the Microsoft Home CD Sampler and a CD of 11 shareware games (unregistered).

Considering the system's price, the performance is impressive, and this machine should be high on the shortlist of those wanting to come in at the bottom end of the P90 range.

Nick Lawrence

PCW Details

Mesh Elite95 P90

Price £1,699

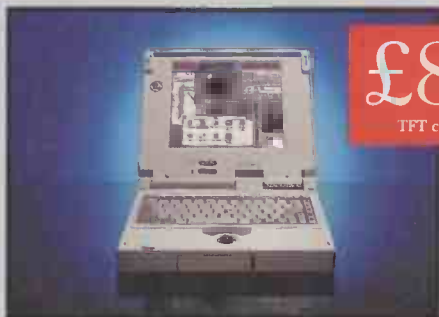
Contact Mesh 0181 208 4493

Good Points Excellent value.

Bad Points Small hard drive; memory uses all slots.

Conclusion A good-value budget computer.

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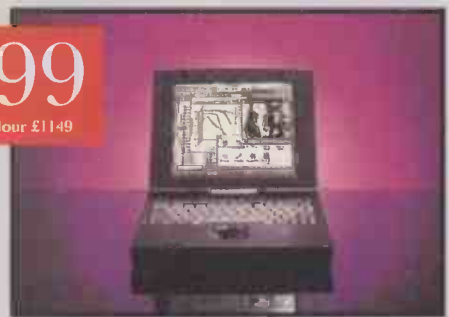
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MJN P90P/CD

From the outside, the MJN P90P/CD looks like any other desktop PC. It features a Mitsumi FX-400 CD-ROM drive, a spare 5.25in drive bay, a 3.5in floppy drive and a 1.2Gb Western Digital

Caviar 31200 hard drive in a blind bay. Inside, the PSU lies at the back, next to the motherboard. Two 8Mb SIMMs take up half the SIMM sockets, leaving expansion room for more memory.

There are four PCI slots and four 16-bit ISAs, with one shared. The top slot, being PCI, is filled with the graphics card, an S3 Trio 64, which has 2Mb on board. The bottom slot has a TeleSound Pro 16 sound card, similar to a Sound Blaster 16 (for those who benchmark by brand names).

A ZIF socket 5 provided some interest when we noticed that the CPU had no fan, even though every other machine here was supplied with one. Closer inspection revealed that there was indeed a fan, but that it had come unstuck from the CPU and had adhered to blanking plates at the back of the case. Attempts to stick it on were futile, as the glue had worn off and it just slid around.

Further evidence of poor build quality was found with the Enhanced IDE. One channel serviced both the hard drive and the CD-ROM drive, which degrades the performance of the hard disk severely under Windows, since it disables 32-bit access to the disk. Either MJN could not spare the cost of a second

EIDE cable — two controllers are on board, so the cable would have been the only extra cost in making use of both channels — or the technician building this computer did not know that poor performance would result. Either way, this would go some way to explaining the system's result; it came third from the bottom of the pack overall and under Windows, and fifth from the bottom under DOS.

There's a good range of bundled software, including Lotus SmartSuite (1-2-3 Release 5, Freelance Graphics, Ami Pro, Approach, Improv, Organizer 2.0, SmartPics and a cc:Mail licence), as well as Microsoft's Dangerous Creatures, Multimedia Beethoven's 9th, Golf and Encarta 95. But this cannot make up for the machine's performance.

Nick Lawrence

PCW Details**MJN P90P/CD**

Price £1,779

Contact MJN Technology 01222 777555

Good Points Good software.

Bad Points Mediocre performance and build quality.

Conclusion Others provide better value.

Panrix Micron P90

Panrix has been quietly building top-quality systems for some time. Its latest, the Micron P90, is housed in a mini-tower case. At the top right are six drive bays; two are blind, and one of these is used for the 1Gb Micropolis hard drive. (A Quantum Fireball is now available instead,

which Panrix claims performs similarly.) The 5.25in front-facing bays consist of two spares and a Mitsumi FX-400 4X CD-ROM drive, with the 3.5in floppy disk drive underneath.

The Micronics motherboard, a 54HI model, holds only a socket 5, but apparently there will be a socket 7 and VRM coming on the next revision. This Micronics motherboard was one of the two top performers in our tests (together with the Adams Accura Professional). In this machine the Triton chipset is used with 256Kb soldered-on cache and two 60ns EDO SIMMs, filling two of the four SIMM sockets.

A Diamond Stealth 64 Video VRAM with 2Mb provides a safe and quick choice for the graphics, filling the top of the three PCI slots. There are also four ISA slots, one of which is filled with a Creative Labs Vibra 16. The bottom ISA slot is filled with a rather nifty added extra: a US Robotics Sportster 14.4 faxmodem, fully BT-approved, which comes for £100 extra.

The 80W Trust SoundWave 10 speakers should be more than enough for the multimedia software supplied. This consists of the usual array of Microsoft applications: Works for Windows, Dangerous Creatures, Golf,

Encarta 95 and the Microsoft Home CD Sampler. Setting the software bundle apart is the inclusion of Quicken Deluxe for Windows, as well as Quiclink II, a comms package for Windows to make the most of the faxmodem.

The Iiyama 15in monitor is a good model, with a flat display and controls for pincushioning/barrelling and degaussing. It's also MPRII-compatible, giving it energy-saving features.

In the final analysis, raw speed is often the most important factor, and in this respect the Panrix is our overall winner. It came first in our tests in all three categories of overall, Windows and DOS, and all by a fair margin despite the intense competition. It's a little more expensive than most, but you have to pay some more for the fastest.

Nick Lawrence

PCW Details**Panrix Micron P90**

Price £2,465 (incl. faxmodem)

Contact Panrix 01132 444958

Good Points Faxmodem, good old-fashioned blistering speed.

Bad Points Very expensive, even considering the faxmodem.

Conclusion Excellent but pricey.

Red Box Winstation 90



The Red Box Winstation 90 stands out among the computers here on account of its size. As a small tower, it is more likely to fit under your desk than on it.

Undoing the case looks simple enough,

but in fact involves prising the front fascia off before attacking the casing and then pulling it off towards the front. Inside, the reward is a lot of expansion room: there's already the requisite hard disk (an 850Mb Western Digital Caviar), CD-ROM drive (Toshiba XM-5302B) and floppy disk drive, but there's also room for a further two front-facing 5.25in devices and three more 3.5in hard disks.

The motherboard, an Asustek PCI/I-P54 TP4, is accompanied by the Triton chipset. It's well used in this system, with the two SIMMs (there are four sockets) holding FPM memory and a 256Kb asynchronous cache soldered onto the board.

There's also room for expansion with cards. There are four PCI and four ISA slots, one of which is shared between them. The bottom ISA slot contains an Ensoniq SoundScape 2000 sound card, with full WaveTable capability and SoundBlaster compatibility. One of the PCI slots has a Diamond Stealth 64 VRAM with 2Mb upgradable to 4Mb.

To complement the sound card there's a pair of Altec Lansing speakers, probably the best speakers supplied with standard PC systems. A separate sub-woofer makes for a lot of cables but great sound. The monitor is a

15in Iiyama Vision Master, with degauss and pincushion/barrel controls as well as a crisp, flat display. This makes the system good to look at as well as to listen to.

Also supplied is Lotus SmartSuite 3.0, containing nine applications: Ami Pro, Freelance Graphics, 1-2-3, Improv, Approach, Organizer, Screencam, SmartPics, and a licence for cc:Mail.

The Red Box gets seventh place in our tests, lagging one place behind the leading pack. This is not a bad result, considering the severity of our testing and the stiff competition, but it's the third most expensive machine in this test.

Nick Lawrence

PCW Details

Red Box Winstation 90

Price £2,387

Contact Red Box 01480 405541

Good Points Well specified, with good extras such as the sound card, software and speakers.

Bad Points Expensive.

Conclusion Look out for the next board release.

Sprint Plato P90



Sprint Business Machines is lagging a little way behind the pack with this minitower system. It features many of the same components as various others: a Mitsumi FX-400 CD-ROM drive, a Maxtor 1.2Gb 71260AT hard disk, and a socket 5,

but there are still noticeable differences. For a start, the motherboard is an Intel Plato using the Neptune chipset, now outdated by the Zappa, Aladdin and Endeavour motherboards in Intel's range alone, though Sprint says it will soon be moving up to the Zappa. This limits the upgradability of the processor to the low-to-middle of the Pentium range.

Further evidence of cost-saving is evident in the choice of graphics card: a Diamond Stealth 64 DRAM (instead of the faster and more popular VRAM), although an extra megabyte has been added to bring it up to its maximum of 2Mb. A Sound Blaster 16 Value fills one of the five ISA slots.

Like some other suppliers here, Sprint either didn't know that putting the CD-ROM drive and hard drive on the same EIDE channel would degrade disk performance quite severely under Windows 3.11, or wanted to save the small amount of money involved in using another EIDE cable. Either way, the result is the same.

By no means everything about this machine is bad, however. A Samsung 15SH28 monitor provides low radiation as well as energy savings, and the software supplied includes the excellent Microsoft Office

Professional 4.3 as well as the usual bundle of Golf, Encarta 95, Works for Windows, Dangerous Creatures, Multimedia Beethoven's 9th and Bookshelf. Sounds are played through a pair of 25W Trust speakers. Also in the machine's favour is the fact that contact with the company will put you in touch with a local retailer where you can try out the machine for yourself.

But these points aren't enough to compensate for a disappointing performance under our tests. It finished some way down in the bottom third, no doubt due to the combination of components which are not as highly specced as those in other machines, along with the hard drive/CD-ROM single channel oversight.

Nick Lawrence

PCW Details

Sprint Plato P90

Price £1,948

Contact Sprint Business Machines 01895 846417

Good Points Microsoft Office Professional 4.3.

Bad Points Poor quality in general.

Conclusion Look out for later models instead.

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● More Dynamics

● More Value

● More Fun

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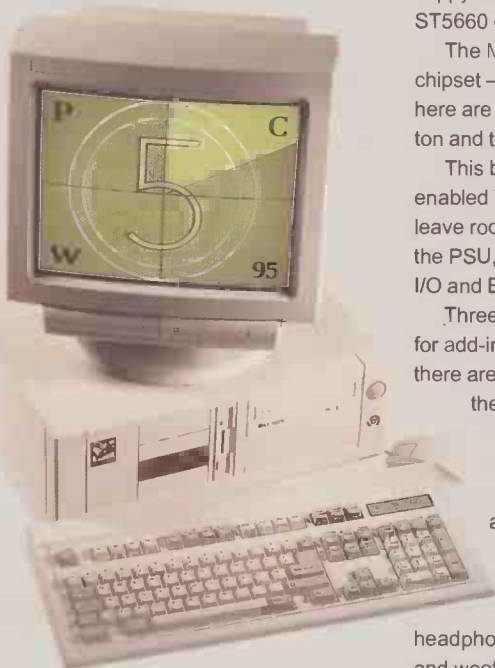
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Vale (Evesham Micros) Platinum P90 MM



A standard case on the Vale lifts back to reveal a Toshiba XM-5302B quad-speed CD-ROM drive with room for another 5.25in device underneath, and a vertically mounted floppy drive. In a bay next to the

floppy drive is the hard disk, a 1Gb Seagate ST5660 on EIDE.

The Microstar motherboard has an SIS chipset — an unusual move when most PCs here are using Intel chipsets such as the Triton and the Neptune.

This board has six SIMM slots, which has enabled Vale to use four 4Mb SIMMs and still leave room for expansion. Next to it, and near the PSU, is a Winbond chipset controlling the I/O and Enhanced IDE channels.

Three PCI slots and four ISA leave room for add-in cards, though one is shared, and there are more case holes than slots, which is the right way around. One PCI slot has a Diamond Stealth 64 Video VRAM, and one ISA slot has a standard SoundBlaster 16, a suitable choice for games playing but not for more serious music

applications. The speakers are big 15W Zydec, which have headphone sockets and separate tweeter and woofer controls.

Supplied software is in the form of a CD bundle, consisting of Encarta 95, Works for Windows, Money, Scenes, Golf and Dangerous Creatures. There's also an option on bootup, the first time you start the system,

to make a backup of the pre-installed software, which is particularly useful for those who are new to computers, or for those who take tinkering too far.

The unbadged 15in Mitac monitor features on-screen controls with a pin/barrel control and, unusually for a monitor of this size, a control for rotating the picture.

Test results, however, weren't good. Although this machine may be one of the cheaper on offer here, its position as the second-slowest computer in this group test overall and under DOS, and the slowest under Windows, makes it difficult to recommend. This could well be down to the SIS chipset, but without direct chipset testing it is not possible to say categorically. And it's not cheap, either.

Nick Lawrence

PCW Details

Vale (Evesham Micros) Platinum P90 MM

Price £2,219

Contact Evesham Micros 01386 765500.

Good Points Good monitor and CD-ROM drive.

Bad points Didn't hold up too well under strict testing conditions, expensive.

Conclusion One of the worst, but this is not a typical result for Vale.

Viglen Genie PCI



Viglen is one of the biggest British names in the computer manufacturing industry, and with a claimed turnover of some £80m.

The PC in this test is described on the case badge as a "Med Tower", and it looks

pretty much like any other. At the top is space for two 5.25in devices, and underneath them is a Toshiba XM-5302B CD-ROM drive.

Below this is a floppy drive, and below that a 730Mb Western Digital Caviar 2700, the smallest drive in the test. This is badly placed, sitting in a front-facing slot and there are two blind bays directly beneath it.

In our August issue Viglen supplied the first Endeavour motherboard we had seen, so it was surprising to find that the board supplied here is a Plato with the Neptune chipset, superseded by the Zappa with Triton. The cache is in the form of 256Kb asynchronous, and the SIMMs are FPM 70ns models.

There are two, with room to fit a further two. A ZIF socket 5 is located beneath them.

On the other side of the motherboard there's an array of five ISA slots and three PCI slots, one of which is shared. Unfortunately, there is evidence of poor design here too, as the top ISA slot is unusable because its blanking plate has been replaced by the I/O connectors even though there are holes in the case for these. The slot

directly below this holds a Creative Labs Vibra 16 sound card, not the best but perfectly adequate.

It's a shame that with three PCI slots to choose from, Viglen has placed the Diamond Stealth 64 VRAM in the shared slot, although it is unlikely that anyone would want to plug in three ISA devices as well as the Vibra 16.

The software supplied covers the usual Microsoft bundle of Golf, Publisher, Works, Money, Scenes and Encarta 95.

The Genie's test result was disappointing, with it finishing almost exactly in the middle of the pack. This is no doubt due to an outdated motherboard, and when more modern boards are available Viglen's results should look very good indeed.

Nick Lawrence

PCW Details

Viglen Genie PCI

Price £2,123

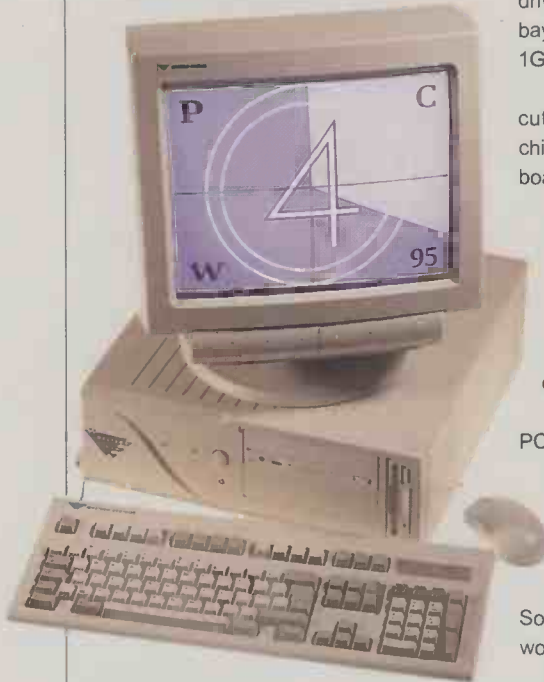
Contact Viglen 0181 758 7000

Good Points Good performance considering the motherboard.

Bad Points Disappointing performance overall.

Conclusion Keep your eye out for more up-to-date machines, which should do well.

Western Systems Power P90



The Western Systems Power P90 comes in desktop form, with the motherboard on the left-hand side, the power supply at the top right, and the drive

bays at the bottom right. A Reveal CD-ROM drive sits in the top bay, with the other 5.25in bay spare. Underneath the visible bays lies a 1Gb Western Digital Caviar 31000.

The motherboard betrays a little cost-cutting, being an Intel Plato with a Neptune chipset. Neither is it Intel's latest, since the board has been superseded by the Zappa, to which Western Systems says it will soon be moving.

Since the chipset doesn't support EDO RAM or pipeline burst cache, these are replaced by standard 70ns SIMMs and a 256Kb asynchronous cache soldered onto the motherboard. There are five 16-bit ISA slots and three PCI slots, one shared. One of the former holds a Reveal Sound FX sound card, and one of the latter a Diamond Stealth 64 DRAM, upgraded to its maximum of 2Mb from the standard 1Mb. Both are cost-cutting measures, as a genuine SoundBlaster 16 and a Stealth 64 VRAM would have provided better quality.

Western Systems is evidently picky about users opening the case: a sticker with the warning "Warranty void if removed" covers the edge of the case so that it has to be broken to get inside. There's glue where the EIDE

cables meet their connectors, so that they cannot easily be removed.

The Mitac OEM monitor, though, is excellent, with on-screen control and a clear picture. Also good is the bundled software, a full version of Lotus SmartSuite. This includes Ami Pro, Organizer, 1-2-3, Improv, Approach, Freelance Graphics, SmartPics, Screencam and a licence for cc:Mail.

The tight competition around the middle of the pack squeezed this PC into the bottom half of the group, but the difference between the Western Systems (in 14th place overall with a score of 5.1) and the Carrera (in 8th place overall with 5.31) is only 0.21.

The price is very good considering the performance, as it is almost the cheapest here. This would therefore be a good PC for those on a budget.

Nick Lawrence

PCW Details

Western Systems Power P90

Price £1,730

Contact Western Systems 0181 842 0071

Good Points Lotus SmartSuite 3.0, good price/performance.

Bad Points Stealth 64 DRAM.

Conclusion Good value for the budget user.

Personal
Computer
World
**EDITOR'S
CHOICE**

Editor's Choice

There were many good systems submitted for this review, and fewer indifferent ones than we expected. Performances tended to be very similar, indicating perhaps that the uniformity of components is leading to a levelling out of performance across suppliers.

The Highly Commended award for a budget machine has to go to Hi-Grade. Performance was nearly in the top league, and the price was eminently reasonable. An easily removable hard disk makes for easy data transfer if you have two or more Hi-Grades, and the company has been around long enough for you to be able to buy with confidence. One of the better monitors here tops off a genuinely excellent deal for the budget user.

Also Highly Commended is the Dan Dantium 95/590MM. A British manufacturer with an outstanding track record, Dan has put together an excellent system



and a brilliantly fast performer while keeping an eye on the price. It is no more expensive than most here, yet packs a lot of functionality — and a truckload of software — into its case.

Yet the Editor's Choice must be the

Adams Accura Professional 586 WS. Adams Technology has been around a long time, providing well-built computers at good prices. This one trounces all but the highly priced Panrix (which has the same motherboard), for a mere £2,099. It provides top-quality components and backs them up with a three-year warranty, the first year of which is on-site. The prospect of WRAM is sorely tempting, as the Matrox Millennium now comes as standard for the same price as the machine reviewed. The Adams Accura is a highly desirable machine and wins this group test.

No doubt the next PC group test we run will feature still faster PCs at the same price as these, but even with Windows 95 zooming towards us at the speed of Bill Gates chasing another billion dollars, these systems should satisfy your need for speed for some time to come.

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What we discovered

The uniformity of many of the computers on test here was quite astonishing. Diamond Stealth 64 VRAM (and the newer Video VRAM) graphics cards and Western Digital hard disks using Enhanced IDE were definitely the norm. Every machine had PCI and EIDE, and there were no NexGen 586-90s to break the Intel stranglehold. Toshiba XM-5302B and Mitsumi FX-400 CD-ROM drives carved up the market between them, while almost all manufacturers went for Creative Labs sound cards.

If all the system similarities made for dull testing, it also provided a good way of discovering what makes the most difference to a system. Naturally, almost every component can make some difference, but it was still surprising that the top two performers were the only ones to use a Micronics motherboard, the same type which helped the Panrix Micron P120 beat a P133 system in our August issue.

What's more, many of the poorer performers were using Plato boards with Neptune chipsets. For such a little known aspect of a computer system (how many people specify a motherboard when

they order a computer?), the motherboard and chipset do seem to make a great deal of difference to overall performance, and that's why we have given them so much space in the reviews.

As a reviewer it's always difficult to give fair weighting to those suppliers who have submitted machines just before they change over to a new major component. In this test it is harder than usual, because the Triton and Triton-compatible chipsets' support for EDO RAM and pipeline burst synchronous cache has led to a spate of system upgrades. The industry was in the middle of changing over while we were putting this test together, so by now the systems should be much more comparable.

As it turned out, those who got the new boards first received higher performance ratings (Panrix, for example, is linked closely to US motherboard and pipeline burst cache supplier Micronics), but this should not necessarily reflect badly on those who weren't among the favoured suppliers. By now almost all suppliers of Plato-based systems should have moved over to Zappas.

Nick Lawrence

Sound cards

Had you looked at PC systems five years ago, you would be hard pushed to find a 16-bit sound card among them. Not only were they expensive, but there wasn't much software around that could use them. Today, it seems to be that no PC is complete without a sound card, and more and more multimedia packages are taking advantage of 16-bit sound. With multimedia taking off in such a big way, it isn't just games that benefit. You can add sound to most Windows applications, and even text documents can have sound files embedded within them.

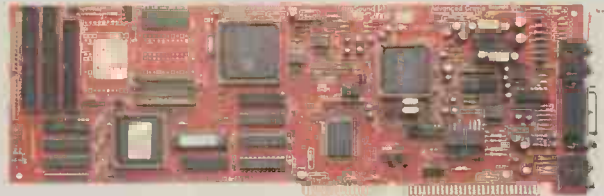
All the PCs in this group test have a 16-bit sound card (most turned up with a Creative Labs Sound Blaster 16 fitted). The SB16 has long been the industry standard and is compatible with just about every piece of software under the sun. It produces audio in two ways: through its internal FM synthesiser, or by playing a digitised, or sampled, sound.

The current crop of 16-bit sound cards are capable of recording and playing digital audio at 44.1kHz stereo. This is the resolution in which CD-audio is recorded, which is why sound cards are often referred to as having "CD-quality" sound. Although to some extent this is true, some produce audible noise which distorts their quality.

Despite some cards being noisier than others, digital audio will sound much the same from one card to the next. But when it comes to the audio output from the synthesiser, the story is very different.

FM synthesis, used by the SB16, has been around since the early eighties. It produces sound by generating a pure sine wave, known as a carrier, and mixes it with a second waveform known as a modulator. When the two waveforms are close in frequency, a complex waveform is produced. By controlling both the carrier and the modulator, it's possible to create different timbres, or instruments.

FM was impressive in the eighties, but it sounds weak now in comparison with WaveTable synthesisers. In our last sound card group test (April '95) we tested 15 sound cards, 12 of which were based on WaveTable technology. WaveTable doesn't use carriers and modulators to create sound, but actual samples of real instruments. A sample is a digital representation of a waveform produced by an instrument. The samples are generally stored in ROM, although some WaveTable sound cards store the instrument samples on the hard disk and download the patches to on-board RAM.



The advantage here is that you can record your own samples and treat them as instruments.

The quality of instruments is determined by the frequency at which the samples were recorded, and the number of samples used to create each instrument. Most instrument samples are recorded in 16-bit 44.1kHz, but many manufacturers compress the data, which often results in slight loss of quality.

When an audio cassette is played back too fast or too slow, its pitch is modified. The same is true of digital audio. Playing a sample back at a higher frequency than its original results in a higher-pitched sound, thus allowing instruments the play over several octaves. But when certain timbres are played back too fast, they begin to sound weak and thin. This is also true when a sample is played too slow: it sounds dull and unrealistic. To overcome this, manufacturers split up the keyboard into several regions and apply the relatively pitched sample from the original instrument to it. The more sample regions recorded results in a more realistic reproduction.

So, WaveTable produces more realistic-sounding instruments than FM cards and more manufacturers are using the technology. But upgrading to WaveTable sound doesn't always mean having to buy a new sound card. Most 16-bit cards have a feature connector that connects to a WaveTable daughterboard; one card we know of that doesn't is the SB16 Value edition.

As well as (somewhat predictably) generating sound, sound cards also double up as CD-ROM interfaces. In addition to SCSI and IDE, which are becoming more popular, there are three proprietary interfaces for Sony, Mitsumi and Panasonic drives. You'll also find that sound cards have an audio connector for the CD-audio output, too.

Steven Helstrip

CD-ROM drives

When choosing a new system you already have enough to worry about with hard disk sizes, processor-type and whether the monitor is any good, without having to think about a CD-ROM player. You might think that one CD-ROM drive should be the same as any other, and you can at least relax on this element, but you'd be wrong. Of course it isn't! This is the computer industry after all, and CD-ROM drives, like any other aspect of IT, is a minefield of jargon and misconceptions.

Before you give up completely and are found screaming or weeping behind the sofa, here's a brief guide to what CD-ROM drives actually do, and what you should look out for when choosing one. Those who are particularly interested in this field should look no further than our last CD-ROM drive group test, in last April's *PCW*, or the dedicated quad-speed IDE feature in August's issue.

When Sony and Philips invented the Compact Disc in the early eighties, even they couldn't have imagined what a versatile carrier of information it would become. What was originally designed to carry 74 minutes of high-quality digital audio can now hold up to 650Mb of computer data, 100 publishable photographic scans, or even 74 minutes of VHS-quality full-motion video and audio. Many discs offer a combination of all three, along with various other types of information.

The trouble with such a variety of formats, continually developed over almost 15 years, is finding a machine that can successfully read all of them. After all, your audio CD player at home may have the right laser pickup assembly, but it won't stand a snowball's chance in Hell of recognising — let alone actually doing anything useful with — any other types of discs. This is particularly infuriating since physically, the discs themselves are as good as identical.

In order to realise which discs do what, and which machines will read what, you need to identify the different formats clearly, and this is one aspect of CD technology which is reasonably well defined.

The information describing the various CD standards is written on pages bound between the coloured covers of a book, and each standard is known by the colour of the particular cover. CD audio is known as Red Book; CD-ROM is Yellow Book; and recordable CD, which includes Photo CD, is Orange Book. More recent is White Book, which is the standard for storing up to 74 minutes of MPEG-1 video and audio on a CD. White Book is also known as Digital Video (DV). Other disc varieties include the native format for Philips CD-i, called Green Book.

Confusion reigned temporarily when Philips put MPEG-1 video on Green Book discs, which could only be played on CD-i machines. All new MPEG-1 film titles conform to the White Book standard, which may be read on any White Book-compatible machine, which includes CD-i and suitable CD-ROM drives. Note that additional MPEG decoding hardware is required to view White Book discs. CD-i uses something Philips calls a Digital Video cartridge, while PC owners require a suitable MPEG card.

Put simply, all CD transports are compatible with a certain number of the book standards — all you have to do is work out which discs you're interested in, then ensure your drive is compatible. All CD-ROM drives are Yellow Book- and Red Book-compatible, as well as boasting built-in digital to analogue convertors (DACs) which enable you to listen to Red Book audio discs directly through

headphone or line audio sockets.

Every CD has a table of contents (TOC) which carries track information. Orange Book solves the problems of writing CDs, where later recordings on the same disc require their own update TOC. Part of the appeal of Kodak's Photo CD format is that you don't have to fill the disc with images on the first go; you can return at a later date and add more images until the disc is full. The information on a Photo CD is Yellow Book CD-ROM format and consequently readable on any drive, with only one small condition.

The problem is that subsequent recordings, known as sessions, are only recognisable by a multisession drive. Single-session drives can only see the first TOC, and consequently miss any further recordings. Luckily, all but the oldest CD-ROM drives are multisession devices. Look out for the phrase "Photo CD-compatible", although unscrupulous suppliers may only be referring to recognition of the first session. To be certain, ensure the drive is labelled "multisession-compatible".

Once you've got all your books and compatibility issues sorted out, there's performance. The first CD-ROM drives pulled

information off discs at what was described as "single speed". This translates into a sustained data transfer rate of approximately 150Kb/sec, around the same as a floppy drive. Double- and quad-speed drives spin the disc two or four times faster and should sustain data rates of around 300 and 600kb/sec respectively. Quads have become the new standard, single-speed drives should be avoided at all costs, and doubles only considered if budgets are particularly tight.

Six-speed drives have already arrived courtesy of Plextor and eight speed will probably be hot on their heels, raising the transfer rates of CD-ROM to that of average hard disks. Average access time is an important factor too, with CD-ROM drives grabbing at around 250ms. Faster access times and higher transfer rates are obviously highly desirable.

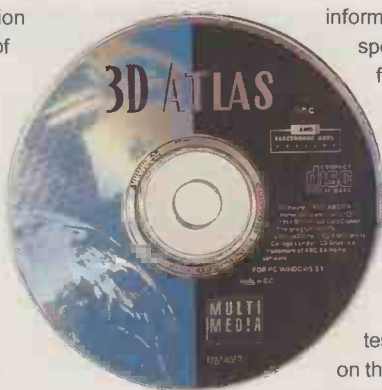
So, you've chosen your drive and now have to connect it to your PC. There are three proprietary interfaces which have become standards offered on most sound cards: Sony, Mitsumi and Matsushita, the latter also known as Panasonic. Each of these performs adequately, but the oldest, costliest, and still highest performing, is SCSI.

Increasingly common these days are IDE drives, which may be daisy-chained with existing IDE hard drives, in much the same way as SCSI, while avoiding the need to buy a new interface. Unfortunately the IDE interface was never designed for anything other than hard drives, and daisy-chaining a CD-ROM drive to the same channel will confuse Windows and sacrifice the desirable 32-bit disk access of version 3.11.

One solution is to fit the CD-ROM drive to a different IDE channel — some sound cards offer an extra one, while additional basic IDE interfaces are available for around £10. Or you could wait for Windows 95 and keep your fingers crossed that Microsoft has addressed the problem with its promised, updated 32-bit drivers.

The best overall solution both now and for the future is that offered by all but one of the IDE-based machines in this test: Enhanced IDE. This boasts two separate IDE channels, and lets you put your hard drive on one and your CD-ROM drive on the other. *No problema*, as they say.

Gordon Laing



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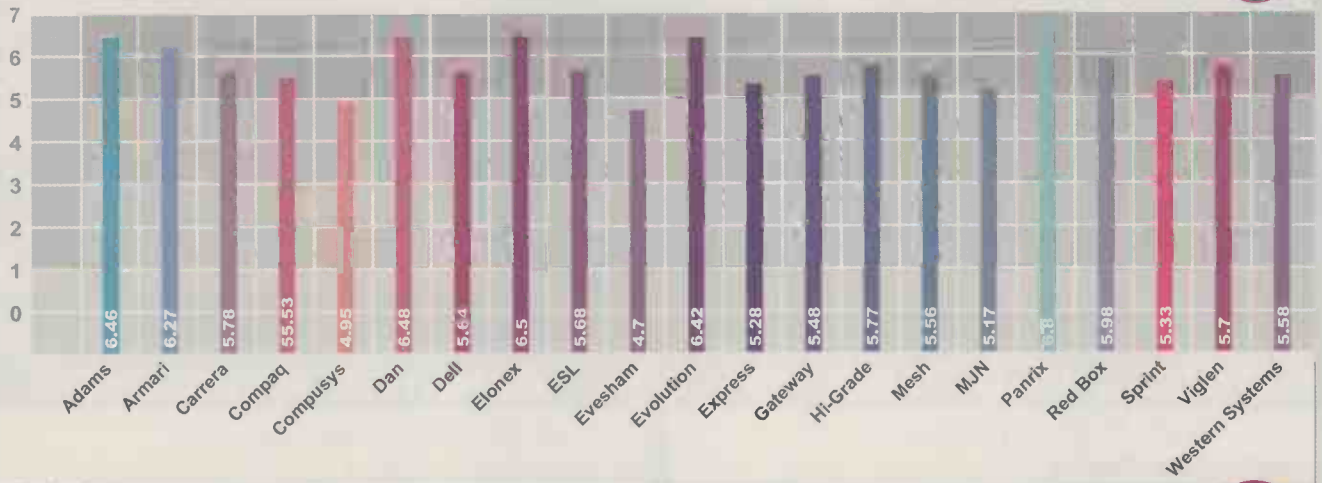
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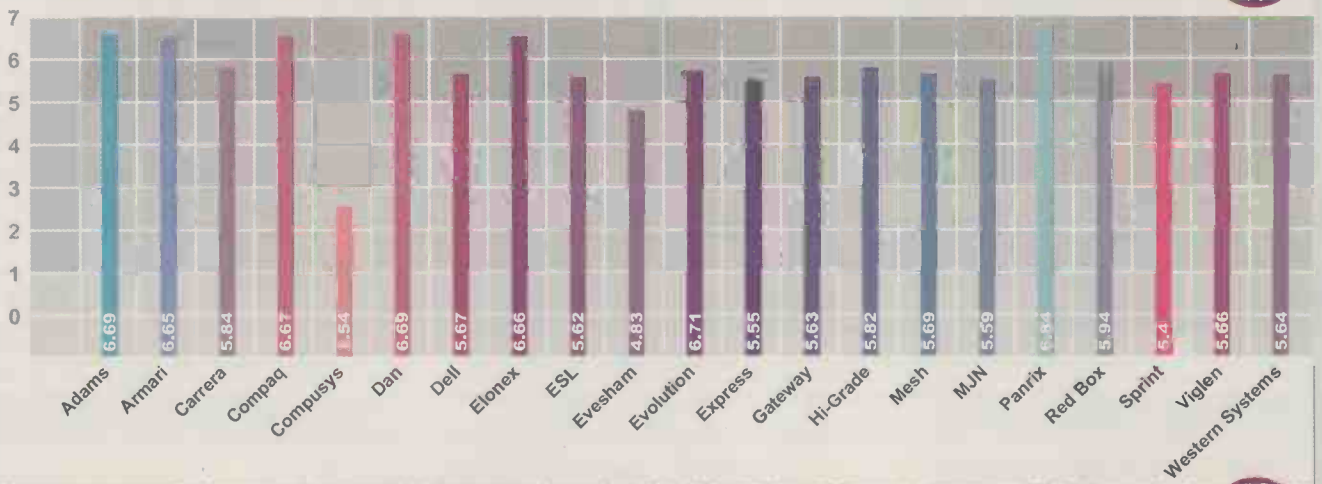
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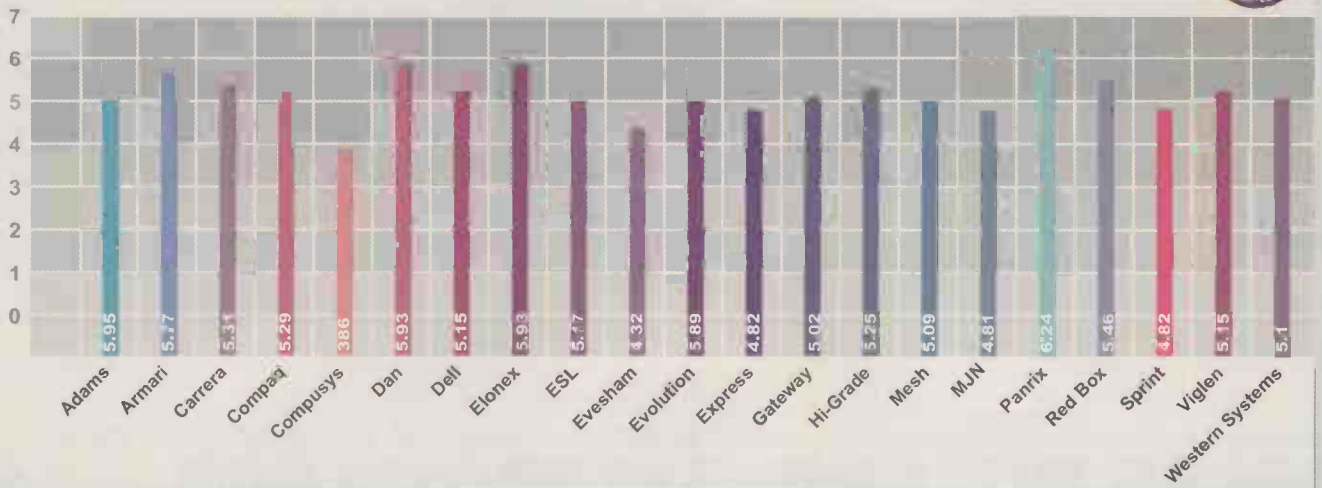
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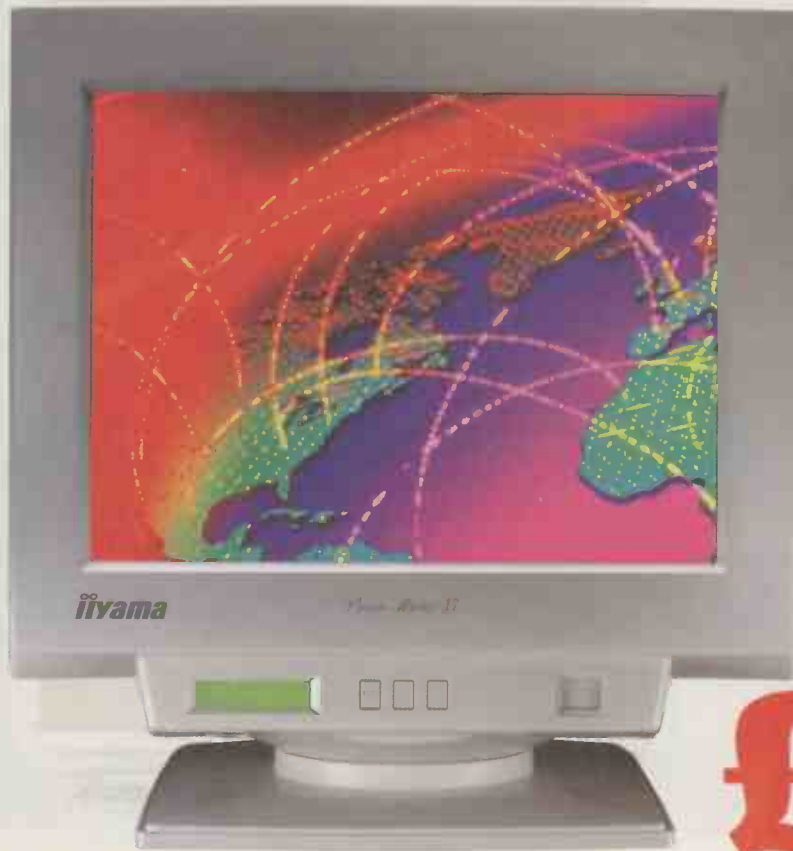
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Model	Accura Professional 586 WS	Triton VRM	Panther P90 Multimedia	Compaq Prolinea 590 5/5	Business MT90
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Fax number	0161 877 8684	0181 810 5783	0171 830 0286	0181 332 3409	01296 24165
Price as tested, excl. VAT	£2099	£2199	£1995	£3090 (RRP)	£1739
BASIC INFORMATION					
Processor manufacturer and model	Intel Pentium 90	Intel Pentium 90	Intel Pentium 90	Intel Pentium 90	Intel Pentium 90
RAM/Max RAM	16Mb/128Mb	16Mb/128Mb	16Mb/128Mb	16Mb/192Mb	16Mb/128Mb
Secondary cache	256Kb	256Kb	256Kb	256Kb	256Kb
Local bus architecture	PCI	PCI	PCI	PCI	PCI
EXPANSION					
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Free ISA-only slots	2	2	3	3	2
Size of case	Desktop	Desktop	Minitower	Minitower	Minitower
HARD DISK					
Interface	EIDE	EIDE	EIDE	EIDE	EIDE
Manufacturer	IBM	Western Digital	Seagate	Western Digital	IBM
Size	1Gb	1.2Gb	850Mb	1Gb	1Gb
MULTIMEDIA					
CD-ROM manufacturer	Mitsumi	Toshiba	Mitsumi	Compaq	Mitsumi
CD-ROM model	FX-400	XM-5302B	FX-400	Internal 4X IDE	FX-400
CD-ROM speed	4X	4X	4X	4X	4X
Sound card manufacturer	Creative Labs	Creative Labs	Creative Labs	Compaq	Creative Labs
Sound card model	SB16 Value	Sound Blaster AWE-32	Sound Blaster 16	Enhanced Business Audio	SB16 Value
GRAPHICS					
Graphics card manufacturer	Diamond	Diamond	Diamond	Cirrus Logic	Diamond
Graphics card model	Stealth 64 VRAM	Stealth 64 Video VRAM	Stealth 64 VRAM	GD-5434	Stealth 64 DRAM
Graphics card RAM/Max RAM	2Mb/4Mb	2Mb/4Mb	2Mb/4Mb	2Mb/2Mb	2Mb/4Mb
Graphics card max non-interlaced resolution	1280x1024x256, 75Hz	1600x1200x256, 76Hz	1280x1024x256, 75Hz	1280x1024x256, 60Hz	1024x768x256, 75Hz
Monitor manufacturer	ADI	Samtron	Goldstar	Compaq	Hyundai
Monitor model	4V	528UXL	1520DM	151FS	HL5864
Monitor size (inches)	15	15	15	15	15
Monitor-max refresh rate at 1024x768 (Hz)	72	75	72	72	60
OTHER INFORMATION					
Standard warranty (years; BTB or on-site)	3 years (1st year on-site)	2 years BTB for base unit	1 year parts, 3 years labour, BTB	3 years, 1st year on site	1 year on-site; lifetime BTB labour
Warranty options	£150 for on-site for all 3 years	Monitor on-site for three years	1st year on-site for £25	Contact resellers	Extensions are available
Type of tech. support	Normal rate	Normal rate; 24-hour BBS	Normal rate	Normal rate	Toll-free
Company turnover (most recent figures available)	£3.8 million	£250,000	£9.6million	\$10.86 billion	£8 million
Number of staff	12	9	40	14,372 worldwide	32



* All information supplied by manufacturers, except prices which were obtained by PCW. E&OE.

TABLE OF FEATURES

Dan	Dell	Elonex	EuroAsia Systems (ESL)	Evesham Micros	Evolution	Manufacturer
Dantium 95/590MM	Dimension XPS P90	Elonex PC-590/1	ESL P90	Vale Platinum P90 MM	EV PRO 90T	Model
0181 830 1100	01344 720000	0181 452 4444	0171 498 7816	01386 765500	0181 944 6222	Phone number
0181 830 1122	01344 860187	0181 452 6422	0171 498 3218	01386 765354	0181 944 9447	Fax number
£2083	£1919 (with better spec)	£2100	£2019	£2219	£2150	Price as tested, excl. VAT
BASIC INFORMATION						
						Processor manufacturer
Intel Pentium 90	Intel Pentium 90	Intel Pentium 90	Intel Pentium 90	Intel Pentium 90	Intel Pentium 90	and model
16 Mb/128 Mb	16Mb/128Mb	16Mb/128Mb	16Mb/128Mb	16Mb/128Mb	16Mb/128Mb	RAM/Max RAM
256Kb	256Kb	256Kb	256Kb	256Kb	256Kb	Secondary cache
PCI	PCI	PCI	PCI	PCI	PCI	Local bus architecture
EXPANSION						
0	0	0	1	1	0	Free shared local bus/ISA slots
3	2	1	1	1	2	Free local bus-only slots
2	3	2	2	2	2	Free ISA-only slots
Desktop	Desktop	Desktop	Mini tower	Desktop	Minitower	Size of case
HARD DISK						
EIDE	EIDE	EIDE	EIDE	EIDE	EIDE	Interface
Seagate	Western Digital	Seagate	Western Digital	Seagate	Seagate	Manufacturer
1.2Gb	1Gb	1Gb	1.2Gb	1Gb	850 Mb	Size
MULTIMEDIA						
Toshiba	NEC	Philips	Mitsumi	Toshiba	Wearnes	CD-ROM manufacturer
XM-5302B	271	[not specified]	FX-400	XM-5302B	CDD-220	CD-ROM model
4X	4X	4X	4X	4X	4X	CD-ROM speed
Creative Labs	Creative Labs	Creative Labs	Creative Labs	Creative Labs	Creative Labs	Sound card manufacturer
Sound Blaster AWE 32 Value	Vibra 16	Sound Blaster AWE 32	Sound Blaster 16 Value	Sound Blaster 16	Sound Blaster AWE 32	Sound card model
GRAPHICS						
Diamond	Number 9	Diamond	Diamond	Diamond	Diamond	Graphics card manufacturer
Stealth 64 Video VRAM	9FX Motion 771	Stealth 64 VRAM	Stealth 64 Video VRAM	Stealth 64 Video VRAM	Stealth 64 Video VRAM	Graphics card model
2Mb/4Mb	2Mb	2Mb/4Mb	2Mb/4Mb	2Mb/4Mb	2Mb/4Mb	Graphics card RAM /Max RAM (Mb)
1600x1200x256, 76Hz	1600x1200x256 76Hz NI	1024x768x256 75Hz	1600x1200x256 76Hz	1600x1200x256 76Hz	1600x1200x256 76Hz	Graphics card max non-interlaced resolution
CTX	Dell	Philips	Samsung	Vale	Samtron	Monitor manufacturer
1560/LR	US15	MN024	Samsung 15GLi	EcoScan	UXL15	Monitor model
15	15	15	15	15	15	Monitor size (inches)
75	72	75	75	75Hz	75	Monitor max refresh rate at 1024x768 (Hz)
OTHER INFORMATION						
First year BTB parts and labour	1 year collect and return	1 year on-site	3 year BTB, 2nd and 3rd year labour only	1 year on-site	1 year on-site	Standard warranty (years; BTB or on-site)
Same day on-site	Additional years; on-site	2nd year on-site	[not specified]	2nd and 3rd years on-site	2nd and 3rd years on-site	Warranty options
Normal rate	Normal rate	Normal rate	Normal rate	Normal rate	Normal rate	Type of tech. support
£39 million (94/95)	circa \$3.5 billion	£110 million	£3 million	£45 million	£4 million	Company turnover (most recent figures available)
120	approx 500	750 world-wide	8	200	10	Number of staff



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1 yr wty .

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Trackball mouse .
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Windows 3.1 .
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display . 2 x PCMCIA
slots . Trackball mouse .
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Windows 3.1 .
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Lotus Organiser .
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Windows 3.1 .
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trackball mouse .
DOS 6.22 . Windows
3.11 for workgroups .
Lotus Organiser .
1 yr maint .

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**ZENITH
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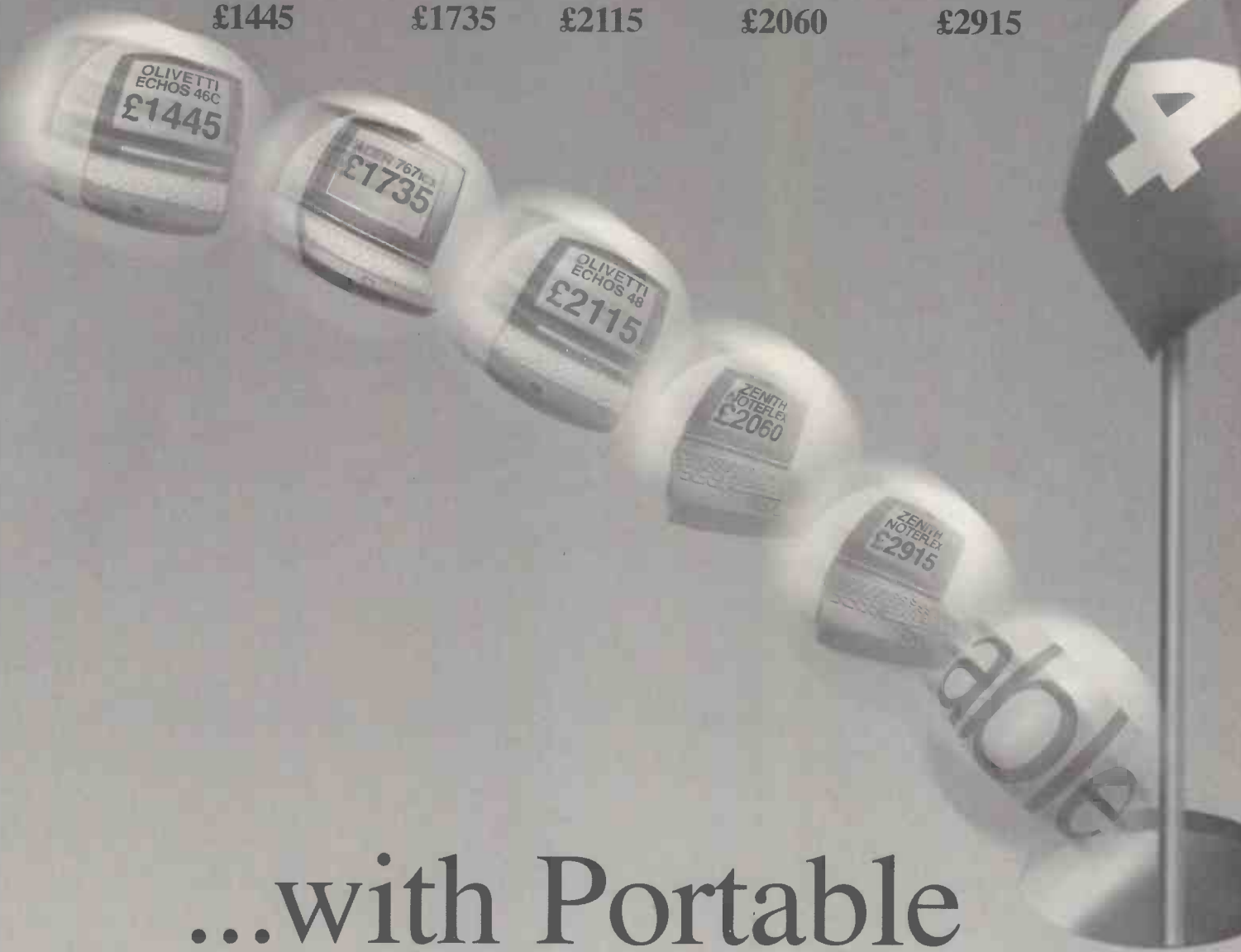
80486 DX4 75MHZ .
4MB RAM .
3.5" 1.44MB floppy disk .
450MB hard disk .
10.4" Dual Scan colour
display . 2 x PCMCIA slots .
Trackball mouse .
Multimedia ready (16 bit
sound) . MS DOS 6.22 .
Windows 3.11 .
3 yr wty .

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Manufacturer	Express Micros	Gateway 2000	Hi-Grade Computers	Mesh	MJN Technology
Model	Rapler Pro P90	P5-90 Premium	Winputer P5-90	Elite95 90	MJN P90P/CD
Phone number	01909 530242	0800 172000	0181-591 9040	0181-452 1111	01282 777555
Fax number	01909 530261	00 353 1 848 2022	0181-591 1586	0181-208 4493	01282 770844
Price as tested, excl. VAT	£1775	£1999	£1795	£1699	£1779
BASIC INFORMATION					
Processor manufacturer and model	Intel Pentium 90	Intel Pentium 90	Intel Pentium 90	Intel Pentium 90	Intel Pentium 90
RAM/Max RAM	16Mb/128Mb	16Mb	16Mb/128Mb	16Mb/128Mb	16Mb/128Mb
Secondary cache	256Kb	256Kb	512Kb	256Kb	256Kb
Local bus architecture	PCI	PCI	PCI	PCI	PCI
EXPANSION					
Free shared local bus/ISA slots	1	1	1	0	1
Free local bus-only slots	2	1	2	2	2
Free ISA-only slots	2	2	2	3	2
Size of case	Minitower	Desktop	Minitower	Minitower	Desktop
HARD DISK					
Interface	EIDE	EIDE	EIDE	EIDE	EIDE
Manufacturer	Maxtor	Western Digital	Seagate	Western Digital	Western Digital
Size	1.2Gb	1Gb	1Gb	850Mb	1.2Gb
MULTIMEDIA					
CD-ROM manufacturer	Toshiba	Mitsumi	Mitsumi	Teac	Mitsumi
CD-ROM model	XM-5302B	FX-400	FX-400	CD55	FX-400
CD-ROM speed	4X	4X	4X	4X	4X
Sound card manufacturer	Reveal	Ensoniq	Gravis	Creative Labs	Televideo
Sound card model	SoundFX	SoundScape	Ultrasound	Sound Blaster AWE 32	Telesound Pro 16
GRAPHICS					
Graphics card manufacturer	Diamond	ATI	Diamond	Diamond	S3
Graphics card model	Stealth 64 DRAM	Mach 64	Stealth 64 VRAM	Stealth 64 VRAM	Trio 64
Graphics card RAM/Max RAM (Mb)	2Mb/2Mb	2Mb/2Mb	2Mb/4Mb	2Mb/4Mb	2Mb/2Mb
Graphics card max non-interlaced resolution	1024x768x256, 75Hz	1024x768x16, 100Hz	1024x768x256, 75Hz	1024x768x256, 75Hz	1600x1200x256, 72Hz
Monitor manufacturer	Smile	Sony	ADI	CTX	Taxan
Monitor model	1515VL	Vivitron	Microscan 4V	1565GM	580LR Plus
Monitor size (inches)	15	17	15	15	15
Monitor max refresh rate at 1024x768 (Hz)	80	70	70	75	80
OTHER INFORMATION					
Standard warranty (years; BTB or on-site)	1 year collect and repair	1 year next day on-site, plus 2 years BTB	1 year BTB	1 year on-site	1 year RTB
Warranty options	1 further year	3 years next day or same day on-site	extendable for 2 more years	Up to five years RTB or on-site	1 year on-site; 3 year on-site
Type of tech. support	Normal rate	Toll-free	Normal rate	Normal rate	Hardware: normal; software: premium
Company turnover (most recent figures available)	£10 million	\$776m (Q1 1995)	£9.3 million	£8 million	over £100
Number of staff	54	5000 worldwide	60	44 in UK	350



TABLE OF FEATURES

Panrix	Red Box	Sprint Business Machines	Viglen	Western Systems	Manufacturer
Panrix Micron P90	Winstation 90	Plato P90	Genie PCI Med Tower	Power P90	Model
01132 444958	01480 405541	01895 846417	0181 758 7000	0181-842 0071	Phone number
01132 444962	01480 471687	01895 850567	0181 758 7080	0181-841 3891	Fax number
£2465	£2387	£1948	£2123	£1730	Price as tested, excl. VAT
					BASIC INFORMATION
Intel Pentium 90	Intel Pentium 90	Intel Pentium 90	Intel Pentium 90	Intel Pentium 90	Processor manufacturer and model
16Mb/128Mb	16 Mb/128Mb	16Mb/128Mb	16Mb/128Mb	16Mb/128Mb	RAM/Max RAM
256Kb	256Kb	256Kb	256Kb	256Kb	Secondary cache
PCI	PCI	PCI	PCI	PCI	Local bus architecture
					EXPANSION
1	1	1	0	1	Free shared local bus/ISA slots
1	2	1	2	1	Free local bus-only slots
2	3	3	2	3	Free ISA-only slots
Minitower	Medium tower	Minitower	Medlum tower	Desktop	Size of case
					HARD DISK
EIDE	EIDE	EIDE	EIDE	EIDE	Interface
Micropolis	Conner	Maxtor	Western Digital	Western Digital	Manufacturer
1Gb	1.2Gb	1.2Gb	730Mb	1Gb	Size
					MULTIMEDIA
Mitsumi	Toshiba	Mitsumi	Toshiba	Mitsumi	CD-ROM manufacturer
FX-400	XM-5302B	FX-400	XM-5302B	FX-400	CD-ROM model
4X	4X	4X	4X	4X	CD-ROM speed
Creative Labs	Ensoniq	Creative Labs	Creative Labs	Reveal	Sound card manufacturer
Vibra 16	SoundScape	Sound Blaster 16 Value	Vibra 16	SoundFX	Sound card model
					GRAPHICS
Diamond	Diamond	Diamond	Diamond	Diamond	Graphics card manufacturer
Stealth 64 Video VRAM	Stealth 64 VRAM	Stealth 64 DRAM	Stealth 64 Video VRAM	Stealth 64 DRAM	Graphics card model
2Mb/4Mb	2Mb/4Mb	2Mb/2Mb	2Mb/4Mb	2Mb/2Mb	Graphics card RAM/Max RAM
1600x1200x256, 76Hz	1280x1024x256x75Hz	1024x768x256, 75Hz	1600x1200x256, 76Hz	1024x768x256, 75Hz	Graphics card max non-interlaced resolution
Iiyama	Iiyama	Samsung	Viglen	Mitac	Monitor manufacturer
8115	8115	15SH28	MC1528-LE	5064	Monitor model
15	15	15	15	15	Monitor size (inches)
75	100	75	75	75	Monitor max refresh rate at 1024x768 (Hz)
					OTHER INFORMATION
2 years on-site	1 year on-site	1 year on-site, 2nd and 3rd BTB	1BTB	1 year BTB parts and labour	Standard warranty (years; BTB or on-site)
3 years or 1 instead	Extendable to 2nd and 3rd years	2nd and 3rd years on-site	Range of fast on-site responses	On-site Instead of BTB	Warranty options
Normal rate	Normal rate	Normal rate	Normal rate	Normal rate	Type of tech. support
£2 million	£2.1 million	£2.6 million	£80 million	£60 million	Company turnover (most recent figures available)
14	13	14	200	34	Number of staff



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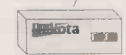
2 Keyboards & 2 Monitors to 1 Computer

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Automatic Printer Switch £39

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Automatic Printer Switch £39

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Automatic Printer Switch £49

1 Computers to 4 Parallel Printer - Bidirectional

Automatic Printer Switch £179

8 Computers to 1 Parallel Printer

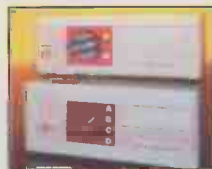
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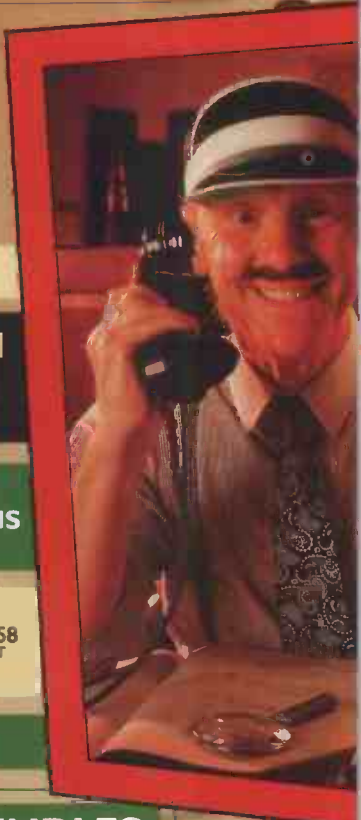
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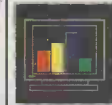
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Touch and go

In the final part of their Access tutorial, Iain Summers and Angus MacKellaig put the finishing touches to the application they have been building.

In the preceding articles, we have suggested ways of gradually building an application with emphasis on:

- providing a functional system that the user can work with at each stage; and
- writing generic routines that can be used in any Access application with little or no modification.

Article one dealt with database design, table and form creation.

Article two dealt with adding user-friendly features to the data entry forms.

The third article discussed the various controls that can be used in forms and how the programmer can manipulate them, the creation of reports, how to run them from Access Basic and apply data filters to them. Some generic routines were provided for the user-friendly routines supplied.

The database supplied on the cover disk, ARTICLE3.MDB, is at the stage where your own database should have been at the end of the previous article. It also allows new readers to pick up the series at this point.

The Access Basic code modules are supplied in files CHANGERE.TXT and FRONTEND.TXT.

This article will refer to routines in

these modules, so load them into NOTEPAD and print them prior to commencing any work on the database. For the less adventurous, the completed database is supplied in the file FINISHED.MDB. If you simply want to use the application, skip to the end of the article for some suggestions as to how it can be utilised.

We conclude our series of articles by putting some finishing touches to our application.

At the moment, the user must create reports manually using the [New] button in the [Reports] tab of the [Database Window]. Similarly, they must manually edit them using the [Design] button.

You will now add a form to the application that will allow the user to add and modify reports in a manner consistent with the rest of the application.

Select the [Form] tab of the [Database Window], then click the [New] button.

Select the [Blank Form] button.

Set the form properties as follows by clicking in the grey area outside the drawing area.

Caption	Maintain Reports
---------	------------------

Scroll Bars	Neither
Record Selectors	No
Navigation Buttons	No
Modal	Yes
Border Style	Dialog
Control Box	No
Min Button	No
Max Button	No
On Load	=ChangeGetReportNames()

Add a form header and footer using the [Header/Footer] option in the [Format] Menu.

Add the text "Modify Report" in the header. Modify it to look like that in Fig 1.

Add the [OK] command button in the footer and set the following properties:

Name	OKButton
Caption	OK
Default	Yes
On Click	=ChangeReport()

Add the [Cancel] command button in the footer and set the following properties:

Name	CancelButton
Caption	Cancel
On Click	=ChangeExit()

Now create a list box in the detail section. Drag its label above the list box and change its caption to "Select Report". Set the following properties:



Fig 1 The finished "Maintain Reports" form

Name	ReportList
Row Source Type	Value List
On Dbl Click	=ChangeReport()

Finally, create a command button above the list box.

Set the following properties on the command button:

Name	NewButton
Picture	AutoReport
On Click	=NewReport()

Add the text "Create New Report" above it. Save the form as [Change Report], then close it. The finished form should be similar to that in Fig 1. You will now need to add the Access Basic code required by the form.

Select the [Modules] tab in the [Database Window]. Click the [New] button.

Select [Load Text...] from the [File] menu.

Select the file CHANGERE.TXT, then click the [Replace] button.

Save the module as "Change Report".

The application is almost finished. You will now simply add a few dialogues to act as a menu to make the application more user friendly.

Adding "menus"

You will now add a dialogue (i.e. form) to the application that will act as a menu. This will provide access to all the features available in the application.

Select the [Form] tab of the [Database

Window], then click the [New] button.

Select the [Blank Form] button.

Click in the grey area outside the drawing area to set the form properties, then set them as follows:

Property	Value
Caption	Main Menu
Scroll Bars	Neither
Record Selectors	No
Navigation Buttons	No
Modal	Yes
Border Style	Dialog
Control Box	No
Min Button	No
Max Button	No
On Open	=FrontInit()

Add a form header and footer using the [Header/Footer] option in the [Format] Menu. Add an Object Frame to the header. Select the [Create from File] option, then click the [Browse...] button. Select PCWLOGO.BMP from the cover disk. Click [OK].

Adjust the size of the Object Frame so the whole picture is displayed. Set the background colour to Light Grey. Add the text "Mailing List Management System" in the header. Centre the text and set its appearance to "Raised".

Add the [Quit] command button in the footer and set the following properties:

Property	Value
Name	QuitButton
Caption	&Quit
On Click	=FrontExit()

Now add command buttons for each of the "menu" options. The first button will load the "Edit Addresses" form to allow the user to maintain the Customers table.

Create a command button with the following properties:

Property	Value
Picture	MSAccessForm
On Click	=FrontExit()

Resize the button when the picture has been added. Add the text "Edit Addresses" above the button.

The next button will load a "submenu" that will load either of the "Edit Categories" forms to allow the user to maintain the Categories tables.

Create a command button with the following properties:

Property	Value
Picture	MSAccessForm
On Click	=FrontEditCat()

Resize the button when the picture has been added. Add the text "Edit Categories" above the button.

The third button will load the "Maintain Reports" form to allow the user to maintain their reports.

Create a command button with the following properties:

Property	Value
Picture	Edit Document
On Click	=FrontModiReport()

Resize the button when the picture has been added. Add the text "Maintain Report" above the button. The last button will load the "Record Select" form to allow the user to specify a range of records to print.

Create a command button with the following properties:

Property	Value
Picture	Printer
On Click	=FrontPrint()

Resize the button when the picture has been added. Add the text "Print Report" above the button. Save the form as "Front End". Close the form. The completed form should be similar to the one displayed in Fig 2.

You will now need to add the Access Basic code required by the form.

Select the [Modules] tab in the [Database Window]. Click the [New] button. Select [Load Text...] from the [File] menu.

Select the file FRONTEND.TXT, then click the [Replace] button.

Save the module as "Front End".

There are now only two things that remain to be done to finish the application: add one last form as a "submenu" to select which of the two categories to edit; and create a macro that will automatically load the Main Menu form when the database is loaded.

The Select Categories submenu

Select the [Form] tab of the [Database Window], then click the [New] button.

Select the [Blank Form] button. Set the form properties as follows by clicking in the grey area outside the drawing area.

Property	Value
Caption	Select Category List
Scroll Bars	Neither
Record Selectors	No
Navigation Buttons	No
Modal	Yes

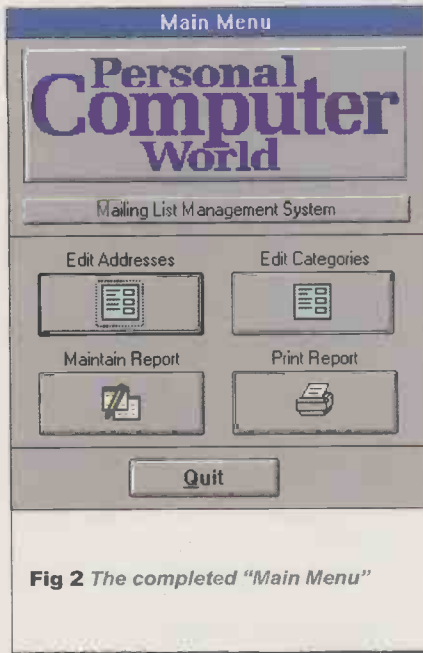


Fig 2 The completed "Main Menu"

Border Style	Dialog
Control Box	Yes
Min Button	No
Max Button	No

Add a control button and set its properties as follows:

Property	Value
Name	SelCat1
Caption	Category 1 List
Default	Yes
Status Bar Text	Click here to edit Category 1 table
On Click	=SelCat1()

Select the Control button, copy it to the clipboard, then paste it back. Position the new button, then change its properties as follows:

Property	Value
Name	SelCat2

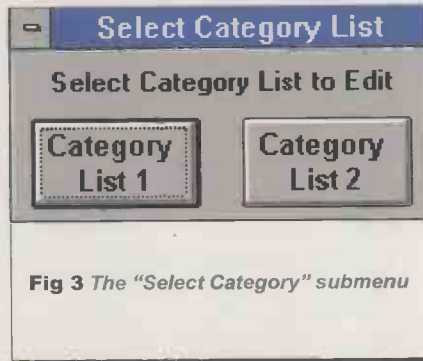


Fig 3 The "Select Category" submenu

Caption	Category 2 List
Default	No
Status Bar Text	Click here to edit Category 2 table
On Click	=SelCat2()

Add the text "Select Category List to Edit" above the two buttons. Save the form as "SelectCategories", then close it. The form should look somewhat similar to Fig 3.

It is useful to see how the forms relate to each other in the menu system. (Fig 4.) You may wish to examine the code in the Access Basic module to see how the forms are loaded from each other. Examine the Function names in the "On Click" properties.

Macros

The final task in our application is to add a macro that will automatically load the "Main Menu" when the database is opened. This is done by creating a macro called "AutoExec":

Select the [Macro] tab in the [Database

Window]. Click the [New] button. You will now be presented with the form similar to that in Fig 5.

In the "Action" column at the top of the form, select [OpenForm].

Under "Action Arguments" at the bottom of the form, enter the following details:

Property	Value
Form Name	Main Menu
View	Form
Data Mode	Edit
Window Mode	Normal

Save the Macro as AutoExec then close the design form. You can now run the macro by double-clicking its name in the [Database Window]. This will be done automatically when the database is loaded.

Tip: If you wish to refine the database application, hold the [SHIFT] key when

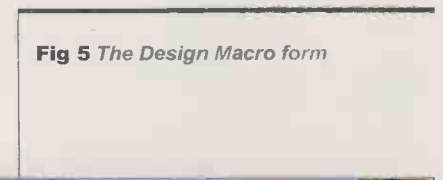


Fig 5 The Design Macro form

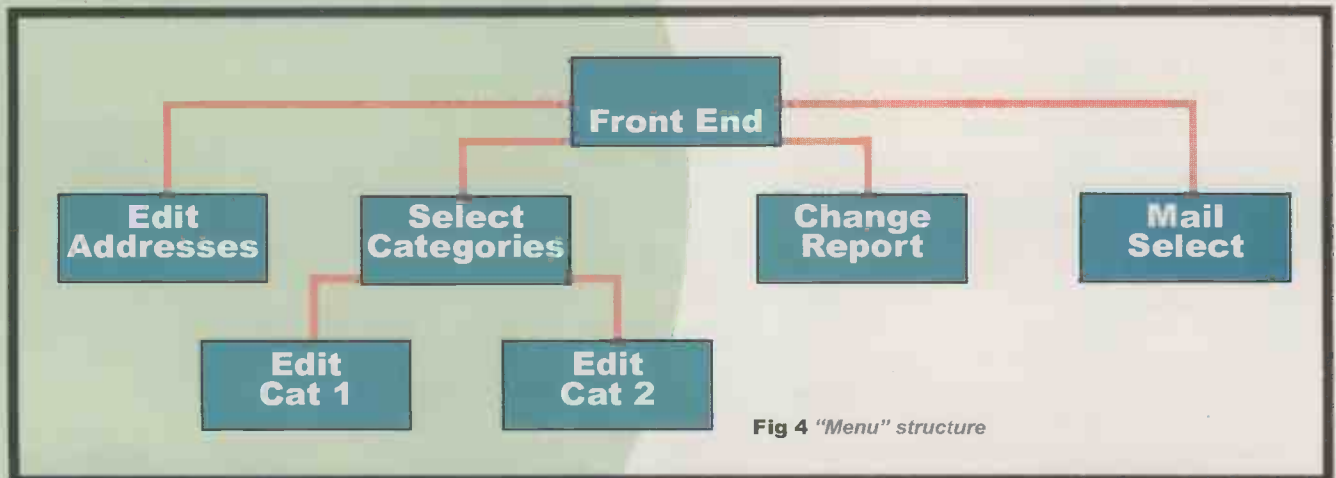


Fig 4 "Menu" structure

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the database is loading. The master copy of any application we build generally has a macro "AutoExecMacro" which will not be run automatically. This is renamed as "AutoExec" before it is installed on a user's machine.

Further refinements

Access has tools that allow you to customise menus and the toolbars. Objects in these are similar in to buttons in a form. We do not have room to go into this here; however, they are fairly well documented in the Access manuals.

Suggested usage

So you have developed your application. If you have followed the steps carefully, you should have a useful tool for a small business or club that will allow you to produce mailshots and labels. Here is a suggested way of using the application for a small sports club.

The [Category 1] table holds the following data:

```
Squash
Badminton
Tennis
```

and Category 2:

```
Beginning
Intermediate
Advanced
```

Remember that the [AddressBook] table holds a customer's (member's) name, address, telephone number, sex, date of birth and category 1 and 2 data.

The club has been informed that a girl's regional under-14 badminton championship is to be held in the near future.

The [New Report] feature allows the club secretary to create a [MS Word Mail Merge] report from the [AddressBook] table. This will contain a covering letter and an application form.

In Word, by clicking the [Mail Merge] button on the tool bar and selecting [Query Options...] we can specify that only records where

```
Sex='F', DOB <"30/09/95",
Category1="Badminton" and Category2="Advanced"
```

be printed.

The [Print Report] feature allows the secretary to specify the same criterion (using our much more friendly front-end) to print labels for the envelopes (or the envelopes themselves).

The Access Basic modules, from article 3, explained in more detail

In article 2, much was made of writing reusable code that can be utilised in other forms with little modification. Routines that are used by a form are, by their very nature, specific to that form as they need to refer to the objects in it by name. As different forms are unlikely to use the same names, such routines are generally non-portable.

However, the routines in the ListStuff module are generic. The routines in the RecordSelect module demonstrate how these can be utilised to minimise the programmer's workload.

Let's examine the RecordSelect module first. The initial part of the module is the **declarations** section (Fig (a)). The statements in this part are automatically executed when the module is loaded.

The module is loaded whenever any of the routines in it are called, in this case from the RecordSelect form. The list boxes are used to provide a list of categories that can be selected or deselected by the user. It is identical in function to the field selector in the Mailing Label wizard.

The routines that manipulate the information in these lists require two string arrays, one for the list of values available and one for the values selected. They also require two integer variables which contain the number of records stored in each array.

The function RecordSelOpen() is called when the RecordSelect form is opened (see

Option Compare Database

```
' Category 1 Lists
Dim c1av1$(20)
Dim c1sel$(20)
Dim c1nav1 As Integer
Dim c1nse1 As Integer

' Category 2 Lists
Dim c2av1$(20)
Dim c2sel$(20)
Dim c2nav1 As Integer
Dim c2nse1 As Integer
```

Fig (a) The declaration part of the RecordSelect module

Similarly, mailshots can be produced for different courses that are available. e.g. Intermediate Squash could be targeted at all records where Category1=Squash and Category2=Intermediate.

The availability of the two category fields allows much versatility in the applications use.

If two category fields are insufficient,

Fig (b)). This routine opens the Category1 table and loads the Category1Description field of each record into the array, then the same for Category2.

C1SelOne() copies the currently selected value in the Category1 available list into the Category1 selected list.

C1DeselOne() copies a value the other way.

C1SelAll() copies all the values from the available list to the selected list.

C1DeselAll() copies all the values the other way.

The C2 functions work in exactly same way for the Category2 lists.

Let's now examine the ListStuff module. Procedure MoveItem takes a source array, the number of items it contains, the target array and its number of items, and the item number of the source array element to move. It moves the requires item from source array to target, updating the counts and deleting the item from the source array. By specifying the arrays and counts in different orders, this routine can be used by both the selection and deselection routines.

Procedure MoveAll works in a similar manner, except it copies all the items from the source array to the target.

Procedure LoadRowSource takes one of the selected items arrays and its item count producing a string of the form

```
"value1";"value2";"value3"
```

This string can then be assigned to the row-source property of the associated list box, updating its contents. This is carried out by the SetC1Sources() and SetC2Sources() routines in the RecordSelect module.

Examine the code for C1SelOne() and C1DeselOne() to see exactly how these routines are used.

Function SelCancel(), which closes the form, is executed when the [Cancel] button is clicked.

Function GetReportNames\$() returns a string containing a list of all the reports in the

the articles will have provided you with enough knowledge (and reusable code modules) to add further categories, or tailor their names. e.g. Sport and Level could be used instead of Category1 and Category2.

Conclusion

That concludes our series of four articles on, and introduction to, creating applica-

Object Name	Property Name	Property Value	
Main Form	Caption	Select Records	
	Views Allowed	Single Form	
	Allow Updating	No Tables	
	Allow Filters	No	
	Auto Centre	Yes	
	Modal	Yes	
	Border Style	Dialog	
	On Open	#NAME?	
	[Include] option group	Name	IncludeOptionGroup
		Default Value	1
Button 1		Option Value 1	
-	Button 1 text	Caption Include &ALL records except categories selected	
-	Button 2	Option Value 2	
-	Button 2 text	Caption &Only include categories selected	
[Sex] option group	Name	SexOptionGroup	
	Default Value	3	
	Button 1	Option Value 1	
	Button 1 text	Caption Males	
	Button 2	Option Value 2	
	Button 2 text	Caption Females	
-	Button 3	Option Value 3	
-	Button 3 text	Caption Both	
[Born After] text box	Name	MinDOB	
-	Format	General Date	
-	Label	Caption Born After	
[Born Before] text box	Name	MaxDOB	
-	Format	General Date	
-	Label	Caption Born Before	
[Available Category 1] list box	Name	C1AvList	
-	On Double Click	=C1SelOne()	
-	Label	Caption Category 1	
[Selected Category 1] list box	Name	C1SelList	
-	On Double Click	=C1DeselOne()	
-	Label	Caption Selected	
[Available Category 2] list box	Name	C2AvList	
-	On Double Click	=C2SelOne()	
-	Label	Caption Category 2	
[Selected Category 2] list box	Name	C2SelList	
-	On Double Click	=C2DeselOne()	
-	Label	Caption Selected	
[Category 1] [>] button	Caption	>	
-	On Click	=C1SelOne()	
[Category 1] [>>] button	Caption	>>	
-	On Click	=C1SelAll()	
[Category 1] [<] button	Caption	<	
-	On Click	=C1DeselOne()	
[Category 1] [<<] button	Caption	<<	
-	On Click	=C1DeselAll()	
[Category 2] [>] button	Caption	>	
-	On Click	=C2SelOne()	
[Category 2] [>>] button	Caption	>>	
-	On Click	=C2SelAll()	
[Category 2] [<] button	Caption	<	
-	On Click	=C2DeselOne()	
[Category 2] [<<] button	Caption	<<	
-	On Click	=C2DeselAll()	
[Report List] combo box	Name	ReportList	
-	Row Source type	Value List	
-	On Enter	#NAME?	
-	Label	Caption Please select name of required report	
[OK] button	Name	OKButton	
-	Caption	OK	
-	On Click	#NAME?	
[Cancel] button	Name	CancelButton	
-	Caption	Cancel	
-	On Click	#NAME?	

Fig (b)

database. The string is similar to that used to set the Category1 and Category2 rowsource properties. This is used by function LoadReportNames() which is run whenever the [Select Report] combo box is selected. This allows the form to present you with a list of *all* the reports currently in the database, allowing you to add your own. You are not limited to a predefined set supplied by the programmer.

The most important routine is the DoReport() function which is executed when the [OK] button is selected. It checks to see if a report name has been selected in the combo box. If one has, it then extracts the information from the remainder of the form, building up a string such as

```
"(Category1 = Null OR Category1 NOT
IN ('val1', 'val2', 'val3'))
AND (Sex = 'M')"
```

It closes the form, then opens the selected report in print preview mode, using the AddressBook table and the above string as a filter to extract the specified records. The example string was deliberately chosen to highlight a "feature" of Access which requires a little explanation.

Consider the filter string

```
"Category1 NOT IN ('val1', 'val2')"
```

You might expect that this would extract all the records in the table except those whose Category1 values were 'val1' or 'val2'. No so! In fact, Access extracts the records who *have* a value in the Category1 field which is not 'val1' or 'val2'. It completely ignores any records who have an empty Category1 field. The additional

```
"Category1 = Null OR"
```

clause at the beginning cures this, since any Null value cannot match those specified in the list.

You now have a database with forms that allows you to edit its tables. You can select a report and specify the range of records to use with it.

PCW Contact

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tions in Microsoft Access. It has hopefully demonstrated that this task is not as complicated as it may initially seem. With a little practice, sensible design of forms

and by writing reusable code, the task becomes even easier as many features of one application can be easily ported to another.

PCW



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On the

CUTTING EDGE

PCW

Welcome to Cutting Edge, the section in *Personal Computer World* that combines our regular reviews of games, books and CD-ROMs with features bringing you the latest news about computing and consumer technologies and online services.

We now have the most comprehensive coverage of these topics available in a general computing magazine. Stay with us and we'll take the pain out of keeping on the cutting edge.



Screenplay

PCW Online

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- 2 4 2 **net.answers** — Stephen Cobb gives an example of how children can use the Internet for research.
- 2 4 6 **net.surf** — At last, British stock quotes come to the web, plus the FT adds some pink web pages. There's also free access to the Encyclopedia Britannica, and the Edinburgh Festival online.
- 2 4 8 **net.news** — Stephen Cobb brings you a special report on American censorship of the Internet, and finds out more about new versions of the popular NetScape web browser and Internet Phone.
- 2 5 0 **net.comms** — Stephen Cobb discusses voice fax/modems and the security risks in allowing remote access to offices.
- 2 5 7 **net.newbies** — A shortened and simplified explanation of how to get online.

PCW Futures

- 2 5 9 **Innovations** — Tim Frost looks at HD-CD technology.
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- 2 6 5 **Retro Computing** — Simon Rockman looks back at the Atari 400 and 800, the dream home machines of their day.

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- 2 6 8 **CD-ROMs** — The Louvre vs the Barnes Collection — two art galleries on disc compared, plus 3D Atlas and the Dorling Kindersley Encyclopedia of Nature.

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- 2 7 9 **Screenplay** — Rise of the Triad (yet another Doom-alike), and Full Throttle.
- 2 8 2 **Leisure Lines** — Puzzles with JJ Clessa.

CD-ROMs



Retro Computing

Personal Computer



Pectoral fin

Pelvic fin

Anal fin

Tail fin

Love story



Splashing on the virtual Brut, Michael Hewitt cruises the Internet in search of safe Cybersex and investigates whether love on the line could ever take over from such places as singles bars, supermarkets, Blind Date, or other more usual venues at which to seek your lifetime partner.

These days, Internet publications, as well as some of the downmarket national dailies, churn out stories with near bran-assisted regularity, about couples from opposite ends of the earth — perhaps he

in Scunthorpe and she in Halifax, Nova Scotia — who've met, fallen in love, and subsequently married thanks to that hi-tech matchmaker, the "Information Superhighway".

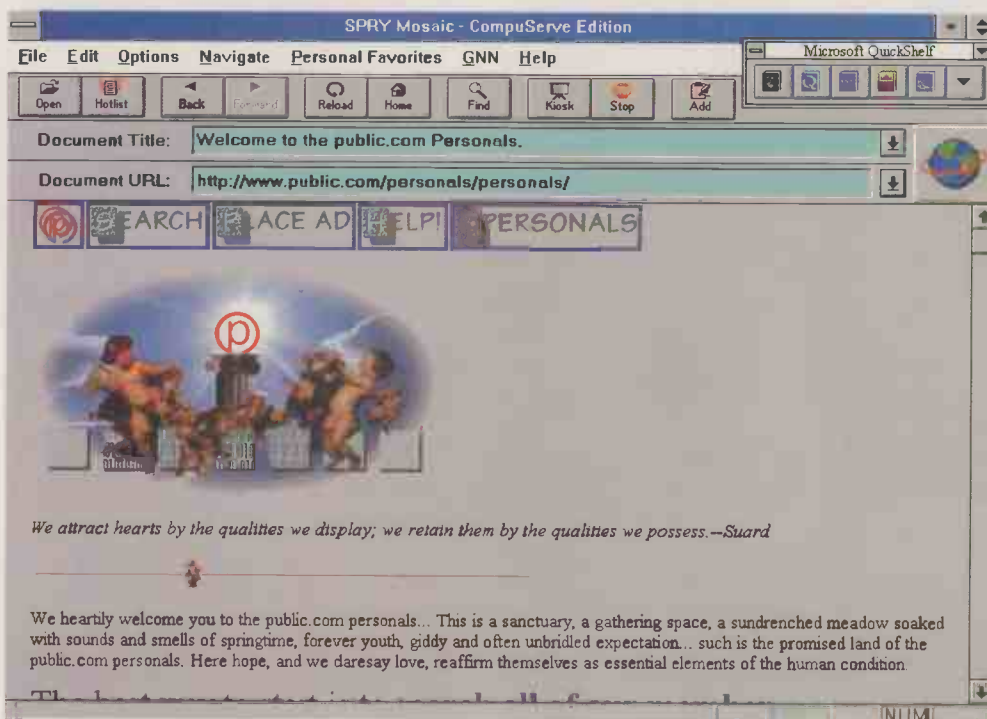
The stories are frequently

peppered with cuddly, Mills & Boon-type quotes: "I felt there was a chemistry between us from his very first posting," and "I was instantly smitten — her personality came bubbling through the monitor." The pub-

lication shows a picture of the happy couple, making it perfectly clear that neither could possibly have found a soulmate anywhere *but* on the Internet.

But all this is relatively unimportant in comparison with the impression that is created: that Cyberspace is a hotbed of seething passions and all you have to do is log on to get laid. This is, of course, a load of rubbish; by its very nature the Internet is intensely romance-hostile. How could it be otherwise, given the high proportion of nerds and out-and-out weirdos using it, and the imbalance of the sexes using the Internet (there's a male to female ratio of 10:1 in some areas)?

In spite of this, people still trawl the bandwidth, seriously expecting to get lucky. So is there a correct strategy? First of all, you've got to ask yourself what type of relationship



Select Connections' public.com personal ads have over 17,000 people on their books

you're after as this determines where to look. For example, if you're prepared to forego the love and romance aspects in favour of something shallow and meaningless, then your tastes are more likely to be catered for by adult bulletin boards and conferencing systems, such as ThrobNet, EROSLink, and Orgasmatron.

Not that there's much chance of hot, torrid passion, mind you. Probably the best you can hope for here is that someone like Mistress Marlene will administer a virtual spanking if you've been naughty. Or, for the more interactive types, Teen Bunny will remove items of her clothing to order (or at least claims to), fluffy tail and ears included.

For those who are into this sort of thing (or who'll never have the chance to aspire to anything else) so-called "cybersex" apparently comes as a safe, convenient substitute for the real thing. But how do you physically "do it" over a computer monitor?

Being an innocent in such matters, I enquired of someone in the know, who told me: "I received an email letter from a lady who suggested we perform cybersex. I agreed and next day received an email message that she was removing her skirt. I wasn't sure what to make of this, so I let it go. But the next day I got another email, in which she pronounced herself 'sans blouse'. At this point I got the drift and replied, saying that I was in the process of removing my shirt. Over the next four days, we conducted the slowest undress in history, which was stalled when she went off to Brussels for two weeks, leaving me in my socks. When she returned she was totally naked.

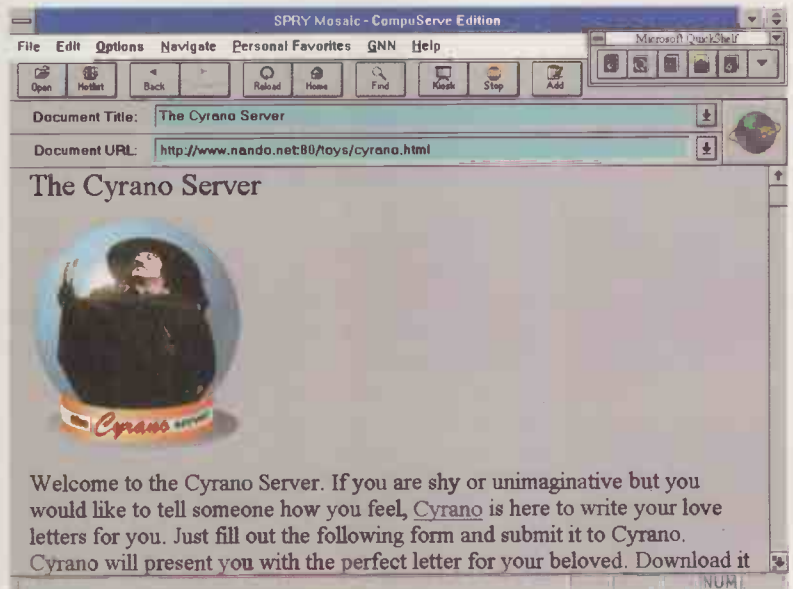
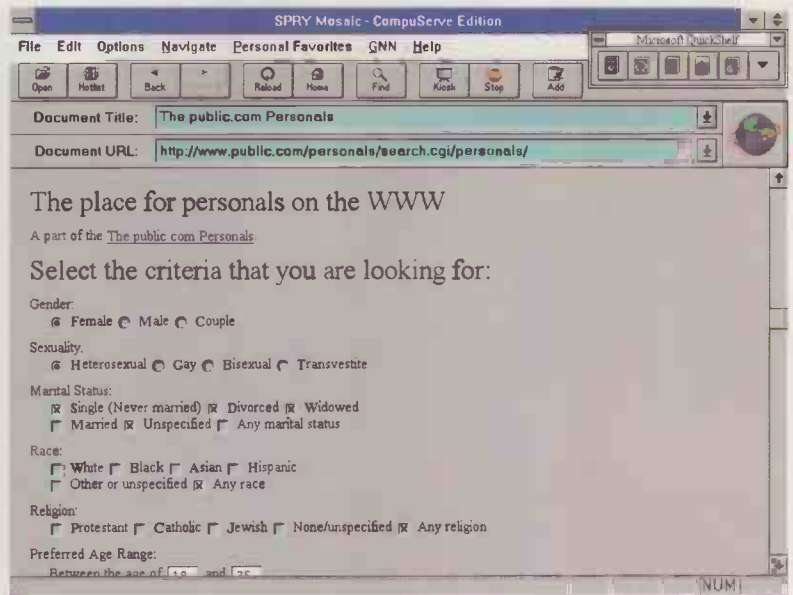
"Next, she suggested that it might be safer if I wore a condom. So I popped down to the chemist to procure a packet. A couple of hours later she announced that she was...

[REMOVED FOR REASONS OF PROPRIETY AND GOOD TASTE]. Not to be outdone, I replied that I was similarly engaged in... [REMOVED FOR REASONS OF PROPRIETY AND GOOD TASTE].

So, for the next couple of weeks, we carried on in this vein, our messages becoming shorter and shorter. After a fortnight, she finally reached a climax and the CIX mail system went down."

A particular disadvantage with cybersex — quite apart from its not being the genuine article — is that the ASCII persona of your innamorata may not be all that it seems. In many instances, "blonde and lovely Tracy, 36-24-36" might in reality be "bald and gross Barry, 48-56-47". Virtual cross-dressing of this ilk is particularly prevalent on some American systems where it's reckoned that more than 60 percent of the "female" IDs are actually male. Why is this the case? And moreover, what do they get out of it?

"It's not that I have any deep-down desire to be a woman," says one such transgressor, somewhat unconvincingly. "I'm just intrigued by the different ways in which men react to me when I assume a woman's ID as opposed to when I log on under my own name. I'm not talking about being hassled, though of course this does happen. I mean that people are more patient with me, and more revealing when I ask them questions."



Top Select your search criteria and a few seconds later, a range of potential partners appears

Bottom Too shy to do your own wooing? Over to Cyrano...

Anyway, let's assume you want to set your heights a little higher than simply "talking dirty". You want to meet a real-life, flesh and blood man or woman and ultimately walk off into the sunset together hand in hand.

Getting personal

Here's where it starts to get difficult. There are, of course, "lonely hearts" conferences and forums on services like CIX and CompuServe, as well as the alt.personals and alt.romance newsgroups on the Internet. These operate in

exactly the same way as the personal ads in newspapers. In other words, you exaggerate your physical attributes, claim to be sensitive and caring with a good sense of humour, and hope that your respondents are a bit more honest. But the hit rate is apparently very low.

Somewhat more successful are the Internet offshoots of already established singles' publications. Unfortunately, the vast majority cater solely to the US market. A company called Select Connections, for instance, runs the public.com personal ads, found at

www.public.com/personals.

The home page greets you with the following message: "This is a sanctuary, a gathering space, a sun-drenched meadow soaked with sounds and smells of springtime, forever youth, giddy, and often unbridled expectations..." "...such is the promised land of the public.com personals. Here hope, and we daresay love reaffirm themselves as essential elements of the human condition."

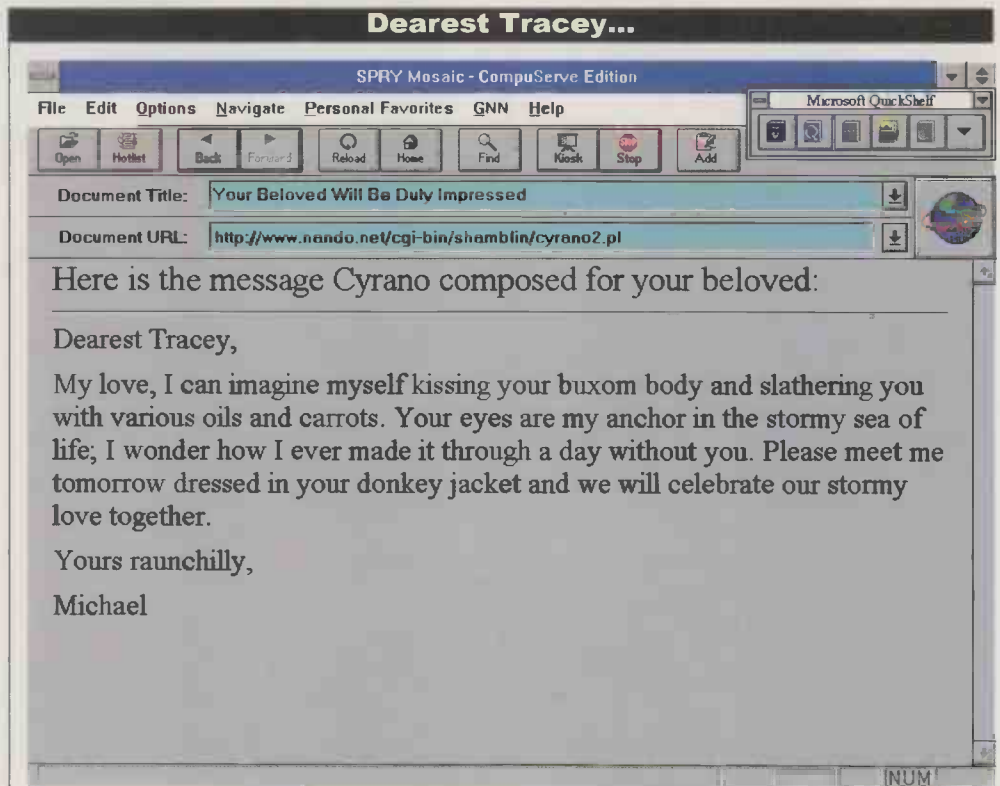
Dream lover

Once you've wiped the vomit from your monitor, you can specify the type of dream partner required. This is done by clicking on a range of search criteria, including sex, race, age, marital status, and geographical location. Thereupon the engine chunters away for a few seconds, scouring the list of over 17,000 hopefuls on Select Connections' books.

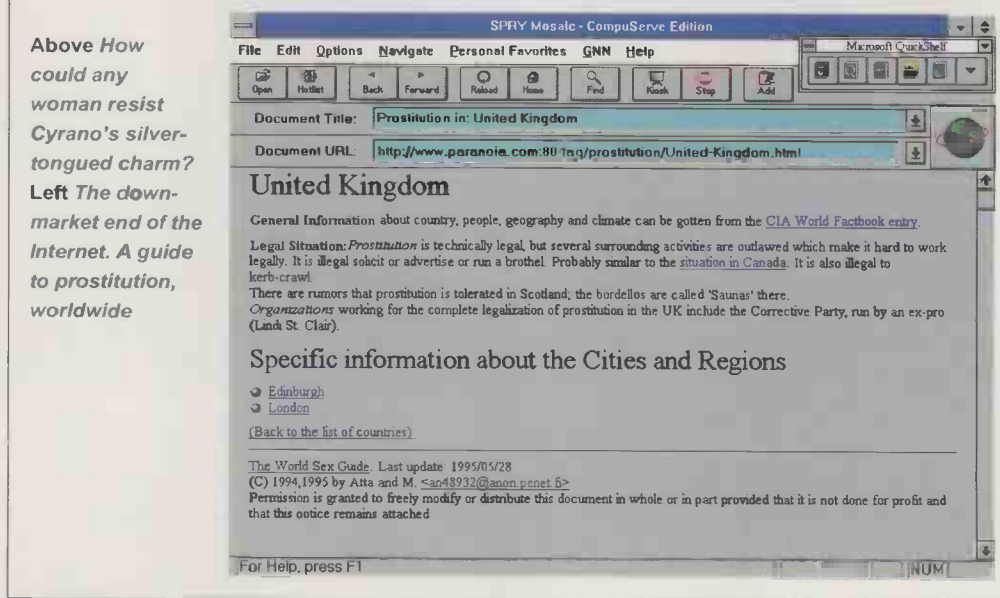
At the end of the search, it presents you with short biographies of 25 potentials ("Hi, I'm Cheryl! I'm into cinema, books, and long walks in the country. I'm looking for a non-smoking man with a good sense of humour. Looks are unimportant, but he must have that special 'something'").

Many are accompanied by low-resolution JPEG images, giving you a rough idea of what you'd be letting yourself in for. If, at this point, your enthusiasm hasn't waned, you can phone a surcharged number (US only) to hear what they sound like. And if, after that, you're still not put off, you can mail a box number and try to arrange a date.

This isn't, in fact, a dedicated Internet service. Select Connections have simply gone through their printed magazines and uploaded the details to an online database. The advantage of the information being online is that you can search through it quickly and easily. Also, if you want to place an ad yourself over the Internet, you can do so and it will be pub-



Above How could any woman resist Cyrano's silver-tongued charm? Left The down-market end of the Internet. A guide to prostitution, worldwide



lished both online and in the magazine. Payment is by credit card.

Okay, suppose her interest is aroused and you've arranged a date but you're the sort of person who's so shy and tongue-tied that, most likely, you'll be stammering into your dinner napkin all evening. What can you do to appear slightly more rugged? Here is where the Cyrano server (www.nando.net:80/toys/cyrano.html) comes in: "If you are

shy or unimaginative, but would like to tell someone how you feel, Cyrano is here to write your love letters for you." Which he does, with — it should be said — varying degrees of success.

A prompt screen comes up into which you enter details, including the name of the object of your affection, any favourite part of her body, preferred item of clothing, her favourite food, and so on. You hit "Send", a computer whirrs

away in the background and, a few seconds later, produces a love letter incorporating all the items in your list.

If she's online, you can then email it to her. However, if it comes out looking anything like mine (*above, top*), I wouldn't advise it. Incidentally, if you're already in a relationship that's going cool, Cyrano will compose a Dear John letter on your behalf, telling your partner, ever so politely, to get out of your life

and never to offend you with their objectionable presence ever again.

Talking of things objectionable; just in passing I came across something called "The World Sex Guide — A Prostitution FAQ" (www.paranoia.com/80). Its tone is set by one of the opening paragraphs of one of its lead articles: "Remember that the two greatest gifts God has given you are an American passport and good health."

Yuk. If one were to follow its advice, the good health bit probably couldn't be guaranteed for much longer. This is a country-by-country guide to prostitution, detailing prices, availability, bulk discount opportunities, and so forth. Interestingly, a couple of travel agents have got in on the act, too. In the course of perusing the pages, you can click on a hypertext link which allows you to book plane tickets and make hotel reservations online.

Equally distasteful — to my mind, anyway — is the online version of Asian Brides magazine (www.aloha.com/80).

Young women from some of the poorer Third World countries are advertised for marriage in what is essentially a mail order catalogue.

The service is obviously aimed at European and American men who are looking for someone exotic and, no doubt, submissive. The common theme throughout Asian Brides is that most of them would like to marry an American and live in the US.

The real thing

Anyway, so much for that, and for the online singles scene which, as I said earlier, isn't exactly swinging. Yet, for all this, people do meet their soulmates on the Internet. Usually, though — at least, in all the cases I've encountered — it's by pure chance. A man and woman will suddenly "click" during the course of everyday

Internetting. Maybe they've been emailing one another about some perfectly mundane subject. Or it could be that they're participating in the same conference and have simply read one another's messages. Whatever the situation, Cupid's arrow comes in through COM1 and out through the VGA monitor.

How come? Given the arid, soulless nature of cyberspace, how can a person's true qualities come across in nothing but ASCII?

"The sort of nuances that can be conveyed in face to face

Roberts while she sees him as Richard Gere, yet the reality couldn't be further from the truth?

"We weren't particularly worried by the prospect of our first meeting," admits Frank. "From our honest and open discussions online, we pretty well conceived accurate images of what we each looked like. Not that this was ever going to be a factor, anyway. The only thing that worried us was whether the 'chemistry' would be there. Obviously it was, because we've stayed married for the past five years."

talk about: 'How are you accessing this system?'; 'What comms package are you using?' and so on. It's not having something to talk about that prevents most relationships gelling, or even getting started in the first place.

"But however you meet — face-to-face or modem-to-modem — what determines the outcome is always the same: do you still like them after you've seen them naked? I've seen my husband naked, and we're still married. It says it all, really," Natalie concludes.

But others aren't so lucky:

"Online she described herself as being witty and attractive," complains one disgruntled ex-suitor. "When we met in the restaurant, she turned out to be tongue-tied and a bit of a frump. We ran out of things to say after five minutes."

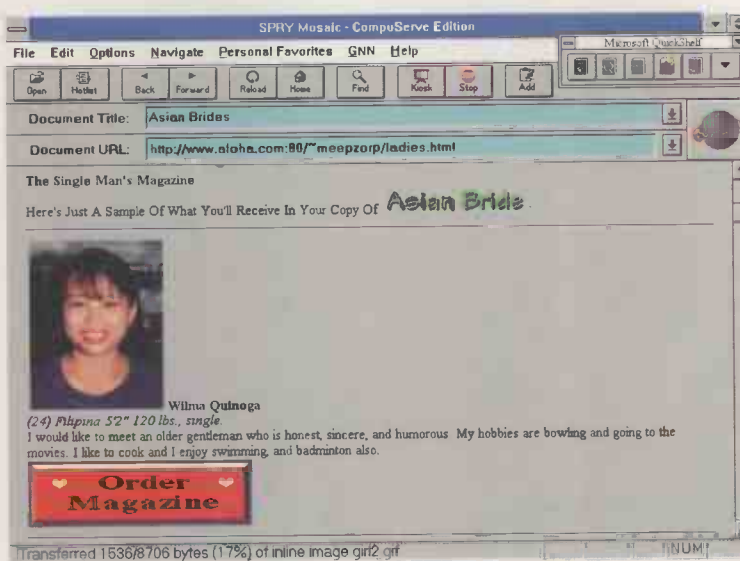
An equally disgruntled woman reports a similar experience: "His online personality was totally different from the reality. It could have been a different man. He was ineffectual and, frankly, very, very, boring. The fact that we met in real life ruined

our online relationship."

Where the match has worked out though, some conferencing systems have hosted online weddings. This has happened on more than one occasion on CompuServe, for example. Equally, where it has worked but then eventually screwed up, a few systems have played host to online divorces, too, with all the associated acrimony.

Anyway, the reality of the situation is that establishing a successful relationship online and then transferring it to the real world is only about as common as a successful pairing on Blind Date. For the moment, therefore, a real-life singles bar would seem a far better bet than the virtual one. **PCW**

Please note The screenshots in this article could not be edited at PCW.



conversation, or simply by voice inflexion over the telephone, simply can't be employed online," agrees Frank (I promised him anonymity), who met his wife in an online chat session.

"But because you're not influenced by such aesthetic considerations, you're left to explore each other's opinions and philosophical feelings. For two people to truly get along online, they must be both emotionally and intellectually compatible. That, surely, is the basis of any successful relationship, online or off."

But surely; it's these very aesthetic considerations that ultimately come into play if and when the couple meet up in real life? The crunch has to come some time. Suppose, online, he thinks she's Julia

Asian brides by mail order.
The K-Mart Catalogue
approach to love and
romance

And yet another success story: "It was surprising to me that one could actually get to know someone else so well without ever having seen them naked," says Natalie (not her real name).

Natalie, a US expatriate, first met her husband while playing an online Multi-User Dungeon game. Following a whirlwind romance, she came to the UK and the two of them were married last November.

"I do think it might be easier to find a friend, a soulmate, or even a romance online," she says. "This is because there is immediately common ground between you — something to

net.answers

Doing your homework?

The following question is typical of several we have received lately. "My wife and I are wondering if there is any educational value to going online, and we don't mean education-style games. We have two daughters (aged 8 and 13) and would be prepared to install a modem in our home PC if there were some genuine benefits. Also, we are concerned about the risks, such as viruses and access to adult material."

To address the risk factor first, see the "Avoiding viruses" answer, which should tell you most of what you need to know about this aspect of comms.

While you may be somewhat intimidated by comms

technology, as well as by how fast your kids adapt to it, the fact is that in terms of suitability of material, going online has a lot in common with watching television and videos. In other words, parents must be aware of, and must supervise, what their kids get into when they are online. Speaking as a parent, I have little sympathy with those who say "He goes in his bedroom and shuts his door and spends hours on his computer and I have no idea what he's up to." As a parent, it is your responsibility to find out.

Hopefully, you have raised your daughters in such a way that they will exercise some degree of self-censorship. For

example, you would expect them, when faced with a web page link that promises "More raw sex than de Sade could handle", not to click the button. Similarly, you would expect them not to join a newsgroup titled `alt.sex.bestiality` and not to respond to email that was inappropriate.

As to the education value of going online, it is quite genuine, and definitely not a game. My daughter was assigned a homework project recently on world population and I decided this would be a good chance to show her how online research works. The first thing we did was load WinCIM, the software for accessing CompuServe. She pressed the Find button, typed "population" in the dialogue box and clicked OK. The software logged us onto CompuServe and brought up a list of three forums that related to population. The Earth Forum looked promising and we used the Library Search button there to look for relevant files. We found several, including a good bibliography. We downloaded these files to her PC, ready to print out when we came offline. Before logging off CompuServe we accessed the Hutchinson Encyclopedia and captured to disk the entry on population explosion.

Next we logged on to the Internet and loaded NetScape to check for relevant Web pages. Using Yahoo to search for "population" brought up a long list of URLs (Web page addresses) and we saved the results to disk as an html file (the format used for Web pages). Many of the references were academic, including universities in Britain, Australia, Sweden and the US. We found several sites which allowed us to download informative documents, including a lot of up-to-date population statistics. However, since the emphasis of the project was overpopulation, we thought some statistics on farming and land use would also be helpful, so we visited the CIA World Factbook, the latest edi-

tion of which is online at <http://www.odci.gov/94fact/fb94toc/fb94toc.html>.

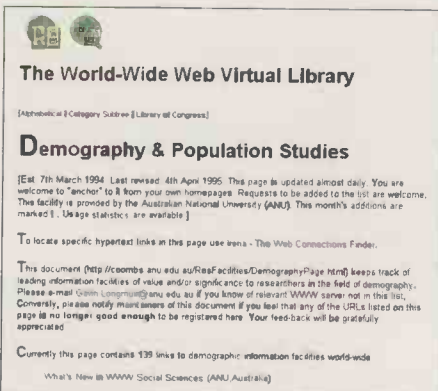
After capturing several pages of CIA information to disk, we used the File Open button in NetScape to load the results of our Yahoo search from disk and check out a couple more references. By far the most exciting were the POP-Clocks. There are several of these which give an odometer-style display of the total world population (try <http://sunsite.unc.edu/lunarbin/world-pop>). One of them updates as you view the page, and seeing a number somewhere in excess of 5.7 billion increment by 45 in less than ten seconds really made an impression on my daughter. We printed out a screenshot for her report and calculated the increase in population between taking the shot and delivering the report in class.

During this exercise my daughter not only learned about the subject, she also discovered that there is an enormous wealth of information out there. She realised that many people all over the world are willing to share information.

Down to business

In our ongoing response to your questions about the business potential of the Internet, we thought the results of a recent study of the World Wide Web by California-based research institute, SRI International, might be helpful. SRI found that 50 percent of Web users can be characterised as highly educated, early adoptors of technology, eclectic, earning a median income of \$74,000 per year. Only one in ten people in the "real world" population fall into this category.

The survey found the Web community earned a median income of \$40,000 annually and 28 percent of the community earned less than \$20,000. The survey also found the male-to-female ratio to be 70:30, compared to a 49:51 ratio in real life. While lower-



The World-Wide Web Virtual Library

[Alphabetical] [Category Subject] [Library of Congress]

Demography & Population Studies

[Est. 7th March 1994. Last revised: 4th April 1995. This page is updated almost daily. You are welcome to "anchor" to it from your own homepage. Requests to be added to the list are welcome. The facility is provided by the Australian National University (ANU). This month's additions are marked. Usage statistics are available.]

To locate specific hypertext links in this page use menus - The Web Connections Finder.


This document (<http://coombs.anu.edu.au/RefFacilities/DemographyPage.html>) keeps track of leading information facilities of value and/or significance to researchers in the field of demography. Please e-mail coombs@anu.edu.au if you know of relevant WWW servers not in this list. Conversely, please notify maintainers of this document if you feel that any of the URLs listed on this page is no longer good enough to be registered here. Your feedback will be gratefully appreciated.

Currently this page contains 139 links to demographic information facilities worldwide.

What's New in WWW Social Sciences (ANU Australia)

Left Just one of the databases available of demographic information your children can learn from

Below Part of Britain's entry on the World Wide Web version of the CIA World Fact Book



United Kingdom

Geography

Location: Western Europe, bordering on the North Atlantic Ocean and the North Sea, between Ireland and France

Map references: Europe, Standard Time Zones of the World

Area:
total area 244,820 sq km
land area 241,590 sq km
comparative area slightly smaller than Oregon

income households (under \$20,000) are represented, these households are still highly educated. Almost 95 percent of those surveyed have some level of college education.

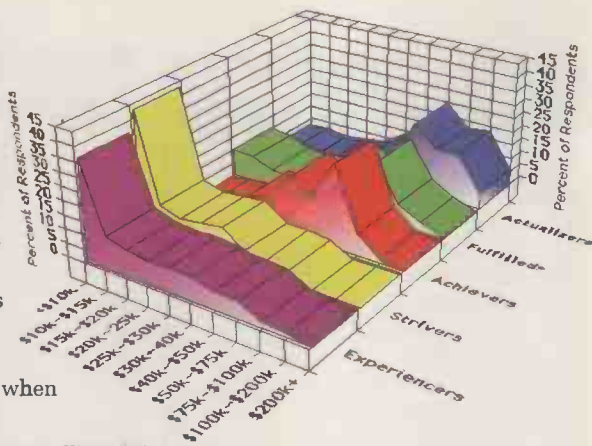
While these statistics may not be too surprising, SRI came up with some more remarkable findings when it compared the survey's picture of Web users with a set of six consumer "profiles". The results suggested that well educated, affluent, and technologically sophisticated people were not using the Web as much as their profiles might have lead one to expect. SRI says some groups of consumers expressed a lack of time and patience for what they see as the Web's triviality. Many also view computer-based media as overly artificial.

Other complaints point to a lack of control of information on the Internet, making it difficult to determine its value. This suggests a continuing role for commercial online services, such as CompuServe, and even the larger bulletin boards, which have the ability to filter information and provide focus. A term often used about some areas of the Internet is "low signal to noise ratio" meaning that very little of what you see is really useful. For more on the survey and SRI see <http://future.sri.com>.

Avoiding viruses

In previous net.answers I have talked about catching a virus from the Internet and warned that any program files you download with ftp should be checked with anti-virus scanning software before being executed. We also said that the only way to catch a virus is to execute a program. However, reader Derek Clifford comments: "True, but not a very helpful statement." He goes on to discuss ways in which documents transferred by email or the World Wide Web could cause damage. I will return to this discussion in a moment, but first, I need to stress that we made this statement to calm fears that simply receiving email from the Internet could somehow transmit a virus.

Consider the message I received a couple of months ago via my Internet account. It warned of a "Good Times" virus allegedly being circulated in email on bulletin boards and several commercial services. The warning stated that simply reading the message in a mail reader



Source: SRI International

A chart of Internet demographics from SRI

would cause it to activate, reaping various forms of havoc. Luckily, this message sounded somewhat familiar and I logged on to the Information Security Forum on CompuServe (GO NCSA) to search for files about "Good Times".

Sure enough, there was a report describing how this rumour first appeared in December last year. Since then, nobody has reported any credible encounter with such a virus, but the warnings keep appearing. The report from the Forum of Incident Response and Security Teams (FIRST) notes "the possibility that someone is using this as a precursor to a real attack. That is, someone is repeatedly circulating the "Good Times" rumour to condition people to believing there is no danger, and will then circulate some damaging code under that name."

Trojan Horses

The report provided the following, sensible advice: "If you ever get any mail labelled 'Good Times' that's in some way executable (i.e. a program or command file) do not run it!" If you are using a company computer you should report it to the help desk/IS manager. You could also email one of us here at PCW and we will investigate. That is what happened when someone distributed a file described as PKZIP 3.0, an EXEcutable file that was not a self-extracting archive, but a Trojan Horse (Trojan Horse being the actual term for a destructive program which masquerades as something benign).

What's disturbing is that when I received the message about the bogus PKZIP 3.0, I didn't know if it was a rumour or not and was forced to act. After calling the vice president of PKWARE, makers of PKZIP, and confirming that the current version is still 2.04g and that

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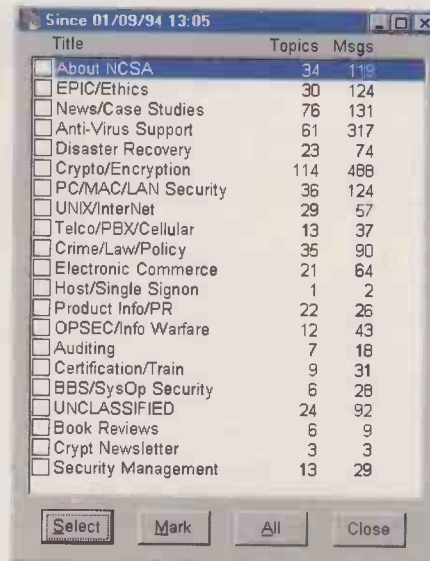
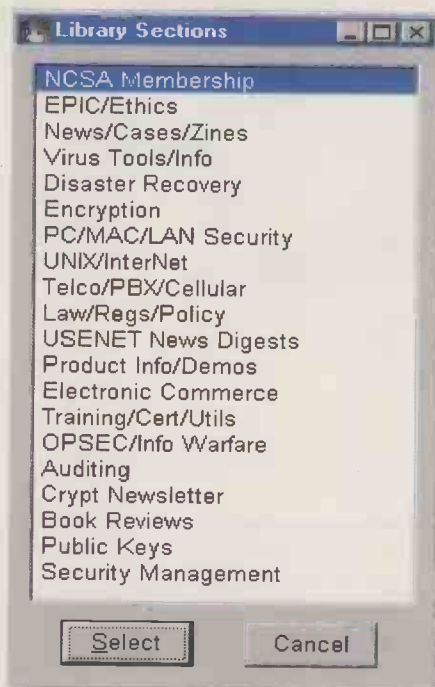
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The file library and conferencing facilities provided by the NCSA on CompuServe

rumours of a Trojan were true, I arranged for PKWARE to send a captured copy of the Trojan to Richard Ford, former editor of Virus Bulletin, now head of research at the NCSA, for analysis. But not everyone is in a position to take this type of action and you, or your company, need to establish a procedure for dealing with items like this.

To return to the question of potentially harmful email we first have to observe that, according to FIRST: "When email arrives at a system and is read by the user, it is seldom 'executed' by anything that could damage the system, let alone reproduce the code itself." In other words, messages themselves cannot be viruses or spread viruses. However, there are a number of scenarios in which mail could be dangerous.

If you're using an MSDOS system with an ANSLSYS driver, a control code sequence embedded in email could execute some unwanted actions when the mail was read. However, this would only work if the mail was displayed in text mode (not in a window or specialised application). Even then it is unlikely, because the necessary control characters would have a hard time passing through mail gateways and forwarders without modification.

More plausible is the Web scenario that Derek Clifford sketches. He writes: "Modern applications have macros and programming languages, so doing something as apparently innocent as viewing a document can infect or damage your PC." We concur with the word "damage", as in

executing commands such as FORMAT and DELTREE, which were used by the PKZIP Trojan. But we cannot accept "infect" which implies spreading virus code, which would have to come from somewhere other than the message.

So how would the damage be done? Mr Clifford supposes that you have set up NetScape to use Word as the viewer for DOC files. Then you browse a URL that points to a Word document: "Click on the URL and the file is downloaded, Word is launched and, if you are very unlucky, an autoexec macro is executed." For example, he points out that a Word file could contain the embedded command ECHO Y > FORMAT C: and then call a Windows DLL to execute it. This is possible, and security experts have been aware of this for some time. It does depend on a number of factors, such as using Word as your DOC viewer instead of a safer option such as Write. It also depends on finding the destructive commands on your machine. Some people move DELTREE and FORMAT out of the DOS directory, or rename them, as a defence against accidents as well as malicious programs

Mr Clifford makes a valuable point. Today's actual documents don't contain destructive or viral code, but it is true that they could be used to launch destructive programs that already reside on systems. We can defend against this by making such commands hard to find. But as documents evolve into something closer to "agents", we will need to work hard to ensure that such agents remain friendly.

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Newspapers online

Two more national newspapers from opposite sides of the political spectrum have turned up on the World Wide Web. And given the generally upmarket demographics of Internet users, they are likely to find the Financial Times somewhat more useful than Socialist Worker.

On the FT's (pink) web pages you will find the top domestic, European, American and Asian stories of the day plus a summary of all the day's news, stock market indices, and a recent technology article.

Socialist Worker's pages come to you all the way from the political science department of the Australian National University. They can be downloaded from the Contemporary Marxist Material link on the Marxism page, which is very good if you like that sort of thing. All available material from each issue is on each page in a single 100Kb lump, which makes it time-consuming to download.

Financial Times:

<http://www.ft.com/>

Australian Marxism Page:

<http://www.anu.edu.au/polsci/marx/>

Stock Exchange quotes

London Stock Exchange quotes have finally come to the Internet and CompuServe. For several years it has been possible to get stock quotes from American exchanges (more or less) free of charge, as long as you're prepared to get them 15 minutes out of date. ESI, an online trading company mentioned in May's Newsprint, and CompuServe, are both offering LSE stock quotes on the World Wide Web and from within CompuServe. Due to tighter controls on its information here in the UK, both companies only offer the price of the stocks you

select at the close of business on the previous day. ESI also offers prices of the top 350 stocks and recent or popular issues, updated five times a day, and the FTSE 100 index, updated once a minute.

CompuServe's UK stock quotes are part of a more comprehensive Basic Global Quotes service. By typing "GO QUOTES" you can look at quotes from Amsterdam, France and Germany as well as London, and grab up to 20 at a time for export as a file into personal finance software. The French quotes are realtime and the Amsterdam quotes are delayed by only 15 minutes.

The London International Financial Futures and Options Exchange has just set up a Web page at <http://www.liffe.com/>, but for the moment it is just promotional and educational; don't expect to find any prices, live or otherwise.

The FT lists indices of

major world exchanges updated half-hourly on its web pages (see first story).

ESI: <http://www.esi.co.uk>

01223 566926

CompuServe 0800 289378

email: 70006.101@csi.

compuserve.com

c|net

The first major computer magazine available only on the Internet has arrived. Calling itself c|net (presumably after its founder, Christopher Barr) it is linked to an American technology TV series of the same name and contains all the features of a mainstream American magazine — news, features, group tests and columnists — and adds to the mix a number of unique features that only the Internet can provide. It has an unusual, Web-based conferencing system built in for readers to converse with the writers (and each other), a fairly sophisticated search engine to help you find the software you want on the Net, a "reference desk" full of frequently asked questions about computers and the Internet, and some "support forums" for popular hardware and software products

(although these don't appear to have any company representatives checking them).

C|net comes across as a more conventional version of HotWired, which was one of the first really ambitious web-based magazines. HotWired is closely linked with Wired, the magazine for the techno-hip (and an inspiration for Cutting Edge). Though HotWired was around first, it is closer to a lifestyle magazine than a traditional computer magazine, with features about travel written by the Rough Guide organization, and fiction and photography as well as the obligatory Net and computer stuff. There should be room on your hotlist for both.

Both "webazines" can be a bit graphically intense and US-centered, but they're still well worth a look.

c|net: <http://www.cnet.com>

Hotwired:

<http://www.hotwired.com>

Women's Wire

CompuServe has announced its intention to house Women's Wire, an online resource for women which has been available as an independent online service in the US since 1992. Currently, about 17 percent of CompuServe's members are women, a figure which it claims has grown significantly.

The service will be available in late summer and is designed to help women to "network conveniently and easily with professional associations, find mentors, chat with role models, learn about job openings, as well as stay current on the latest tips for balancing work and family or staying healthy". Much of the information available is likely to have a strong North American bias.

Individual

In July's net.surf we told you about Individual's NewsPage, a huge collection of Web pages (more than 25,000 in all) updated daily with news from more than 500 sources, including Reuters, Business Wire and

The screenshot shows the c|net website interface. At the top is the c|net logo and a "join now" button. Below that is a "contents" section with a list of categories: daily news, features, columns, hot list, hands on, television, and forum. Each category has a brief description of its content. At the bottom, there is a tagline: "c|net is a complete web-based computer magazine".

contents

- daily news**
Visa, MasterCard to standardize online security...Group proposes standard for digital commerce.
- features**
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How to get a killer deal on your next PC.
And c|net reviews the 100 best CD-ROMS!
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Hotwired, an ambitious mix of diverse articles

There are few pictures, but it does include hundreds of articles which aren't yet in the paper encyclopedia, and hundreds of links to Internet resources.

It is already available as a commercial service to educational institutions, but prices for individuals or corporate users haven't yet been agreed.

Pathfinder, Time Warner's Web site, is at <http://www.pathfinder.com>



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This page was developed and is maintained by Rich Mann. Last revised 30 May 1996. Please send suggestions for improvements to RAM@newt.znu.edu.au



This Australian site is home to Socialist Worker, plus many other Marxist texts

Lloyd's List. Since its free trial period ended, you can read only headlines and brief summaries of each story for free. To get full text, you will usually have to pay.

The good news is that Individual is planning a British version of its site with British advertising at <http://www.news-page.co.uk/>. It is due to go live by 1st September. When it does, it will be faster, since you will not have to use scarce trans-Atlantic bandwidth. It will feature a free three-month trial period.

Britannica

Time Warner is one of the largest publishers in the world, and has one of the Internet's most extensive Web sites, but since most of its content has been American (Time magazine, Sports Illustrated, People magazine and so on) I didn't consider it important to mention. Now it has broadened its global appeal by adding access to the Encyclopedia Britannica and to a number of CMP computer publications, including Net Guide.

Anyone can register for a free trial of Britannica Online, which is expected to run to the end of September. It gives subscribers access to the whole text content of the encyclopedia in a hypertext format.

Grolier to link to CompuServe

The next version of Grolier's Multimedia Encyclopedia, due to ship in mid-September, will contain built-in links to CompuServe. Grolier's is already available online and is updated quarterly, so it should be more up to date than the CD version. What it can't easily offer is the rich graphical interface and pictures of a CD. But the thousands of links in the disc will not just be to the online Grolier; they will also be to related forums and databases on CompuServe.

Edinburgh Fringe

Last year, the Edinburgh Fringe festival was home to one of the first (temporary) cybercafés in the UK, and a fairly primitive set of Web pages was available. This year, the pages are much more elaborate. They are sponsored by Web13, an Edinburgh-based cybercafé (on 13 Bread Street) and include the Fringe's programme online in hypertext format, a way to submit unofficial reviews and background about the festival. Unfortunately, it's still not possible to order tickets online. <http://www.presence.co.uk/fringe/>

mag.net

VNU, one of the leading publishers of computer and business magazines (including this one), has launched mag.net, a web site with links to home pages for all the magazines in the group. It contains selected news and features from every title, and by the time you read this, you should be able to search these, download any software that was included on magazine cover disks, and possibly join forums with editorial staff and your fellow readers.

<http://www.vnu.co.uk/vnu>

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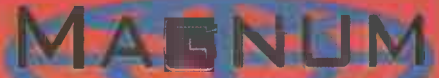


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American net censorship

Do you swear? Do you say rude things? Do you sometimes say them on the phone or write them in messages you post to bulletin boards? Do you like to download pictures of naked people? Well, as St. Paul used to say, you'd better stop it. Right now! Because if you continue, and if the United States Senate has its way, you could, in theory, be "fined not more than \$100,000, or imprisoned for not more than two years, or both."

In June, the United States Senate passed, by an overwhelming majority of 81-18, a major telecommunications reform bill; a sweeping overhaul of regulations affecting local and long distance companies, cable companies, television and radio stations, and online service providers (the Senate is made up of 100 people, two from each of the 50 States). The legislation now goes to the House (made up of over 600 Representatives from regions of the country defined according to population). The House and Senate must agree on the legislation before it goes to the President for approval.

The act that was passed included a provision which started life as the Exon/Coats Act, named after the first two senators to sponsor it, also known as the Exon Amendment, or the Communications Decency Act. This legislation makes it a crime to knowingly transmit "indecent" content via any communications network accessible by minors (under 18 years old). It further prohibits making any obscene communication in any form, including any comment, request, suggestion, proposal, or image, to anyone, regardless of age.

But why should you care about American legislation?

For a start, just about every "communications network" is now global, which means partly British, partly American, partly every other country. For example, BT is part owner of MCI, a major long distance carrier in the States. Deutsche Telekom and France Telecom are allied with Sprint, another US long-distance carrier. Both Sprint and MCI provide Internet connections. PSI, a major US Internet provider, has just bought 85 percent of EUnet GB. CompuServe, the largest commercial online service in Europe, is based in the US. In other words, even if you are sending a message from Woking to Bradford, it may well get there via America or an American carrier.

More ominously, according to the legislation, the US Senate is happy to arrest anyone who "knowingly within the United States or in foreign communications with the United States by means of a telecommunications device makes or makes available any (indecent or obscene) request, suggestion, proposal, image... regardless of whether the maker of such communication placed the call or initiated the communication."

As to the definition of the words "indecent" and "obscene", the legislation is silent. But clues can be found in the list of lobbyists for the Exon amendment, which included the Christian Coalition and various "family value" groups such as the Family Research Council (for readers unfamiliar with the term "family values" as used in American politics, it generally stands for pro-Christian, anti-abortion, and anti-gay).

The First Amendment, which guarantees the right to

free speech, has traditionally been used as a defence against censorship of any kind. What the First Amendment does not offer is any guidance on the definition of obscenity or decency, or any distinction between adults and minors. Clearly there are some things which adults can legitimately say, see, or do, which are inappropriate for minors. The traditional solution is to draw such a distinction and then enforce it with some form of access control, such as "You must be over 18 to see this movie."

So why not control access to the Internet?

This is very difficult to do. First of all, it is by nature widely accessible. Second, the identity of users is very hard to establish, so it is easy to lie about how old you are, or even what sex you are. However, this has not stopped some companies from tackling the problem. For example, an outfit called SurfWatch has developed a parental control for newsgroups. The makers of the Web browser, NetScape, have recently teamed up with Microsoft and a firm called Progressive Networks (makers of SurfWatch, covered in last month's net.news) to form the Information Highway Parental Empowerment Group (IHPEG).

What does IHPEG want? The inaugural press release lists the following goals: "The development of a system which would enable parents to ensure that their children do not unwittingly gain access to materials that the parent would deem inappropriate; an easy way for both content providers and third party rating services to characterise content using whatever criteria they deemed appropriate; and a system which could be implemented efficiently and would be designed in such a way that maximises the likelihood that it will become a standard part of Internet access systems."

What chance do these standards have? Slim to good. On

the slim side is the fact that standards in general are very difficult to create, even when you are dealing with simple hardware and software issues. Vendors tend to deviate from the standard in order to gain market share. Some people have already criticised Microsoft for poisoning the IHPEG announcement with partisan plugs for Microsoft Network, as in this quote from the general manager of the Personal Systems Division, John Ludwig: "We remain committed to enabling parents to use the Microsoft Network from the day it ships, in a way that is family-friendly." Industry observers detected a between-the-lines dig at pre-existing services, such as America On-line and Prodigy, which have experienced problems in this area due to the fact they had to pioneer an appropriate balance between free speech and the protection of minors.

On the other hand, while some cultures are more "liberal" than others, most people in most countries agree that some things are best kept from minors. This makes possible a "lowest common denominator" standard. While some people will regard this standard as less than ideal, it has one enormous advantage: widespread support due to a high level of consensus. While some people would prefer the world to embrace a morality specified by divine decree, effective global standards will eventually emerge by consensus and the Internet will help to make this happen.

The Exon provisions in the Bill will probably not become law in the US. So far, the Bill has passed the Senate but not the House. There is extensive opposition to the legislation from the electronic community, including a huge petition drive organised by the Electronic Frontier Foundation. While this failed to sway the Senate, it has another chance to defeat the Bill in the House. The very powerful Speaker of the House, Newt Gingrich, has publicly

announced his opposition to the legislation, saying: "It is clearly a violation of free speech... a violation of the right of adults to communicate with each other. I don't agree with it."

Although this Bill may not make it, this is not a subject that is going to disappear and it may well re-surface in UK or EC legislation. The problem remains, and it is up to all responsible adults to work towards a sensible solution.

Stephen Cobb

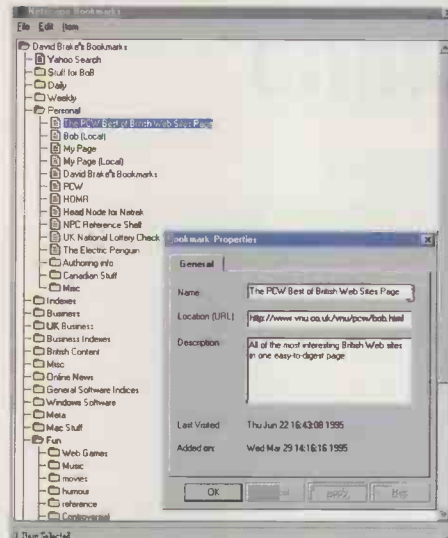
• *CompuServe has announced plans to launch an "Internet In A Box For Kids" package in the autumn which will shield children from inappropriate sites, and can monitor both the time spent online and where children went.*

Related Web Sites

NetScape
<http://home.netscape.com>
Microsoft
<http://www.microsoft.com>
IHPEG
<http://www.realaudio.com/content/p/rabest/exon1.html>
EFF
<http://www.eff.org>
SurfWatch
<http://www.surfwatch.com>

New NetScape

NetScape's development team must be working overtime. Windows 95 hasn't yet arrived, and already the company has produced a new beta version of its browser which takes advantage of some of its features. Version 1.2 works with Windows 3.1 and NT as well as Windows 95, but when it is used on a Windows 95 machine it supports long file names and uses the "registry" rather than an .INI file (which means you must re-type your preferences from scratch). I used Beta 1, but Beta 2, which may be out by the time you read this, will allow you to drag Internet addresses onto the desktop, or into email and documents, and use them to go straight to those documents on the Web.



NetScape's long-awaited improvements to the organisation of bookmarks

The biggest single improvement in the new version is long-overdue improvements in the way NetScape stores frequently-accessed sites: "bookmarks". It has always been possible to organise Universal Resource Locators into subject categories using sub-menus, but the process was hard to manage. The new bookmark editor works with Drag and Drop. It also has a better interface for handling file downloads: you could always start a download and carry on browsing, but the new interface makes this more obvious.

Like most new beta releases, this one has its share of bugs, including one which makes it impossible to read the text of some Web pages, including my own, so I can't really recommend Beta 1. But Beta 2 should be worth a download, especially for Windows 95 users.

The best place for British residents to download new versions of NetScape is <ftp://sunsite.doc.ic.ac.uk/computing/information-systems/www/Netscapes/>.

NetScape's Web server is at <http://home.netscape.com>.

Email as a communication medium

The Internet is an ideal medium for spreading news or

rumours — new information spreads at lightning speed across it.

So far, the most widespread bulletins have been about the Internet itself — debate about the merits of the American attempt to censor the Net, discussion of the latest hot net software and similar topics.

Recently, though, news from the real world has started to intrude upon my email inbox. Eight days after the dramatic rescue of Scott O'Grady, the US fighter pilot shot down over Bosnia, I found in my mailbox what appears to be an eyewitness account from one of the participants.

It was an extraordinary example of the way that news travels on the Net; it had been passed from hand to hand through at least 14 different people before it reached me.

Of course, on the Internet, it remains virtually impossible to positively verify who the originator of a message actually was, but the original was emotional enough and filled with enough Air Force jargon to be utterly convincing.

The original sender, who wishes to remain anonymous, received more than 120 messages in a week about the letter and felt "violated" when it spread throughout the globe,

but as he later pointed out, he had not told his friends *not* to forward it.

New Internet Phone

Vocaltec, the developer of Internet Phone, which was the first commercial product to allow easy voice communication across the Internet, has launched an enhanced version of its software.

Version 3.0 now allows "full duplex" conversation — that is, you can speak and listen to the person at the other end at the same time (just as you would with an ordinary telephone) rather than having to take turns in speaking.

This benefit comes at a price, however: it requires a more powerful PC (a 50MHz 486 instead of the 25MHz 486 previously recommended) and either two sound cards or a single one that supports full duplex. At the moment, very few sound cards support full duplex, but according to Steven Helstrip, PCW's sound-card expert, most new cards launched in the next few years will include this facility.

You might think that sending and receiving speech simultaneously would require twice the bandwidth, but according to Vocaltec, the developer, it only requires on average only ten percent more: this is because the software only sends audio when someone is actually speaking.

You can download either the full or half-duplex versions of the software from Vocaltec's Web site, but it will hang up after one minute of speech with any one caller until you pay \$69 for a registration code.

<http://www.vocaltec.com>
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David Brake

PCW

Internet Phone now follows a natural, phone-like, communication over the Net, but only with new sound cards

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What's more, you can access requirements that the agencies didn't even know about until after *Computer Contractor* magazine had gone to press. Within minutes of finding a new requirement, agencies can now "advertise" it on *Computer Contractor's Job.net* and moments later you can send an email CV and a message advising them of your availability.

Contract recruitment and the Internet

Until now the drawback of the Internet for agencies and contractors alike, has been the lack of a well known, focal point where you can find most of the current IT contract assignments, without having to randomly surf the Internet.

Several agencies list their vacancies electronically but, in the main, they do so independently, which makes finding a contract fairly haphazard. *Job.net* transforms this into a highly efficient procedure which enables you to find the biggest and best selection of current jobs corresponding to your own search criteria.

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Comms

Voice Modems

by Stephen Cobb

Several readers have been asking for more information about voice modems. These are part of the current communications convergence; the merging of voice, data, fax, and even video. This trend is affecting all aspects of comms. Consider the Internet — originally a file transfer system, it is now transmitting radio signals, real-time audio, telephone conversations and, for those who have the bandwidth, live video. Modems now answer phones and record voice messages, and will soon enable simultaneous voice and data transfer.

Modem-isation

Modems were originally designed to convert digital data to analogue signals and back again, so that data could be transmitted between computers. Later, a fax capability was added so that a digital document could be converted to analogue, ending up as a picture file (if the receiver was another fax/modem), or a printed document (if received by a facsimile machine).

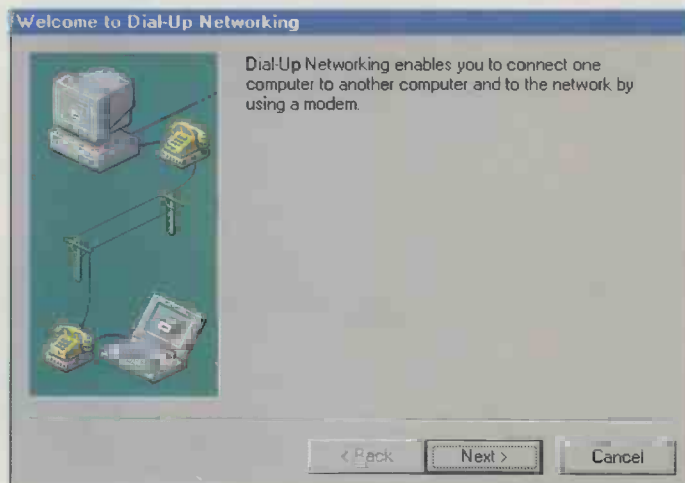
Now we have voice, in the form of voicemail, available in modems from manufacturers such as Zoom, Boca Research, Digicom, and Dataflex. A number of these are available in the UK (from vendors such as Electronic Frontier and Solwise), although some American manufacturers have balked at the time and expense involved in obtaining largely redundant BABT approval (the

modems are already certified to similar standards by the FCC).

The multi-purpose modems perform as anything from a simple answering machine (recording messages on the hard disk) to a complete voicemail system with hundreds of boxes, message forwarding, and fax retrieval service. Voice/data/fax modems automatically direct incoming data or fax calls to the appropriate software module and pass voice calls through to the answering machine/voicemail software. Some, like the Digicom Connection Pro, can even be upgraded to handle simultaneous voice and data (see the section headed "Digital Talk").

Such technology is even available in the credit-card, PCMCIA format. For instance, California-based Simple Technology offers a PCMCIA 28.8Kb/sec modem with 14.4Kb/sec fax, plus voicemail with multiple voice mailboxes and automatic paging to notify a user when a message has been received (contact Ideal Hardware or email to simpletec@aol.com). The PCMCIA format has encouraged further convergence as designers try to make the most out of available slots (most notebook computers only have a couple).

At PC Expo last June, 3Com showed a PCMCIA card which combines an EtherLink III LAN adaptor with a 28.8Kb/sec voice/data/fax modem. This card incorporates Radish Communication Systems' VoiceView V.34 voice-modem chip and Parallel Tasking technology for Ethernet



One of many
Setup Wizards,
to be found in
Windows 95

LAN connections. (Parallel tasking handles transmission and receiving operations as overlapping processes, not as separate steps, to increase speed from the notebook over the LAN). Other examples of convergence include sound-card features combined with a modem on an internal card, such as Boca's Sound Expression, as well as a number of sound/modem and sound/SCSI cards in PCMCIA format.

Voice-mail heaven or hell?

Is voicemail a serious application or not? Do you really want this on your PC, given that some people still view it in the same way as dentists' drills and wheel clamps? I like it: it clears the desk of another piece of mechanical equipment, the answering machine, and makes small companies sound like big companies.

US companies definitely like using voicemail. According to the Voice Messaging Educational Committee (VMEC) some 40 percent of companies, responding to a recent survey, thought that voicemail "actually saves or generates money" for the organisation. Not only does it save money, but it seems to work better than expected. An impressive 97 percent of companies claimed that (following implementation) their voicemail systems either met or exceeded expectations, and a whopping 94 percent said that their employees' productivity had improved.

Mind you, one has to remember the source of these statistics: the survey was conducted in the US, where the use of voicemail is more widespread, and by an organisation that serves the voicemail vendors. Nevertheless, the numbers are interesting. For instance, most of these US companies are using voicemail for much more than just answering phones: some 94 percent use it to send messages to other people, rather than calling them directly. About two thirds use it to provide recorded information, such as hours of operation. More than one in three use voicemail networks to link employees at separate locations. Half of the respondent companies claimed to have installed voicemail in the hope of improving customer service; and 85 percent said that voicemail had improved or enhanced customer service.

Nevertheless, there are still many complaints about badly implemented voice attendants, such as circular forwarding instructions that trap you in a "voicemail jail", and "Enter the extension of the person you are calling", when you don't know the extension and can't contact anyone to tell you the number. VMEC has

developed an etiquette guide to help companies and organisations set up "caller-friendly" voicemail systems. A similar publication on voicemail security has also been developed (see Vanguard Communications in our "PCW Contacts" box, page 254). In a future column, we will report our experiences of installing and using a voice modem for a small office.

Digital Talk

The latest example of voice/data convergence involves transmitting voice and data simultaneously over the same line. For example, you could play Doom via modem while talking to your opponent, on the same line.

Technology called VoiceView, developed by Radish Communications Systems, is beginning to appear on modems. This enables you to switch between talking on the phone and sending a file or fax, without having to hang up the phone and redial. AT&T Paradyne's VoiceSpan technology (found in the company's DataPort 2001 14.4Kb/sec modem) lets you talk and send data simultaneously by splitting a phone line into two fixed channels: one for data communications and the other for analogue voice communications. You do get high-quality speech, but uncompressed data speeds on 14.4Kb/sec modems using VoiceSpan won't exceed 4,800bps (18Kb/sec on V.34 modems).

Other voice/data line sharing technologies try to outperform VoiceSpan by digitising both voice and data. This allows on-the-fly variations in bandwidth, so a file transfer will automatically speed up during pauses in spoken conversation. Multi-Tech offers Multi-Tech Supervisory Protocol (MSP) in some of its modems, while Boca and others have backed an emerging standard known as DSVD (digital simultaneous voice data). Backers include Hayes and US Robotics. Early impressions of products using this technology are that voice transmissions with DSVD may sometimes be distorted, with noticeable delays, but that may be an acceptable price to pay in return for the savings gained from not using separate phone lines.

Comms: remotely possible

One of the hottest topics in comms today is remote access security; the problem of how you control people outside the office accessing the computers inside the office, over phone lines. Remote access offers many productivity improvements and cost-savings such as round-the-clock access to data and messages, telecommut-

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14 steps to safer dial-up access

If a comms server is beyond your budget, you can apply a range of related measures which add up to a fairly high level of security:

1. If the RA software is run from a LAN, restrict access to the RA directories to prevent changes to configuration files (such as changing passwords or turning off the RA software's logging).
2. Use both the RA software's logging feature and network auditing software to track significant network activities (you might script the loading of the RA host software so that it activates logging, or trigger it with the caller login procedure).
3. If the RA software has drive security, use it to lock callers out of sensitive areas and prevent them from messing around with the host's hard disk; setting up a trap for the next caller, for instance.
4. Use encryption options in the RA software, if available. While these might be relatively weak, they add a layer of defence, particularly against the casual hacker.
5. Use password protection on the host to prevent unauthorised access from within the office; perhaps to change login passwords, call-back numbers, and other configuration settings.
6. Restrict and control keyboard entry at both host and remote computers. Unattended machines allow piggyback access onto somebody else's session. Social engineering attacks are also possible if an interloper dupes technical support into typing commands that lead to sensitive data (typing messages in the RA software's chat mode eliminates the natural detection provided by a voice request).
7. Consider blanking the host screen during online sessions, otherwise anybody looking at the RA monitor can view activity that might provide valuable information for future exploitation (bear in mind that a blank screen makes tech support difficult and may mask intruder activity).
8. Set up the host to perform a reboot following a loss of connection, in case the connection is lost due to illegal activity.
9. Set the modem to wait several rings before answering. This discourages demon dialler attacks (whereby a modem-equipped computer systematically tries all numbers in an area and records which ones are answered by a modem).
10. Use inactivity time-outs, and log inactive users off the network. This prevents systems being left unattended or logged on in auto-answer mode.
11. Change passwords regularly and don't use the same password for all users.
12. Regularly check any logs or audit trails for machines hosting remote access and use station and time restrictions to isolate who can legitimately use the access and when.
13. In a large office, use a demon dialler to check the phone numbers in your office for auto-answering modems. Consider using utility software that checks for modems on network workstations.
14. Educate users in remote access security. For example, they should know about weak passwords, logging off the network before dialling out, not leaving modems in auto-answer mode, and so on.

ing, and direct-to-digital input from remote employees such as salespeople. Yet as with all technologies, remote access has a big "but". In this case, "but how do we control it?"

Now that most office computers are being networked and client/server applications are moving corporate data onto the desktop, inadequately controlled remote access can spell big trouble. This might be in the form of internal abuse, such as using the remote access facilities for personal rather than corporate purposes. Or it might be in the form of an external attack such as data theft, by competitors using hackers-for-hire — a phenomenon that is causing growing concern as kids, who started hacking for fun, encounter a need to make ends meet.

According to a 1994 survey, jointly sponsored by the Department of Trade and Industry, the National Computing Centre and ICL, half of all UK companies have staff who use computers outside the office. Remote access is nothing new, of course, but during the last three years it has



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grown so rapidly that an unprecedented situation has been created. Some large organisations can no longer say exactly how many incoming phone lines they have, or how many modems, or how many modems are sitting on phone lines in auto mode. So serious is this problem that at least one major corporation took the drastic step of seizing all modems, only restoring them on a case-by-case basis following a highly regulated approval process. This may sound draconian but the company in question had suffered serious hacking-related losses.

The preferred procedure is for management to devise ways of meeting the comms needs of employees while including adequate controls. This can be an effective defence against the dangerous freelance efforts which frustration creates. Some readers will be familiar with this scenario: a group of employees wants remote access, management says no, the group installs a modem anyway and does so without proper security procedures; the system gets hacked, so now management is even less likely to approve remote access.

Secure access

So what are adequate defences? They depend upon the type of remote access you are offering, the two main types being remote control and remote node. The latter is a direct connection to the office network using a phone line instead of a LAN cable. This requires the remote computer to be configured as a network client running the necessary software and allows it to act as though it were part of the network. Although this is feasible, it can be expensive, and requires high performance connections (ordinary phone lines and modems operating at 28.8Kb/sec choke on basic 10Mb/sec Ethernet traffic).

Remote control

The simpler and more widely used remote access method is remote control, where a comms program such as Symantec's pcAnywhere, Norton-Lambert's Close-Up, or Ocean Isle's Reachout, is used to remotely operate a host computer. This allows the remote computer to use applications on the host machine, which can be a stand-alone PC with a modem, or a network machine that has access to a modem. If the computer hosting the session has a

network connection, then the remote caller can access the network using the host's NIC card. Thus the remote connection only has to transfer the pre-processed results of network accesses, rather than the network traffic itself.

This type of remote access can be securely implemented if you only have one copy of the remote access (RA) software, one user, and one well-chosen password on each of the two systems. It can be improved by using the dial-back features of the RA software and by ensuring that there are no applications besides the RA software, not even COMMAND.COM, residing on the host machine. According to JD Abolins, a sysop on the InfoSecurity Forum on CompuServe, "The difficulty is that the above conditions rarely persist for long. The number of copies of RA software, the number of users and the number of poorly chosen passwords escalates. This becomes hacker heaven."

One response is to establish remote access servers — dedicated hardware with built-in access controls such as 3Com's AccessBuilder and US Robotics' Shared Access COM Server. Such servers centralise

access and make it easier to manage. They may even include support for security tokens such as SecurID, from Security Dynamics, a time-based token system. The remote user dials in to a communication server connected to Security Dynamics' network-security server. Once the modem has connected, users are prompted to enter a personal identification number and the six-digit number currently showing on their SecurID card, which is about the size of a credit card. The number changes every minute, in sync with a corresponding number on the host — so access without the card is impossible.

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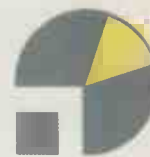
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net.newbies



Getting started on the Net

If you don't know what a "newbie" is, you probably are one. These pages are designed to be an easy-to-use reference guide to the Internet for the novice — or newbie, as hardened netters will call you.

If you don't understand what's written here or have any suggestions, please email me at derb@pcw.cityscape.co.uk, or write to me via "snailmail" (Internet-speak for paper mail) at PCW.

Meanwhile, here's an easy-reference guide to the tools which will help you make the most of the Internet.

What is the Internet?

The Internet consists of millions of computers inter-connected in a global network. The number of Internet users is difficult to measure for a variety of reasons, but those worldwide who can at least exchange electronic mail messages is estimated to be 30 million and this appears to be doubling each year.

What is the World Wide Web?

It is not the Internet. It is a service on the Internet which uses special software (usually available free) to give users access to pages of information with pictures and multimedia instead of just text. Around 15 million people have access to the World Wide Web.

What do I need to get on?

A PC of almost any age can be connected to the Internet as long as you can plug it into a modem. You don't even need to be able to view graphics on your machine to look around

(although it helps).

A modem allows your computer to dial in to another computer with a modem and communicate with it. They come in different speeds, from 2,400 baud to more than ten times that. When you are using the Internet, the speed at which things work is more likely to be limited by the speed of your modem than by that of your computer, so I would recommend buying the fastest you can afford. If you have an old 2,400 baud "V.22bis" model it would be fast enough to exchange electronic mail messages, but to send and receive files, or use the more exciting services on the Internet, a modem which runs at a speed of at least 14,400 baud "V32.bis" is vital. Fortunately, these have plummeted in price over the past few years and now cost as little as £100.

If you have the money, I would recommend spending even more on a 28,800 baud (V.34) modem.

Okay, I've got a modem. Now what?

For a modem to bring you information, it has to have a number to dial. This is where a "service provider" comes in — you have to subscribe to one if you want to get online. Whatever kind of connection you have set up, you will have to pay your phone costs on top of any subscription, unless you are lucky enough to get free local calls through a cable company. The bigger service providers will have "points of presence" (the numbers you dial) scattered across the country so you only have to dial a

local number.

If there's no company, near to your home, which offers Internet access, you may have to pay long-distance phone rates. Once connected, though, it doesn't matter where the information you are accessing is physically located: you are always charged at the same rate. A list of providers and telephone numbers is available below; a much bigger list has been placed on our CD-ROM cover disk.

Typically, a subscription that only provides electronic mail costs around £5 a month and Delphi offers this. But "all you can eat" Internet access allows you to use email and Internet services for any amount of time, limited only by the size of your potential phone bill. This level of service costs £8.50 to £15 per month. There are dozens of companies offering this kind of Internet access; none of them big enough to dominate the market. The basic service being offered is largely the same, although some higher-priced providers may claim to offer more personal service or a better selection of access software.

Demon Internet is the best known and most popular operator. The BBC runs the BBC Networking Club (BBCNC) and Frontier Communications has launched an inexpensive Internet service that covers most of Britain at local call rates.

Major online services like CompuServe or Delphi offer Internet access, but also have a large number of services of their own to which only their subscribers have access. These services include official tech-

nical support for hardware and software by electronic mail, online games, vast indexed software libraries and databases of business or consumer information. A monthly subscription tends to cost between £6 and £10 per month, plus an hourly charge if you are online for more than a set number of hours in that month. There can also be extra charges for accessing the more popular services.

UK Online is a special case, a cross between an Internet provider and an online service. For £8.50 to £12.75 per month it offers unlimited access to the Internet, partially "censored" to make it safer for children to browse, plus access to online magazines and other services.

Although programs like Windows Terminal can be used to access these kinds of services, it is normally easier to use specially-written online software. Any service provider should provide you with at least some of this software when you sign up, and if you want to choose something different, most of it can be acquired online, free of charge.

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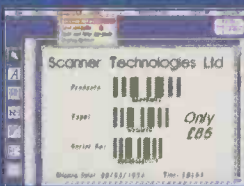
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Innovations

Moving with the Times

The Toshiba-Times/Warner group is taking the lead in bringing the HD-CD format to fruition. Tim Frost reports.

The high-density CD developments continue apace, with the Philips-Sony and Toshiba-Times/Warner groups expanding on the options that their systems will offer, bringing them closer together than ever. It is the Toshiba-Times/Warner camp's turn to take the lead by outlining new technologies that could become part and parcel of the final HD-CD format.

HD-CD aims to put five to seven times the amount of digital data on a single surface of a CD by squeezing more and smaller dots onto the disc's surface, and using a far more efficient error correction system.

Philips came up with the original HD-CD, and Toshiba/Times-Warner topped it by proposing to further double the disc's capacity by the simple expedient of making it double-sided. Philips then responded with its multilayer variant which places a second semi-transparent data-carrying surface above the normal data layer.

The contest for supremacy will run and run, but what's interesting is the further proposals that T-T/W are mapping out for HD-CD. They have split HD-CD, or what they call super-density digital video disc (SD-DVD), into six specific product areas.

The single-sided standard SD-DVD (SD-5) is aimed at the majority of video applications. Its 5Gb capacity would enable a single disc to carry most full-length movies, with digital multichannel audio. The additional data capacity allows several nice features that are simply not an option on VHS. For example, a single SD-DVD can carry up to three different languages, and by flicking a switch on your player you have the choice of which version to watch. Subtitling also becomes an option. Instead of burning the words into the image, subtitling, or any other sort of text, can be encoded as computer data and displayed as and when needed.

This flexibility extends to the movie's aspect ratio. The argument between widescreen letter-

box and full screen pan-and-scan should disappear, since it will be possible to encode the disc with the full widescreen image and then use pan-scan data also placed on the disc to give you a full-screen option.

Put all these features together and it's no wonder video and movie organisations are excited about video on HD-CD. Currently, an organisation like Paramount has to digitise many different versions of a movie (NTSC, PAL, widescreen, pan-scan, different subtitled versions). With HD-CD this could be reduced to one or two versions, normally one for PAL and one for NTSC. Although SD-DVD is capable of being a single carrier playable on both systems, there are compromises in the screen shape, frame rate and, most importantly, the colour balance between the two TV formats. Material that was originated on video, such as TV and video-based animation, would only need one master. But for movies, any self-respecting film company would insist on a pure NTSC master for the US and Japan and a separate master optimised for European PAL releases.

The next two SD-DVD formats that T-TW propose are the dual-layer version which is similar to the Philips/Sony proposals, and the double-sided version. The dual layer seems to be in response to the computer industry's demands, so T-TW seem to have given up the idea of double-sided CDs being

usable for computer work. Since the computer industry has demanded a single unified disc format for video and CD-ROM, this may mean that the double-sided HD-CD idea is already dead and is just waiting to be buried.

T-TW are working on the next generations of HD-CD with published proposals for a super-HD-CD which will carry 9Gb per side.

And there are two further proposals: SD-R and SD-Rewriteable. As expected, T-TW are going to adopt existing CD-R and phase-change technology for their writeable and rewriteable HD-CD. Technologically speaking, the SD-R (write-once) disk is to be along the same lines as existing CD-R, whereas SD-Rewriteable will run with the phase-change format.

Finally, in the wings is the idea of using the SD format for video servers, and set-top boxes for cable and satellite users. Since this is really just the idea of using MPEG2 video and AC-3 which has already been accepted in the States as the future standard for video servers and set-top boxes, it is difficult to see how T-TW can claim that this is their idea. But at the end of their proposals, they slip in an option to use the SD-DVD disc format for a super-fi CD. This would replace the standard 16-bit audio with 24-bit, with its higher resolution and 144dB dynamic range. Although this has been discussed, it's the first time anyone has made a firm(ish) proposal to link it formally with an HD-CD format.

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Horizons

No strings attached

To solve the problems faced by those who want email on the move, Sony and French company COM1 have developed a built-in wireless modem for notebooks. Simon Rockman investigates.

When John Donne said "No man is an island", he clearly hadn't just seen his email go down. The prospect of not being able to get to your notes or memos, or communicate with your colleagues, might seem as restrictive as losing the power of speech. So, imagine what it's like for anyone who hops from desk to desk. Imagine how much less productive someone is if their notebook is an island.

If you work in a number of fixed places within a room, it's fine: you can set up a docking station or use a PCMCIA Ethernet card; you can have a phone point and plug in a modem. But what if you move around within the building, or a number of buildings?

Sony, AMD and a French company, COM1, have come up with a solution — a built-in wireless modem. This isn't a cellular data card as sold by Nokia, but an interface for a conventional V.32bis (14,400bps) modem which allows it to be used with a digital cordless phone. Future versions hope to offer 28,800bps.

The reason COM1 is so interested is that digital cordless has been much more successful in France and Hong Kong than anywhere else. The Rabbit system failed in the UK, eclipsed by the success of the cellular systems, but in France they have BeBop. Sony is interested because it makes digital cordless phones and AMD supplies the modems.

The system uses a standard PCMCIA modem in a notebook which plugs into your serial port. Provided you have a cordless phone base-station within range — around 200m — you can use the link just as you would a modem with wires. It uses the CT-2 standard. There are two major digital systems for cordless phones, DECT and CT-2. DECT is more advanced, but the older

CT-2 standard is more widely accepted. You can get a cordless phone which will work with a serial port in most parts of the world, but it is the French who



will be keenest since the system will work in the streets and in public buildings. It isn't as flexible as true cellular — you have to keep still when using it (there's no hand-off between cells) and you need to find a suitable place. In the UK it will only be of interest to companies that want to install a cordless base station, or to people who have a cordless phone at home.

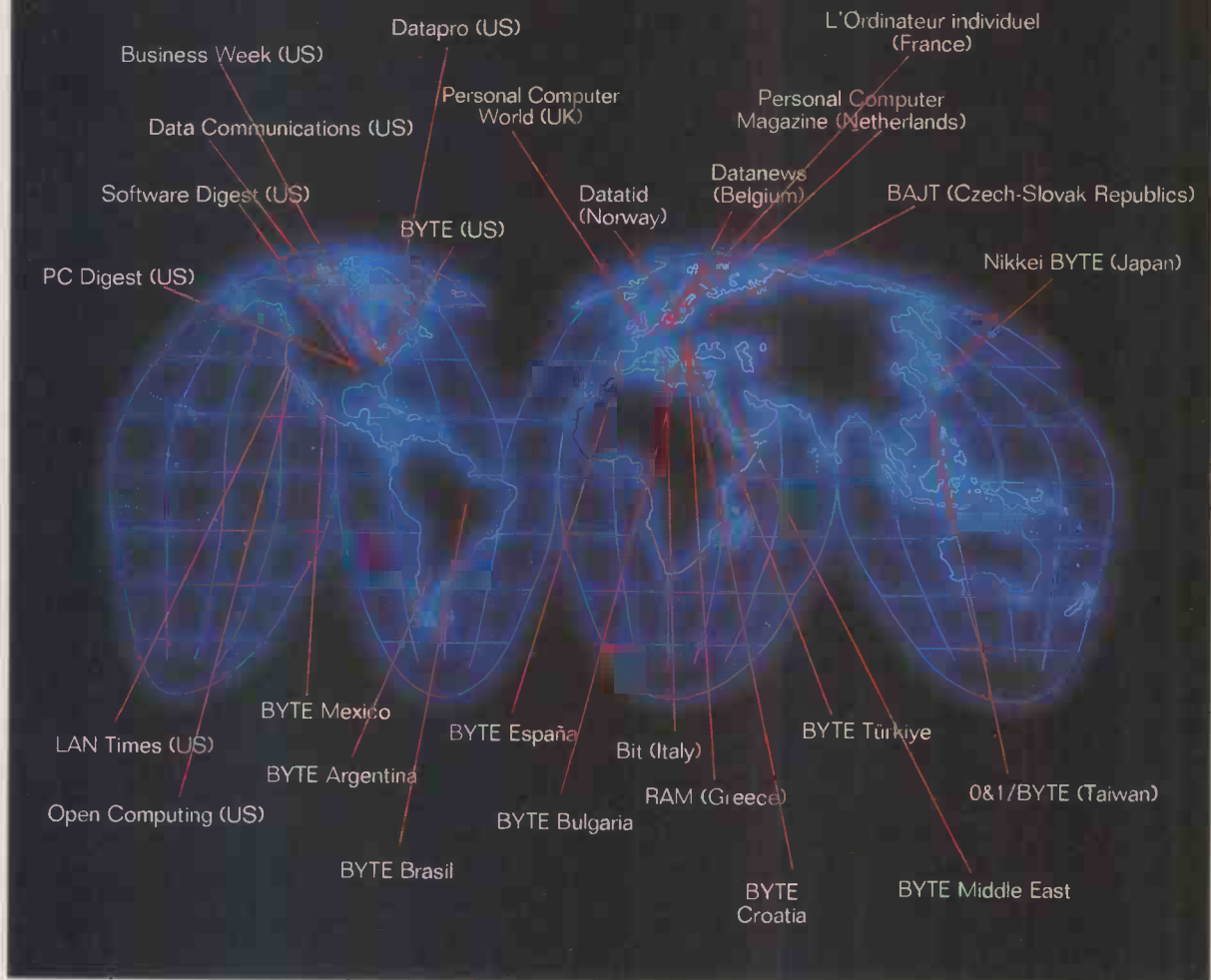
The system uses a convoluted mix of analogue and digital signals. Of course, everything starts off being digital in the notebook, and is then turned into an analogue signal by the modem. The analogue signal is digitised by the CT-2 interface and transmitted using ADPCM to the base station. Here it is turned back into an analogue signal and sent down the phone lines. Ideally we would

have digital phone lines and there would be no need for the second level of translation, but only the UK has widespread ISDN and even here you have to pay through the nose and fight political BT battles to get it installed, so the prospect of sensible digital communications seems some way off. The system could have used a digital link straight from the computer to the base station. It would, in theory, be possible to have a digital data adaptor which sent signals straight to the base station and have the modulation take place at the base-station end or within the telephone network (this is how cellular systems work), but this would require extra infrastructure hardware.

The system is still quite expensive — digital cordless phones cost about £200 as a street price, modems a similar amount and the wireless interface the same again; but for anyone who needs to use a notebook in a number of places, the system offers unbeatable advantages. The call charges are very much less than cellular or any of the custom mobile data systems; unlike these, the CT network can't distinguish between voice and data, and the only wireless communication takes place within your immediate vicinity.

Sony sees a market for the CT-2 system in the fashionable SoHo arena. The number of people switching from analogue to digital cordless phones is growing, especially in America, as people find that the digital phones are more secure and sound much clearer. It is this clarity which makes CT-2 suitable for carrying digitised, digital waveforms. The equipment should be available in the next couple of months. For more details, contact COM1 in France on 00 33 56 78 84 00. **PCW**

World Dominance



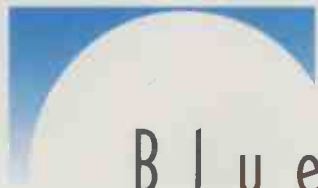
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Bluesky

It's only natural

Massively parallel artificial intelligence brings comparisons between Nature and mechanics. Nick Beard reports.

The problem with intelligence — usually thought to be a product of the human brain — is that there is not enough of it, and it is an expensive commodity. We often want computers to be able to mimic it, either because computers tend to be cheaper than expensive experts, or because we want to place intelligence in places where humans should not have to go. Here we look at the impact of massively parallel (MP) approaches to artificial intelligence (AI) research.

Maybe there are lessons for computer scientists in the way brains are wired? One major difference between brains and computers is in the number of processors. Most computers only have one. Most computers can only do one thing at a time. Even with software like OS/2, the appearance of multitasking is a sham, produced by rapidly switching the single processor between different tasks. They have simple circuitry. Brains, however, are genuine multitasking devices. Brains are truly parallel processors — *massively* parallel ones — with almost unimaginably large numbers of unpredictable interconnections between “processing units.” Maybe the “stupidity” of computers is in their simplicity?

There are always two possible motives for looking at such “structural analogues” between Nature and mechanics. On the one hand, Nature is a rich source of wisdom regarding what works and what does not. If evolution has accomplished something by testing a mechanism against the competition for a few million years, the result tends to be a fairly robust mechanism. Maybe studying nature will help us build better machines, ones with “real” AI. On the other hand, perhaps we can gain a better understanding of how Nature does stuff by building models and simulations.

Might an MP approach to AI offer benefits over traditional systems implemented on serial processors? According to many researchers, large degrees of parallelism enable new approaches to the field. Systems which were computationally improbable because of the huge processing load, suddenly became plausible on MP systems. There are two main reasons for the appeal. The first is that many MP systems can handle huge volumes of data simultaneously. This enables vast knowledge bases to be consulted, for real-time consultation, or neural network-based visions systems to be constructed. The second reason for the appeal is that some researchers believe that only in truly MP systems can the actual processes of Nature be modelled and simulated to an effective degree. For example, MP systems can provide a medium in which evolutionary processes can occur.

Human brains are not the only massively parallel “intelligences”

on the planet, nor the only ones worth mimicking computationally. Insect colonies are another example. In “Turtles, Termites and Traffic Jams”, an MIT physicist recounts how he was told at school that “the invention of the arch was a defining moment in human civilisation.” When he discovered that termites also build arches, he realised that much of what he had been taught in school was suspect, and that termites deserved a bit more respect.

A process takes place in termite colonies which may be of value in understanding other such “emergent” systems, where complex results appear to emerge from multiple simple units. Economies, traffic flows, immune systems, telecommunications networks

— these things are highly complex, yet based on fairly simple “unit” behaviours. To enable the exploration of these ideas, Mitchel Resnick developed StarLogo to enable swarms to be programmed and left to evolve, behave, creep and wander. The results are fascinating.

MP systems might yet prove to be simply another architecture for providing computer power; or they could be a lot more: Kitano and Heston suggest that massively parallel computers will be as important to AI as particle accelerators are to physics or gene recombination techniques are to biology. 2001 is almost upon us, yet spontaneous emergence of philosophy-debating computers seems even less likely than it did ten years ago. Maybe MP systems will help.

PCW Resource Guide

Turtles, Termites and Traffic Jams:

Explorations in massively parallel microworlds
Mitchell Resnick; MIT Press

Describing a wide range of swarm intelligence scenarios, Resnick offers suggestions for their applicability in helping us grasp the behaviour of systems like economies, traffic jams and termite colonies. A remarkable book for its breadth and vision, despite the apparently arcane subject matter of the title.

Massively Parallel Artificial Intelligence
Hiroaki Kitano and James Hendler; MIT Press

A wide-ranging overview of the attractions of massive parallelism to the AI community. Includes work on speech, machine learning, image processing, modelling, neurocomputing and genetic algorithms.



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Pacman's last square meal

The Atari 400 and 800 home PCs were well built and included some fantastic games, but they never really caught on. Simon Rockman reminisces about two machines which offered the right technology, at the wrong price.

The rise and fall of Atari, a company which made arcade machines, became a major computer manufacturer and is now a games console also-ran, is well-charted. One of the important milestones in this journey was the introduction of the Atari 400 and 800 home computers. *PCW* reviewed them in October 1980, although they didn't reach the shops until quite a while later.

The console heritage showed in the way that the machines took video games cartridges in slots. And excellent games they were too. The 400 had one slot and a flat anastatic membrane keyboard, the 800 had two slots and a full-travel keyboard. Both machines were expensive.

The Ataris plugged into a domestic TV and programs were loaded from a 600-baud custom cassette deck. For the *PCW* review we looked at a 16Kb Model 400 and a 48Kb Model 800. Atari also supplied a 40-column dot-matrix printer and a 90Kb single disk drive — although in practice the disk drives were so expensive that most people used tape.

The disk operating system used so much RAM that when the floppy disk drive was attached to the 16Kb machine, only 4Kb was free. One of the cartridges was Basic but the most attractive option was the sensational game, *Star Raiders*.

Inside, the Atari 800 was beautiful: the 10Kb system



ROM and RAM were in modules, with 16Kb memory modules allowing the 800 to be expanded to 48Kb. Remember though, this was a long time before SIMMs.

Screen resolutions varied from 12 x 20 to 320 x 192 with up to five colours. The standard text mode was 24 lines for 38 columns. The CPU was a 6502, as used in the PET, but a little slower with a clockspeed of 1.8MHz. The strong games bias meant that the machines were equipped with four joystick ports, and even though our David Tebbutt was impressed by *Star Raiders*, there was better to come with excellent arcade conversions of *Pacman*, *Missile Command* and *Defender*.

Like many users, David

struggled to keep on the topic of serious use for the 800, but looked quite closely at the Basic interpreter which had good program flow control: you could GOTO a variable, but there was only adequate string handling and no string arrays. The INPUT statement was unusual in that it accepted commas (most Basics will use the comma as a delimiter between two variables). All numbers were treated as floating point. The Basic had reasonable control over the graphics with colour and drawing control, but nothing to drive the hardware sprites. The four sound channels were a luxury.

The manuals were good, particularly for the experienced user, with a supplementary book filling in the gaps for new users. Documentation of the peripherals was poor at the

time of the review, but that was several months before the computer shipped.

With hindsight, if there was a problem with the Atari 800, it was the price: a straw-poll in the *PCW* office today revealed this as an abiding memory (together with how good the games were). We all lusted after one, but only staff writer Steven Helstrip actually had an Atari. The 16Kb Atari 800 was £695, the cassette recorder £55 and a second 16Kb RAM was £145. This made a basic system (without screen) very expensive. Even the 400, with its ZX80-style keyboard, was £395, and you had to buy the custom cassette deck. The £525 price tag on the very slow serial disk drive made it unattainable for most users, particularly since it needed more memory. And remember, you still needed to hijack the family telly to use the computer.

The high price was a shame because the Atari 800 was an amazing machine. Some of its standard sound and graphics features still seem advanced 15 years on. It was the technology which begat the Commodore Amiga and it's a shame that it didn't advance. There were later versions of the 800, in shiny black and silver cases, with lower prices and more features — the 1400XL even had a built-in disk drive with a higher capacity. But ultimately, the home computer wars of the mid-eighties led to a lack of development, and the machine which followed, the ST, owed little to the 800.

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BOOKS

One, an optimistic vision of a digital future; the other, a downbeat look at the future of the Internet — poles apart, yet strangely complementary, opines David Brake.

Being Digital

Author: **Nicholas Negroponte**

Publisher: **Hodder and Stoughton**

Price: **£12.99**

ISBN: **0-340-64525-3**

Rating ♦♦♦♦♦

Being Digital is an interesting and occasionally thought-provoking book by the director of MIT's now-famous Media Lab, Nicholas Negroponte. Despite the book's subtitle, "The road map for survival on the Information Superhighway", it analyses both present and future applications as well as the implications of increasing network bandwidth and processing power.

If you're not sure where all this technology is taking us, in his book Negroponte sets out his own optimistic vision of information at your fingertips; brought to you by computers smart enough to know the sort of information you want but small enough to be sewn into your clothes. He peppers his analysis with unusual facts: for instance, did you know that in America, the electronics in a car now costs more than the steel? The book is probably worth buying just to be able to read these little nuggets of trivia.

There are weaknesses in the book. It can be somewhat unfocused — covering, among many other topics, voice recognition, intelligent agents, virtual reality, copyright and computer-aided education. Much of what he says is fairly obvious to anyone who has spent time thinking about the subjects: faxes are less efficient than email (being more costly to transmit and harder to search and store); people are

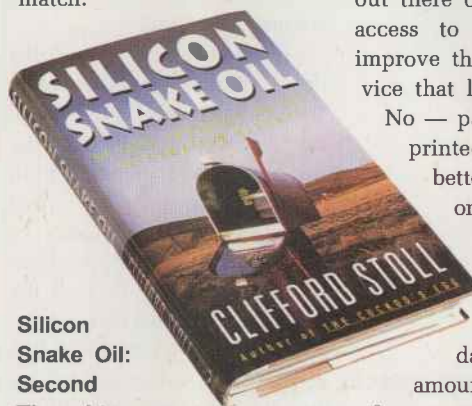
going to be unable to sift through the increasing volume of email messages, television broadcasts and Internet babble without the aid of computerised agents; and so on.

Many of Negroponte's examples and arguments are taken from the US and are often neither interesting nor useful to the British reader. For instance, his optimism about the benefits of a networked, computerised world can grate on you. He says: "Digital technology can be a natural force drawing people together into greater world harmony." He is clearly an online junkie. He is also rather full of himself — he likes to mention that he advised President Mitterand's cabinet and (yes!) Margaret Thatcher too.

These are excusable weaknesses, but when he leaves theorising and tries to make concrete predictions for the near future, he shows worrying signs of having spent too much time among over-excited marketing executives and net-heads: "In 1995, almost every desktop computer shipped will have a CD-ROM in it"; "My guess is that one billion people will be connected (to the Internet) by the year 2000"; or, most ludicrous of all, "I am convinced that by the year 2005 Americans will spend more hours on the Internet (or whatever it is called) than watching network television". If you are in the industry you will recognise these statements as wild hyperbole, but readers without the figures before them may mistakenly take them to be educated guesses.

For all its faults, *Being Digital* is well worth reading — it is full of interesting facts and thoughtful arguments. Best of

all, it is written in a clear and entertaining manner; something few other books written about the digital future can match.

**Silicon**

Snake Oil:

Second

Thoughts on the Information Superhighway

Author: **Clifford Stoll**

Publisher: **Doubleday**

Price: **\$22.00**

ISBN: **0-385-41993-7**

Rating ♦♦♦♦♦

There are plenty of people arguing about the future of the information superhighway but there's been little serious discussion concerning whether or not it is a good idea. Clifford Stoll, however, is an online veteran with several email accounts. He has written a best-selling book on how he caught a German spy ring on the Internet, and his prose is refreshingly well-informed and free of technical inaccuracies. This is why his attacks on many of the claims of Internet futurists are so effective.

Email is one of the most popular benefits of being online, but as Stoll points out: "If I'm confident that my friend has the right system, I can exchange sounds, pretty graphics, even movie clips. More often, though... I'm stuck with simple ASCII text...; Electronic mail can't handle glossy sales

brochures or download a box of chocolates."

What about all that information, available free of charge, out there on the Net? Won't access to this dramatically improve the information service that libraries can offer?

No — paper libraries with printed matter are much better organised than online information, bemoans Stoll.

The Internet has plenty of up-to-the-minute

data but lacks large amounts of information

from texts that have not yet been digitised and stored. "Our networks are awash with data. A little of it is information. A smidgen of this shows up as knowledge," says Stoll. Money spent on computers and online access for libraries is money *not* spent on buying more books and paying librarians, he continues.

What about learning in schools using multimedia? "Much of what comes across the computer screen is a surrogate for experience. Which is more fun? Playing a video game of basketball, or actually playing basketball?" asks Stoll, who sometimes tries to have it both ways in his arguments.

Stoll is as relentlessly downbeat as Nicholas Negroponte is optimistic. Both authors have interesting things to say about the way things are going and I wouldn't buy one book without the other. However, next time you're cornered in a pub by your friend with the Demon account, lecturing you on the benefits to be gained by bringing Britain online, just lend him your copy of this book.

PCW

CD-ROMs

With a 3D Atlas to help her find her way, Adele Dyer views the art treasures of the Louvre in Paris and the Barnes collection in the States, before hitting the nature trail with a highly usable encyclopedia.



•The Louvre — the Palace and its Paintings

•A Passion for Art

Following a plethora of CD-ROMs devoted to the National Gallery, this month brings two CD releases dealing with foreign galleries: the French have launched a CD-ROM of their own national treasures in the

Louvre, and from the States comes *A Passion for Art*, an electronic guide to the Dr Barnes collection.

The Louvre on CD breaks down into two main sections: the catalogue itself, and the history of the Louvre Palace. The latter is quite interesting from an architectural viewpoint but contains a potted history of France which is really too brief to be of great value. Call me cynical but I suspect this is simply an excuse for the French to congratulate themselves on building the Pyramid at the Louvre.

When exploring the gallery, every item in the collection can be found by clicking on the museum's various halls — a nice idea, but really only of great interest if you know the gallery well. However, the pre-

sentation of the catalogue is much better than any other I have seen: all the great Louvre treasures are there, including the Venus de Milo and, of course, the Mona Lisa. When you first select a painting it is shown on its own, with the rest of the screen blacked out, allowing your eye to concentrate on the painting without distraction. You can then get more information on the painting, including biographies of the artists and fun little *à propos* notes. The comparative size of each painting can be judged in relation to the figure shown standing adjacent to it.

The most useful inclusion

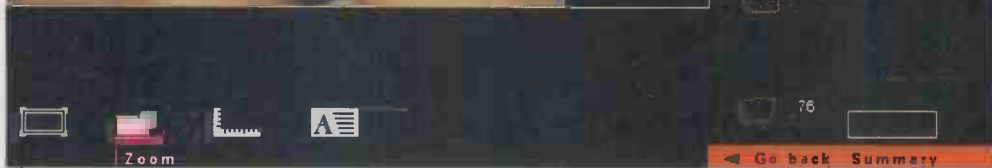
on this CD-ROM by far, is a zoom facility that allows you to pan around the painting by dragging your mouse — thank goodness that at long last someone has seen fit to include this facility on an art CD. No matter how large the picture, you still see the same amount of detail because the scale is maintained at the same rate per square inch.

Another great feature of this CD is the information on the construction of the picture: 35 of the 100 paintings on this disk are each accompanied by a commentary, explaining how the paintings were put together, and an animation



Above In the *Passion for Art* CD-ROM, "visitors" can move around the Barnes gallery and view a particular picture just by clicking on it

Left "Who are you looking at, then?" The zoom facility is the most useful inclusion on *The Louvre* disc



showing the important lines of sight in the painting.

In my opinion, the only downside to the wealth of information that accompanies each picture is that much of it seems presented in an over-intellectual and "arty" way. The description of Romanticism, for instance: "Romanticism was born in the first half of the 19th century, in the wake of Neo-classicism, to which it is a reaction. Faced with Neo-classicism's exaltation of virtue and reason, the movement favours the expression of feeling, colour, realistic detail, and exotic or picturesque props."

Although Dr Barnes was an amateur art historian, no such high-falutin' talk figures on *A Passion for Art*. This CD takes a very straightforward approach to art and has the added appeal of offering an insight into building an art collection. Dr Barnes made his fortune manufacturing a treatment for eye inflammations, but the most interesting point about his life was that he was able to collect paintings during the lifetime of the artists themselves; Renoir, Matisse and Picasso for instance. Rather than investing in well-established and "safe" artists' works, he speculated in buying art that he believed to be underrated at the time, but nevertheless of real value.

There is a wealth of information about the gallery and the foundation that administers it. Additionally, one learns that the gallery has some interesting features of its own as well, such as a mural commissioned from the great master, Matisse.

As with the Louvre CD, you can take a tour around the gallery, looking at each painting in its position on the wall, but in this case the photographs are taken from a better angle and you can move directly to the picture by clicking on it. So using a combination of this and the zoom feature, if something catches your eye during your trip around the gallery, you can go and take a closer look.

The explanatory notes benefit from having been written partly by the collector himself. None of them go into great detail, and rather than offering a full technical critique they encourage the viewer to notice certain aspects of the paintings. But for those who simply want to enjoy art for its own sake, this will be more than adequate.

Of course, since Dr Barnes' collection concentrates on the Impressionists, it is narrower in scope than the Louvre CD although it includes roughly the same number of images. But it does have the personal feel of a small collection, carefully selected by one man. It doesn't contain any real masterpieces but it is better thought out than many of the collections of other, more voracious US galleries.

The Louvre — the Palace and its Paintings

Contact BMG Interactive
0171 384 7500
Price £44.99
Rating ●●●●○

A Passion for Art

Contact Corbis Publishing
0171 278 1387
Price £49.99
Rating ●●●●○



3D Atlas

3D Atlas was compiled by personnel from University College London, so it was perhaps natural for me to have expected a highly academic presentation, with lots of dry, detailed topological maps and little else. However, ABC (one of the "big four" American TV networks) and the MultiMedia Company (a spin-off from the BBC) have contributed to the Atlas and it



turned out to be a good deal more interesting than I had at first expected.

The maps are broken down into three main categories: environmental, political and physical. The best of the three is physical — the others look a little rough in close-up. I was generally disappointed with the maps and would rather look at a printed atlas.

But there are a few maps which are excellent: the map of tectonic plates is particularly good as it clearly shows the relationship of the plates to different countries. For instance, you can see the North American and Pacific plates pushing together through Los Angeles and San Francisco.

The zoom facility is distinctly disappointing. Not only do you have to be quite careful not to go too far by clicking twice, but if you zoom before you pan you can become

Top The maps in 3D Atlas are broken down into three main categories. This is the environmental one

Above One of the statistical sections on the CD

extremely disorientated. It is better to pan and then zoom, but even then, it is difficult to pinpoint the exact area you are looking for. I was put off by the fact that there were no exact lines to clearly delineate height above or below sea level for instance, so all the colours merged into one another and everything simply looked fuzzy.

The zoom facility has other problems too: when you zoom in to look at a city (you are given the choice of only half a dozen) you cannot get in very close. I wanted to have a closer look at San Francisco and was pleasantly surprised to see a

good map showing the entire bay; but when I zoomed in, only a very poor blow-up of the larger map appeared with no further detail included.

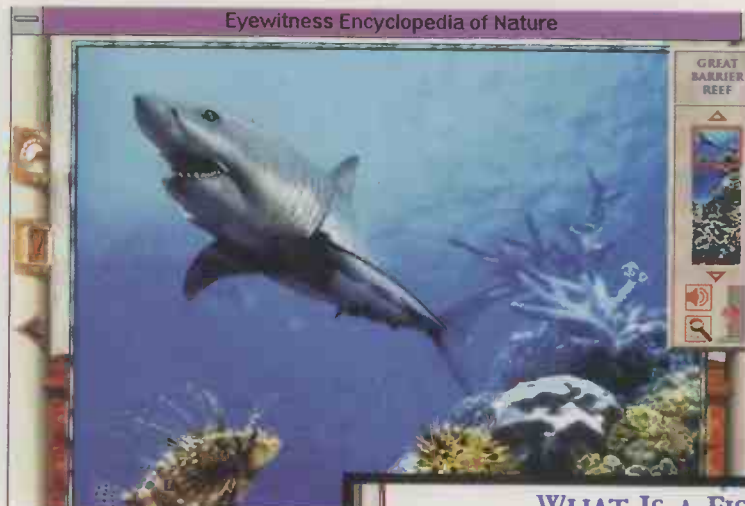
All in all, the picture quality was disappointing, especially as many people who will be using this CD-ROM may only have fairly standard graphics cards and video drivers. More effort could have been expended in achieving a higher standard of reproduction. Unfortunately this takes the edge off some of the factual video montages which have been put together, covering issues such as population, species extinction and oil pollution. They are quite informative and deserve the benefits of better picture quality.

Additionally, there is a sort of "slide show" of postcards relating to each country, which gives you a "feel" for the landscape and these are much better than the video montage.

The redeeming feature of 3D Atlas, however, is the section on statistics: there is a wealth of information provided for those with trivia-hungry minds. The statistics can be shown as line graphs, as shades on the globe, or in ranking tables. There are about a dozen different subjects covered, including people and economics. Using the ranking tables you can move a pointer to extract statistics from within a 30-year period. Thus, you can trace people's average life expectancy, their average age of marriage and the total population of any country — and you get quite a shock when you look at how China's population has grown.

"3D geography lesson" would perhaps be a fitting description of this CD-ROM because the best bits by far are not the maps but the statistics and, if you have a good graphics card, the photographic montages.

Contact Electronic Arts
01753 549442
Price £64.99 (inc VAT)
Rating ●●●●○



Left If you don't like sharks, you can scan up and down to see other underwater life

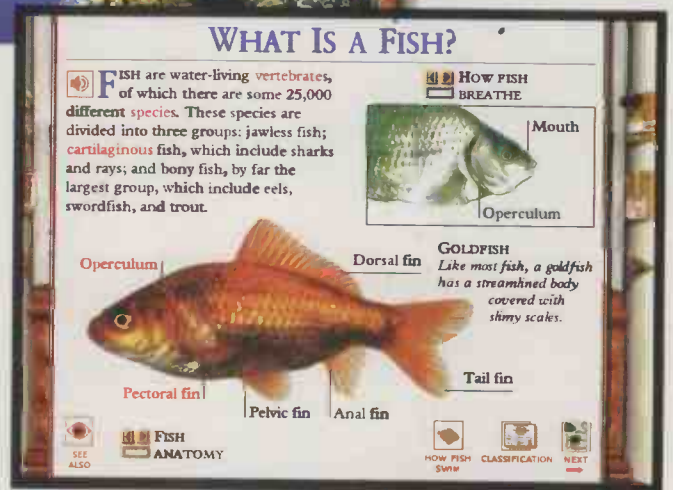
Below The Encyclopedia of Nature describes the different species before moving on to individual animals

Encyclopaedia of Nature

Nature — a wide subject that always makes me think of biology lessons at primary school, and in a way, this is the likely audience for this CD-ROM.

In typical Dorling Kindersley style, the main screen is very much like the Encyclopaedia of History, reviewed in PCW last month, and the Dorling Kindersley Encyclopaedia of Science. Some people may find this publisher's CD-ROMs depressingly repetitive in style, as you always know in advance how they will look, but that is the joy of all these works: you know you are using a quality product within which it is easy to move around and explore.

The Encyclopaedia of Nature is no exception. It principally focuses on the animal world, with mentions of plants and meteorological processes. Mammals and fish, the two areas likely to be of most interest, are accessible from posters on the main screen. Amphibians, reptiles, birds, plants and fungi, insects and invertebrates, can be pulled out of drawers. There is a barometer with which to explore climate, a



globe with which to discover habitats, and a fossil to use to access information about the prehistoric world. Finally, there are two books: one on the web of life (or food chains, to the uninitiated); and another, called The Green Book, on ecological matters.

Each and every one of these sections is packed with information. To help the user understand the basic principles, each section begins with an explanation of what constitutes a certain category — for instance, what is a fish, or what is a reptile? It then describes the different species within each category before moving on to individual animals. Throughout the CD more data is made available, by way of fact boxes and snippets of information, on such things as animal behaviour.

The other great thing about this CD-ROM is the sections of information on habitat for each of the animals and plants featured. If you want to see where

the great white shark swims, you are shown a representation of a coral reef, which not only pictures the shark but a plethora of other marine wildlife, too. You can scan up and down to view sea cucumbers, coral, sea anemones and angel-fish.

As usual, Dorling Kindersley manages to cram in a lot of information while presenting it in a form which is easy to assimilate. Probably because the CD-ROM is aimed at small children, it avoids subjects such as reproduction, yet surprisingly, the more complicated aspects of global warming are covered.

Some things are missing from this CD-ROM. On several occasions I would have preferred to see more detail on things like cloud formation, but there is enough on the disc to spark interest and make you want to find out more from other sources.

Contact Dorling Kindersley
0171 753 3488
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Rating ●●●●○

PCW



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Kids' Stuff

The world of nature, a history of the world, drawings and jigsaws, and party invitations with special fonts. It's been a busy time for Paul Begg and daughter Siobán (aged 9) as they worked their way through this month's children's software.

A few months ago I was walking through WH Smith's children's book department and a title attracted my attention. It wasn't cheap, but I thought it was good and bought it for Siobán. She was pleased with it, looked at it, read a bit, flicked through the pages, and I don't think it's been touched since. She knows it, she says, meaning that she's looked through it and seen everything of interest. Now the book doesn't hold any surprises for her.

I'm not sure whether putting books on CD-ROM is altogether a good thing, and I'm still alarmed that a book can cost £10 and a CD-ROM five times that, but children seem to explore a CD-ROM, if only to see what it can do, and I've found that they do pick up information as they explore.

Learning through exploration is the principle behind the successful Knowledge Adventure series, although this month my mind was particularly drawn to thinking about books on CD-ROM. One reason is that it's about now (as you read this) that the new Orders

for the National Curriculum announced last November are coming into effect. The principal point in the new Orders is that IT is now considered separate from Design and Technology, with which it was previously incorporated, and the expectations of IT teaching in schools are spelt out more clearly. More pertinently, though, the Department of Education has recognised that CD-ROM is a great aid to learning and has recently injected an additional £5m into the expanding CD-ROM libraries in primary schools.

The other reason for thinking about books on CD-ROM is that a couple of betas of Dorling Kindersley's Eyewitness Encyclopedia of Nature and Eyewitness Encyclopedia of World History came my way (these have been reviewed "for adults" in our CD-ROM column).

Dorling Kindersley has published a lot of hugely distinctive Eyewitness books — notable by the use of lots of white space and bright, colourful illustrations — and has already ported one of them across to CD-ROM, the Eyewitness Encyclopedia of Science. Though you get video, animation and narration, the CD-ROMs don't differ hugely from the books. This is a possible black mark against them. Because video and animations on the PC don't come near TV or even video quality, they are mainly of novelty value. There are some exceptions where the animation adds to understanding, such as the demonstration of how a dragonfly's

forewings and hind wings move in opposite directions. This couldn't be done as effectively in a book, and, while it would be easy to show on a video, a video lacks the interactivity. So, overall, transporting this sort of book to CD-ROM is a good idea.

Eyewitness Encyclopedia of Nature

Anyway, to return to the Eyewitness Encyclopedia of Nature, whereas the quantity of text in a picture book is com-

A smashing woodland picture with the magnifying glass option enabled



Right The main screen of the Eyewitness Encyclopedia of Nature



paratively small, here you get the equivalent of an average-sized book of text — about 70,000 words. Align this with more than 700 full-colour photographs and illustrations, over 60 animations and 50 video sequences, and two hours of audio, and it's clear that the CD-ROM far outstrips a book.

The Eyewitness Encyclopedia of Nature is packed with information on all the major animal and plant groups: amphibians, reptiles, birds, insects, invertebrates, and plants and fungi. There are special sections on Prehistoric Life, Microscopic Life and Climate, and two "books", Web of Life and The Green Book, which give an insight into the inter-relationships of the natural world and the latest thinking on environmental issues. Finally, a Quiz-Master feature lets you test your knowledge. If you want specific information, there's an index and an index of videos.

This is all wrapped in a clean and easy-to-use interface which includes a rather nice feature, the magnifying glass. Here you have a large picture, any part of which can be enlarged as if using a magnifying glass, to show even greater detail.

If I have one criticism it's that the beta version I saw had American narration and used American words such as "fall" for "autumn".

Eyewitness Encyclopedia of World History

I also received a beta of Doring Kindersley's Eyewitness Encyclopedia of World History. History is a subject almost made for CD-ROM and it is surprising that nobody has yet seen its full potential. I say this because sometimes you only want a brief summary of an event or a person's life, in

which case a weighty history book swamps you with information; but at other times you need to explore — sometimes in considerable detail — the various strands that go to make up a single event. In this case, you are likely to want that heavyweight book, and more. Maybe you'll even want the actual source material. Add this to the value of video, sound and a library of pictures, and it's easy to see how the storage capacity of CD-ROM could be used to provide a far more comprehensive account of historical events than would ever be possible in a book or, indeed, in any other medium.

Needless to say, the Eyewitness Encyclopedia of World History doesn't meet these expectations, but it is arranged in a way that again, encourages exploration. There are ten time periods, "Up To 500 BC" through to "After 1945", and the world is divided into The Americas, Europe, Africa & Middle East, and Asia and Australasia. Just pick your time period, then the area of geographical interest. For example, "Up to 500 BC" in Europe lets you explore Minoan Crete and Stonehenge.

You can search for specifics using the index, but there are also four "books": Everyday Life, Culture, Innovations and Who's Who. The latter is self

audio. Coverage is nevertheless superficial, but at least gives a bite-sized introduction to world historical events. Well worth taking a look at if you get the chance.

Jigsaws

I've never been a huge fan of jigsaws but Siobán likes to do one at the dining table occasionally, and there was a Disney jigsaw for the computer a few years back that she quite



explanatory, though coverage is not as extensive as I would have liked. Innovations looks at developments in transport, weapons and technology (inventions); Culture covers art, buildings and writing; Everyday Life explores clothing, food and medicine.

There are 150,000 words, more than 700 full-colour photographs and illustrations, over 75 animations, 25 video sequences and three hours of

The Eyewitness Encyclopedia of World History explores ten time periods, "Up To 500 BC" through to "After 1945". Martin Luther King (middle) is featured as part of modern times, and Minoan Crete (above) shows you something of olden times

liked. I thought I'd take a look at JigSoft, a new title from Guildsoft.

I can't say I was massively impressed. You can use one of the pictures supplied by JigSoft or import a picture of your own (most of the popular formats are covered), then choose how you want the puzzle cut and the level of difficulty; you can cut into a few big pieces for young children or loads of little pieces if you are a dedicated jigsawist. Other than this, JigSoft doesn't do that much. Nevertheless, it can keep young children occupied for a while and teaches shapes and being observant and mental skills, as well as how to use the mouse.

Also from Guildsoft comes Etch-a-Sketch. To be honest, I hurriedly glanced at Etch-a-Sketch and thought it was really bad. So bad, in fact, that I thought the greatest favour I could do for it was shoot it to put it out of its misery. But how hurried first impressions can deceive! I've spent hours with Etch-a-Sketch, much to Siobán's irritation, she being the artist in the family.

The concept is extremely simple and the results fascinating. You have an on-screen representation of the Etch-A-Sketch drawing slate. There are knobs for moving the cursor, and also for changing the direction of drawing lines, which is essential for drawing straight lines. For flowing curves there's Magnetic Draw, the drawing line following a magnet-shaped icon. You have erase effects and screen colours, plus drawing shapes. And you can print your creations as well as save them as Windows wallpaper.

Best of all, though, you can animate your pictures. This is brilliant when you've created more abstract drawings, and the only feature Etch-A-Sketch

creator Screen Magic forgot was a means of saving these animations as screensavers.

In addition to this, you get some simple games, a tracer (you can trace drawings) and sound effects.

Especially suitable for very young children and children's software reviewers, Etch-A-Sketch will provide hours of fun. And — something fast becoming unusual for children's software — both JigSoft and Etch-A-Sketch come on floppy disk.

Fonts

Fonts are pretty boring, so I'm always on the look out for fun fonts Siobán can use. I have a

few — some snow-capped letters that are great for Christmas messages and some clowns that can make nice party invitations, but otherwise fonts suitable for kids are pretty thin on the ground. That's why my eye was attracted to Kids Fonts from GSP.

You get 20 fun TrueType fonts: letters with eyes, letters shaped like spaghetti, letters shaped like pizza, letters shaped like storm clouds and rain clouds. Children can use these fonts to send messages to friends, such as: "It's raining. Come around to my house and play". Or: "Mummy says it's okay for you to come and have PIZZA!" You get the idea.



Top Etch-a-Sketch: I never claimed to be an artist, but it does look pretty. **Above JigSoft:** Picture completed

I was amused, though, by a warning on the box that GSP "accept no responsibility for the grossly inappropriate use of these fonts... Please do not send documents created with Kids Fonts to Bank Managers, Accountants or Solicitors." I wonder if GSP accept responsibility for the merely slightly inappropriate use of the fonts, such as to Headmasters?

A nice buy, and an extremely inexpensive way to produce your own party invitations, kid's letter headings, even cards and labels.

PCW Details

Eyewitness History of the World/ Eyewitness History of Nature

Price About £59 inc VAT each

Contact Dorling Kindersley
0171 836 5411

Rating ★★★★★

JigSoft

Price £29.95 inc VAT

Contact Guildsoft
01752 895100

Rating ★★☆☆☆

Etch-A-Sketch

Price £19.95 inc VAT

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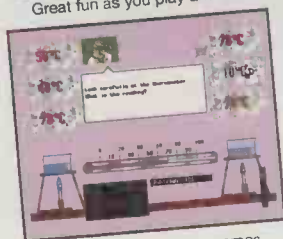
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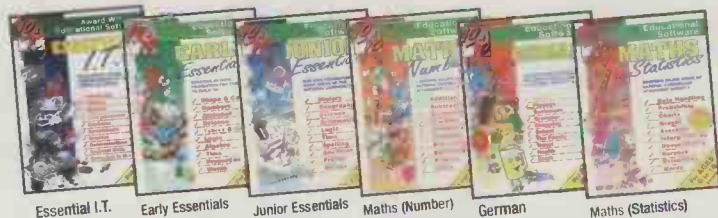


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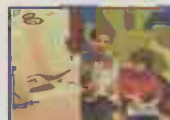
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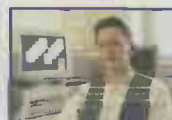


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Steve Botterill (MD) 10 out of 10 Interviewed by Granada TV on 'The Program'



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Win copies of Windows 95 and Office 95

Microsoft has given us ten copies of Windows 95 and Office 95 to give away. If you haven't already looked through the feature starting on page 103, here are a few reasons why it's worth upgrading.

With Windows 95 you can take advantage of new, faster 32-bit applications and see significant improvements in speed, even if you have a 386-based PC. Better multi-tasking allows you to work in one application while another is sending a fax, for example.

One of the most welcome additions is long filenames within native applications, including Office 95. Improvements to multimedia include digital video built in to the OS and utilities for optimising CD-ROM performance.

To win a copy of both Windows 95 and Office, tell us what Windows 95 was called in the initial Beta Test program. Was it:

- (a) Philadelphia
- (b) New York
- (c) Chicago
- (d) San Francisco

Win a copy of WordScan 4.0

We're quite attached to WordScan in the PCW office: it saves us from re-keying reams of documents, including

your letters. Now that version 4.0 has arrived, offering even better accuracy, less time is needed to edit and format scanned-in text. This improvement is brought about by using a new OCR engine, called POWR, that enables the computer to read entire words without first having to isolate its individual letters. Caere is the first OCR developer to invest in this technology, which until now has only been used in laboratories for DNA matching.

Although WordScan uses extremely complex algorithms, it's incredibly easy to use. A new Microsoft Word feature enables you to OCR a document, then drop the formatted text straight into Word, all at the push of a button. This feature will also work with any other Windows application.

There's integration with fax applications, including WinFax Pro and FaxWorks, and the ability to OCR documents from the receive log. WordScan's support for Twain makes it compatible with most scanners.

We have three copies of WordScan to give away. To win a copy, tell us what improved OCR technology is used in WordScan. Is it:

- (a) Read and Write
- (b) Power Scan
- (c) Intelligent Scan
- (d) POWR

Win a scanner

Computers Unlimited has given us a Visioneer Paperport to give away (for a review, see this month's First Impressions). The Paperport measured just 12 x 3.5 x 3in and is the perfect solution for OCR and document management. It connects to your PC via the serial port, making it compatible with both desktop and notebook PCs, and comes with its own OCR package. It will also work with WordScan 4.0 should you require greater accuracy and flexibility. Text and images are scanned at 400dpi and even faxed documents are resolved

with great accuracy.

To win the Paperport, all you have to do is tell us what OCR stands for. Is it:

- (a) Original Character Recognition
- (b) Optical Character Recognition
- (c) Organise Characters Right
- (d) Something else

How to enter

To enter any of our competitions, call 0839 767722 to leave your answers. Calls will be charged at 39p per minute cheap rate, 49p at all other times.

Rules of entry

Competitions are open to all readers of *Personal Computer World* except for employees, and their families, of VNU Business Publications, Microsoft, Caere and Computers Unlimited. All entries must be made by 20th September 1995. The Editor of PCW is the sole judge of the competition and his decision is final. No cash alternative is available in lieu of prizes.

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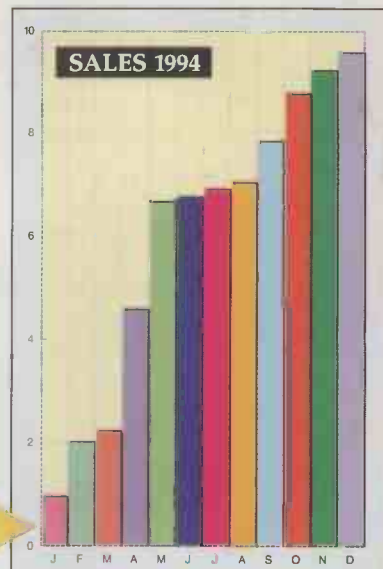
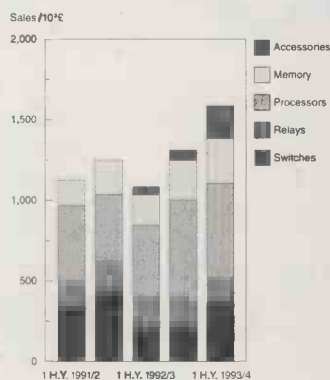
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Sales Breakdown By Product Group



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screenplay NEWS

MPEG action

Sigma Designs, inventor of the ReelMagic MPEG playback card, has announced a new series of MPEG titles for the PC. The company is set to publish nine CD-ROMs, ranging from interactive action thrillers through to children's classics such as *Sleeping Beauty* and *Aladdin*.

Most intriguing is *Silent Steel*, billed as an all-video, cinematic strategy game with an advancing, branching storyline that leads to multiple outcomes. The player stars as captain of the nuclear submarine U.S.S. Idaho, which is being stalked by a mysterious enemy vessel typically packed with baddies bent on world domination. It's up to you to stop them.

Other releases include *In The Company Of Whales*, a multimedia documentary narrated by Patrick Stewart, and *Return to Cyber City*, the sequel to the popular CD-i and PC arcade game. *Sigma Designs 001 510 770 2673 (US)*



Jump for joypad

Featured last month in our new Gadgets section, the Euromax Phase 9 Phantom 2+ has become the world's leading PC joypad in just two months. Over 50,000 units have been sold

so far, and games manufacturers and retailers alike are singing its praises.

Bullfrog Productions, of *Magic Carpet* fame, is standardising on the Phantom as their default games controller.

Along with full eight-way

movement and a slick,

transparent design, the Phantom 2+

boasts six independent fire buttons and retails

for £19.99.

Euromax 01262 601006

CUTTING EDGE

Virgin's all white

Following the success of its first selection of budget-priced "White Label" titles, Virgin has unveiled the next four games in the series.

Joining such classics as *Lands of Lore* and *IndyCar Racing* are *Dune*, *Overlord*, *Buzz Aldrin's Race Into Space* and *SimCity Enhanced*.

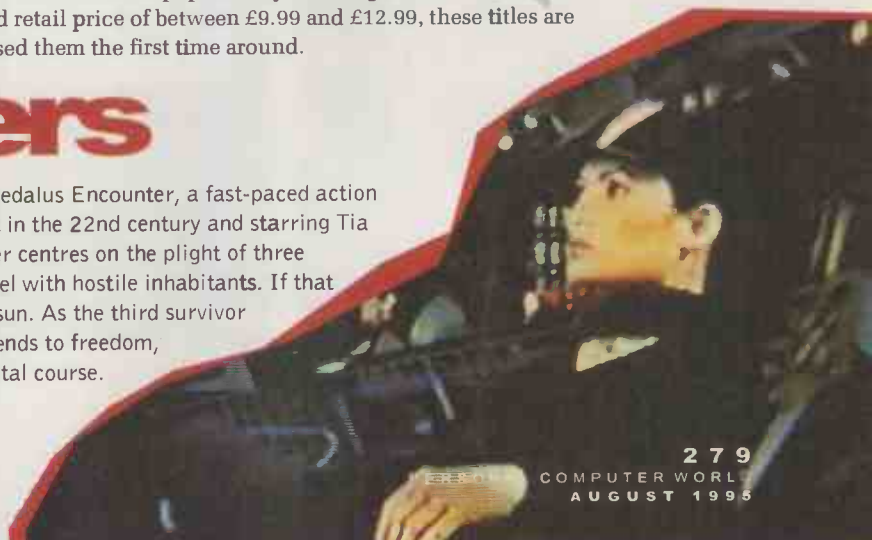
Based on Frank Herbert's best-selling science fiction novels, *Dune* throws the player head first into a strange world of spice mines, sand worms and megalomaniacs. *Overlord* puts you in the cockpit of World War II planes for an atmospheric recreation of D-Day, while *Buzz Aldrin's Race Into Space* drops users off in 1957 with the simple task of putting a man on the moon. *SimCity Enhanced* is the ultimate version of the popular city-building simulation.

With a recommended retail price of between £9.99 and £12.99, these titles are worth a look if you missed them the first time around.

Close Encounters

Leadng 3D0 player Panasonic has released *The Daedalus Encounter*, a fast-paced action affair with real actors and movie-like footage. Set in the 22nd century and starring Tia Carrere and Christian Bocker, *Daedalus Encounter* centres on the plight of three survivors of an intergalactic war, trapped in an alien vessel with hostile inhabitants. If that weren't enough, the ship is on a collision course with the sun. As the third survivor who exists only as consciousness, you must guide your friends to freedom, help them battle the aliens and navigate the ship off its fatal course.

Already available on the PC and Mac, *The Daedalus Encounter* for 3D0 should be in the shops now.



Screenplay

Rise of the Triad

It may be another Doom-alike, but Rise of the Triad has sharper graphics and smoother movement. Daniel Robinson learned just how easy it is to get zapped if you take your eyes off the weapon.

The scene is the not-too-distant future, and Los Angeles is in dire peril. A bizarre religious cult is planning the deaths of millions of people when it detonates bombs planted around the city.

That's the storyline, anyway. But however curiously topical the doomsday scenario might seem in light of current events in Japan, you can safely forget it because this is yet another clone of the now infamous Doom. All you really need to know is to shoot anything that moves as you progress through the various levels of the game.

The Doom format has been followed pretty faithfully, even down to using the same keys to control the action. Doom fans will feel at home, especially as Rise of the Triad (ROTT) supports the multiplayer features that made that game so addictive. You can battle against up to 10 other human players if you have an IPX-compatible network, with modem and serial port links also supported.

Your part in the game is that of an elite operative of HUNT (High-risk United Nations Taskforce). You happen to stumble cross the fortress-monastery home of the Triad on a remote island, so it's down to you to stop them. A neat twist on the average Doom-a-likes is that you can choose to be one of five personalities, two of which are female, and each has his/her own

strengths and attributes.

As a Doom addict, I must admit that ROTT seems to have a slight edge in terms of

sharper graphics and smoother movement. The bad guys are much more realistic than the rather pixellated monsters of

Doom, and there is a much wider range of weapons, such as the awesome "Hand of God". The bazooka and heat-seeking

Point, shoot and splat

Right The violence level is adjustable, so the squeamish can get rid of the blood and flying entrails

Below The "Hand of God" makes you temporarily invincible. Enjoy it while it lasts...



The Complete Idiot's Guide To PC Games

missiles are particularly good for those who enjoy this sort of thing, as your unfortunate victims visibly explode into fragments all over the scenery. In network games, you can even taunt the other players — RemoteRidicule lets you pre-record voice messages, which are played on your opponent's PC when you hit the appropriate hot-key.

On the downside, it does seem ridiculously easy to get killed if you aren't careful. Stepping around a corner without looking can lead to you being instantly terminated without even seeing what it was that zapped you. Games fanatics will no doubt claim that this adds to the challenge. All in all, a compelling game: anyone who liked Doom will be instantly hooked again.

System Requirements:
(Minimum) 40MHz 386DX with 4Mb RAM, sound card.
(Recommended) 66MHz 486DX2 with 8Mb RAM, local bus graphics, sound card.
Price: £29.99 (disk), £34.99 (CD)
Contact: US Gold 0121 625 3366

The brave new multimedia world we live in sometimes makes it difficult to categorise things when they arrive. This book, for example. It's a book, so perhaps it should go in the books section? But it comes with a CD-ROM, so shouldn't it go in the CD-ROM section? As far as I'm concerned, it's more or less of a shareware game compilation with a book of tips attached, so that's why it's here.

If you are a computer novice or are just interested in PC games but haven't bought a system yet, this book explains what components and peripherals you need for good gameplay, how to upgrade your PC to add sound and a CD-ROM, how to get online with a modem, and how to squeeze more conventional memory out of your PC.

Although some of the chapters have been written specially for the book, a lot of them seem to have been loosely adapted from similar chapters from other books in the "Idiots" series. This is fine most of the time, but some advice that is fine for business users is bad for gamers. If you are running out of hard disk capacity (a common problem for PC gamers), one thing the book suggests you do is compress your drive using DriveSpace or Stacker. Unfortunately, many games either do not work,

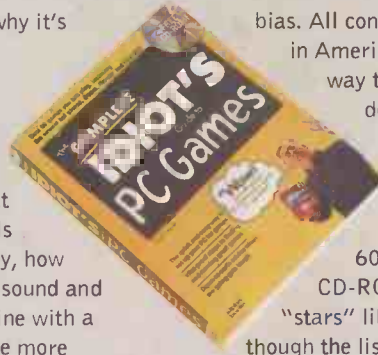
or work badly, when used on a compressed drive. It also suggests buying a video card with at least 2Mb of RAM — possibly a good idea for business Windows users and essential for artists, but irrelevant for gamers. Even the most demanding games only presently use at most 512Kb of video memory.

Other irritations come with its American bias. All contact numbers and addresses are in America, and it states that the best way to get shareware games is to download them on line (fine if you have free local calls, but it could be costly here).

What makes the book hard to resist is the more than 60 games on its accompanying CD-ROM. These include most of the "stars" like Doom, Heretic and Descent, though the list is bulked up with some really poor efforts like Snarf and Win Hangman. The last 70 pages are taken up with descriptions of the games and screenshots, but by the time they've provided contact details to register each game, information about system requirements and installation, and a couple of screenshots, there isn't much room to provide more than rudimentary hints and tips.

David Brake

Price: £19.95. Publisher: Alpha Books.
 ISBN: 1-56761-547-3



Full Throttle

'Howdy stranger. Mighty nice bike you got there. Round these parts there's a legend about a biker, the meanest, hard-riding, gravel-chewing, punk-stomping biker of them all — Ben Watsiname. Ben was the leader of the Polecats, and this one time he had a real adventure. Belly on up, take a load off and I'll tell you all about it.'

Set in the mid west and billed as a heavy-metal adventure, Full Throttle is the latest release from LucasArts. The game casts you as biker Ben, complete with authentic five o'clock shadow, and kicks off in the Kick Stand saloon with a few beers and a shady

deal. Seconds later you find yourself outside, out cold.

With your gang gone, suckered into believing that you're escorting the last great domestic bike-producer, old man Corley, to his annual shareholders meeting, it's up to you to find out just what is going on. Who



Five o'clock shadows

Ben the biker's lost his gang and the keys to his machine, but he's not stalling: he's off to right these wrongs and have a turbo-charged adventure into the bargain. Chris Cain rode pillion.



Mean-looking wheels

was that slime ball in the suit at the bar? Why would anyone want to hijack the Polecats? Where are the keys to your precious bike?

With questions like these piling up in your head, the adventure begins.

The best place to start any investigation is at the scene of the crime, so nipping back to the bar for a chat with the owner is a good idea. Asking



nice) may get you all the right answers, but Ben can resort to other forms of persuasion. A swift click in the pixels has been known to work wonders.

Further exploration brings Ben face to face with the leader of a rival gang, the Rottweilers, a reporter with an unhealthy interest in accidents, and Maureen the mechanic, aka Mo. Born with a silver monkey wrench in her mouth, Mo is great with her hands and for all kinds of technical tasks. She even makes a pretty good doctor, so keep on the right side of her at all costs.

Other parts of Full Throttle have you dodging manic truck drivers, kicking down doors, hiding from the police and being tied up. The quest to rescue your gang and set the

world to rights won't be an easy one, but it's all in a day's work for your average all-American biker.

As with other products from LucasArts, the graphics in Full Throttle are slick, well animated and atmospheric. The opening sequence alone, combined with pounding heavy-metal tunes, is enough to make you rush out and buy a black studded jacket. All the characters have been well thought out, and the background images fit the story perfectly. Ben even has a whole range of facial expressions that change depending on the action you take.

The audio side is just as polished, and the game uses voiceovers by actors to bring everything to life. Ben himself

is played by Roy Conrad, while Kath Soucie and Mark Hamill make up the rest of the main characters. There's plenty of "colourful" language in there, too. A heavy-metal soundtrack by The Gone Jackals helps to keep the pace going.

Full Throttle uses a mouse-driven, interactive interface, designed using LucasArts' SCUMM adventure system.

The learning curve is two to three minutes tops. Don your shades and kickstart your PC for a wheelie good adventure.

System Requirements: 486DX/33, double-speed CD-ROM, DOS 5.0 or higher, 8Mb RAM, mouse, 1Mb hard disk space for minimum install.

Price: £49.99

Contact: Virgin Interactive
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8	Civil War (CD)	Empire
9	Descent (CD)	Interplay
10	Monty Python (CD)	Comptons

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7	Stalingrad (CD)	US Gold
8	Links Pro Golf	Access
9	Peter Gabriel-Xplora (CD)	Real World
10	Flashback	US Gold

Leisure Lines

Brainteasers courtesy of JJ Clessa.

This Month's Quickie

Yesterday at ten past three in the afternoon, my granddaughter told me that our cuckoo clock had struck 33 times since she had begun counting. Since she can count, but can't tell the time, what time was it when she began counting? (By the way, you can assume she started exactly on the hour or half hour — which is the frequency with which the clock strikes.)

This Month's Prize Puzzle

A not-too-difficult (we think)

logic problem, this month.

Four brothers — Aaron, Brian, Colin and David — are standing side by side.

1. One of the brothers has acne, dimples and warts.
2. Two brothers who do not have acne are standing next to Aaron.
3. Brian is the only brother standing next to exactly one brother with warts.
4. Colin is the only brother not standing next to exactly one brother with dimples.

Which brother has acne, dimples and warts?

Answers on a postcard or the back of a sealed envelope — no letters or floppy disks, please. Send to: PCW Prize Puzzle — September 1995,

P.O. Box 99, Harrogate, N. Yorks HG2 0XJ, to arrive not later than 20th September 1995.

Good Luck!

Winner of June 1995

Prize Puzzle

Not a great response to our puzzle about pigs, cows and sheep. Unfortunately we didn't specify the problem exactly enough, and as a result, many solutions were possible. In fact, the way the question was worded, it turns out that 28 solutions were possible. (Not 34, since we did say "cows" and not "cow" in the question.) So we accepted any correct solution to be eligible for the usual draw.

The winning card, drawn by our equivalent of ERNIE, came from a lady this month — Mrs HP Higgs of St. Leonards-on-Sea. Congratulations, Mrs Higgs, your prize will soon be with you.

The answer we expected was 12 cows, 15 pigs and 20 sheep. We won't bother printing the remaining possible solutions.

By the way, we've decided to get our Ernie to draw our lottery ticket every week. So, if the column suddenly stops, you'll know we're on a world cruise (or the editor has fired us!).

Usual message to all the also-rans — keep trying, it could be your turn next.

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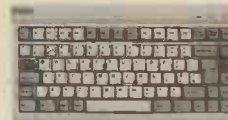
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If you want regular Windows 95 coverage, *PCW* is the place to look. In this month's Hands On, Tim Nott continues his preview of Win95, which is finally due to ship towards the end of the month.

Hands On remains the place where readers can contribute to *PCW*, and as always we'll pay for anything we use. Macros, sections of code and hints and tips will be rewarded with a £20 book or record token (please say which you'd prefer) and we'll pay hard cash for longer, more involved pieces. Please include relevant screenshots in GIF format.

All submissions should be emailed to the author of the appropriate section or snailmailed to Hands On, *Personal Computer World* Editorial, VNU House, 32-34 Broadwick Street, London W1A 2HG. Questions and short hints and tips can be faxed on 0171 316 9313.

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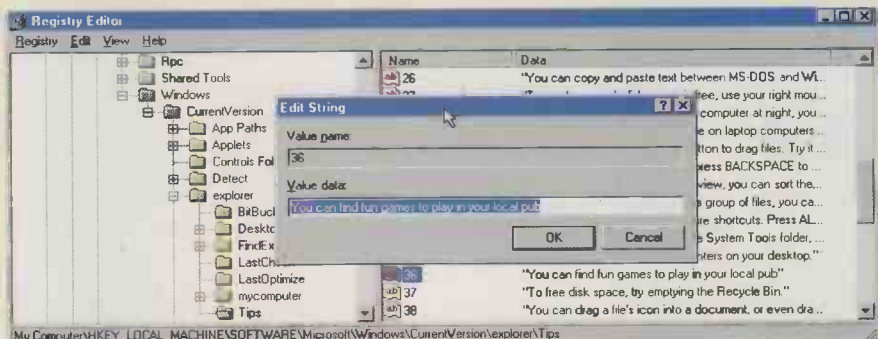
The wicked Wizard

With so much nonsense being written about the Registration Wizard, Tim Nott thinks it's time he set the record straight.

There has been much shock horror in the computer press about the deviousness of the Registration Wizard. Various critics have described this as "viral", and speculated that it sends anything from a complete directory listing of your hard disk to your inside leg measurement. Similarly inept was the initial Microsoft reaction online. "The Wizard does not transmit any information about any software on your machine other than the specific Microsoft software which it looks for and asks you for permission to transmit. The Wizard does not transmit any other files from your computer. The Wizard does not transmit your directory structure either. You may consider this an official response from Microsoft. You may crosspost this. You may also publish it." This was closely followed by the admission that it does, in fact, transmit details of installed rival products.

At the time of writing this column the official line was that yes, it does send information on both Microsoft and non-Microsoft products, but only with your permission. It does send hardware details and your name and address — but again, only with your permission. It doesn't send any other files, directory listings or serial numbers. "For a list of the exact information gathered by online registration, the user can view the REGINFO.TXT file found in the C:\WINDOWS directory of the local computer." The release concluded with the fine piece of spin-doctoring that this "helps Microsoft build better products, as well as offer customers better information on their programs and better product support".

Despite a lot of heated debate, I couldn't find anyone who'd actually tried this on their PC, so as I have nothing to



Customising those Welcome messages with the Registry editor

hide from Microsoft, I went for it. I can report that it asked my permission for everything, asked if I was sure I wanted to transmit the information, dialled up the Microsoft Network, then thanked me. I can also report that I can't find hide nor hair of REGINFO.TXT. However, I did find the information — as I'd given it — squirreled away in the Registry, so perhaps this has been subject to a beta version change.

Finally, I can report that the Wizard's detective skills rival those of Inspector Clouseau. Out of over 50 Microsoft and other applications it reported but two: Microsoft Works and WordPerfect. Whether this is what was actually transmitted, is open to a whole new round of fun-packed paranoid speculation, but the few seconds of connection were certainly not long enough to transmit a full disk listing at MSNet's lugubrious data rates.

Rabbiting on

There's been a lot of feedback about the full window dragging/sizing "secret" revealed in July's column, much of which was along the lines of "What are you on

about?" or even "What are you on?". First, I should have explained that putting ILOVEBUNNY32=1 in the [windows] section of WIN.INI doesn't automatically enable this on its own. Bunny lovers will have to hop over to Control Panel/Display or right click on the desktop and choose Properties. Click on the Settings tab and you should see two new checkboxes, one for full window drag/size and one for font smoothing.

The bad news is that not all display cards support these functions; the boxes may be greyed out. There's worse news as this doesn't work at all with builds later than the preview and apparently won't be a standard feature of Windows 95. Instead, it will form part of Microsoft Plus! for Windows 95.

As I have an abhorrence! of silly punc-

tuation marks! in the middle of sentences, as well as product names that are five words long, I'll refer to this henceforth as Plus. Plus what? Plus when? Plus how much?

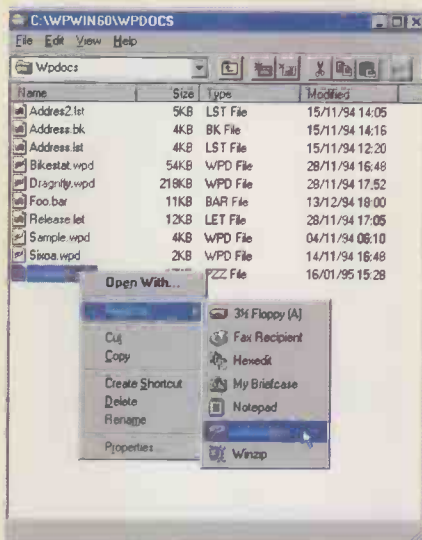
The "what", according to the Microsoft press release, is a System Agent that provides smart versions of DriveSpace, ScanDisk and Defrag that work automatically in the background to keep your PC in top shape. Then, as well as font smoothing and full-window drag, there's a range of desktop bolt-on goodies in the form of themed wallpapers, colour schemes, fonts, icons, sounds and animated cursors. A Multimedia Pinball game is promised, if you're getting bored with Freecell, and the Internet Jumpstart kit, which will provide "easy sign-up and one-button access to the Internet". The "when" is "expected within 60 days of the release of Windows 95" and "how much" is "expected to be under £40".

Your correspondent has yet to see a beta of this, so will believe it when he sees it, but meanwhile, you may remember last month we looked at how to associate file types with more than one application, so, for example, right-clicking on a BMP file offered the choice of opening it with the

native Paintbrush or a third-party application such as Paintshop Pro or Photostyler. A variation on this theme is the Send To option on the menu that appears when you right-click a file. This doesn't rely on associations with a file type, so you can "send" any file to a named destination.

By default you'll have floppy disk, and if you have the software installed, your Briefcase, Fax Recipient and maybe some other destinations. This would seem to indicate that Send To is essentially a smart file-copying tool, but it goes much further than that. Try, for example, opening the main Windows folder and the Windows/SendTo folder. Right-drag NOTEPAD.EXE out of the former into the latter and choose Create Shortcut. Now right-click on any file, choose Send To and you'll see that Notepad is added to the list of possible destinations. Hence you can now send *any* file to Notepad, which is especially useful for all those odd-named text files such as READ.ME, README.NOW or README.1ST, for example. And there's no reason to stop there — there are all sorts of useful destinations to which you can send a file, or group of files. If you use an archiving utility such as WinZip you can add a shortcut to it in the SendTo folder and send a bunch of files to be zipped up. If you're an inveterate meddler or just plain nosy, like me, you can add a hex editor.

The possibilities are really only limited by your imagination, but one useful option is the Windows 95 viewer: QUIKVIEW.EXE in WINDOWS\SYSTEM\VIEWERS. Since this option is already on the menu for many registered file types, it might at first seem redundant. But playing around with the viewer shows there's rather more to it than meets the eye. For example, I can find nothing in the documentation to say that the viewer can read GIF files. Yet, as dragging one onto an open Viewer window will confirm, it can, so it's always worth a try. Similarly, there's a viewer for WordPerfect files, but as that application takes a rather liberal attitude to file extensions, you may have WP documents with all sorts of extensions that it would be laborious or even impossible to register individually. I've tried renaming these to all sorts of silly extensions, but after a query message saying "There are no registered viewers for this type of file - would you like to try the default?" it seems to work every time. In an extreme fit of destructive perversity I even tried renaming them to BMP and TXT, but I couldn't confuse it — the viewer showed exactly the same as with a WPD extension.



You can send any file anywhere you like...

A warmer welcome

Here's some good news about those "Welcome to Windows 95" tips of the day. Though useful at first, half a dozen or so repetitions of "You can minimize neck strain by positioning your monitor at eye level" tends to grate. I mean, where do they think I might have the thing positioned? Down the bottom of the garden? Of course, the sensible thing is to turn it off (the tip box, not the monitor), but those with a more twisted imagination will be delighted to learn that you can create your own messages. Boldly go to the Registry Editor, which you should find by hitting the Start button and going through Programs/Accessories/System Tools.

You'll find a rather intimidating list of things such as HKEY_CLASSES_ROOT and HKEY_LOCAL_MACHINE. As you click on these, they will expand into a seemingly infinite tree of sub-entries, like some bizarre text fractal. I found the tips by clicking down through HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\CurrentVersion\Windows\explorer/Tips. Alternatively, run Edit/Find... on Tips and keep hitting F3 until you see a list of the tips in the right-hand pane. Double-click on the icon next to the one you'd like to change and type the new text into the dialogue box. Close the Registry Editor, the changes will be saved automatically, and in the fullness of time your custom message(s) will appear on the Welcome panel.

PCW Contacts

Keep the feedback flowing in, by post to PCW or by email to timn@cix.compulink.co.uk

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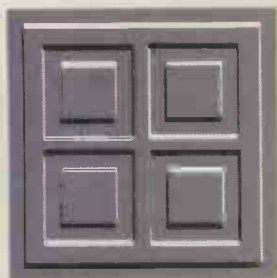
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Game on

We all need a break occasionally, including Tim Nott who refreshes his palate, jaded by little puzzly-type Windows games, by embarking on an orgy of downloading from CIX, to taste the latest shareware games. There's more on RAM upgrades too, as well as tips to help you work with Windows.

It's about time we had some fun. I don't mean doing silly things with desktop settings, or gazing at the latest in screensavers, but real fun — playing games. After all, that's what computers are really for, isn't it? But when you think of successful games, such as *Seventh Guest*, *Myst*, *Alone in the Dark*, *Indiana Jones*, *Day of the Tentacle*, and (it pains me to admit) *Doom*, Windows is rather an also-ran in the platform stakes. Commercially, what have we got? *Sim Earth*, *Sim City*... yawn. *Microsoft Golf*... snore. *Microsoft Arcade*... nostalgia. Then there's lots of little card or puzzly-type things: variations on *Minesweeper*, shareware games that are sometimes good (for instance, *Kye*) or sometimes rivetingly dull (*Barrow*, a game where you shoot balloons with a bow and arrow). There's certainly nothing on the Windows shareware scene to touch the *Commander Keen* series or *Jazz Jackrabbit* — at least, there wasn't the last time I looked.

So, thinking that it was high time I had another look, I embarked on an orgy of downloading from CIX. First down the wire, weighing in at a modest 87kb, was *Puzzle* (*1pz11a.zip* from *Windows/Files*).



Boxes — for those who find Tetris too easy

This shareware game, created by the reassuringly-named software house *Idle Time*, consists of just one file which includes an interactive help screen.

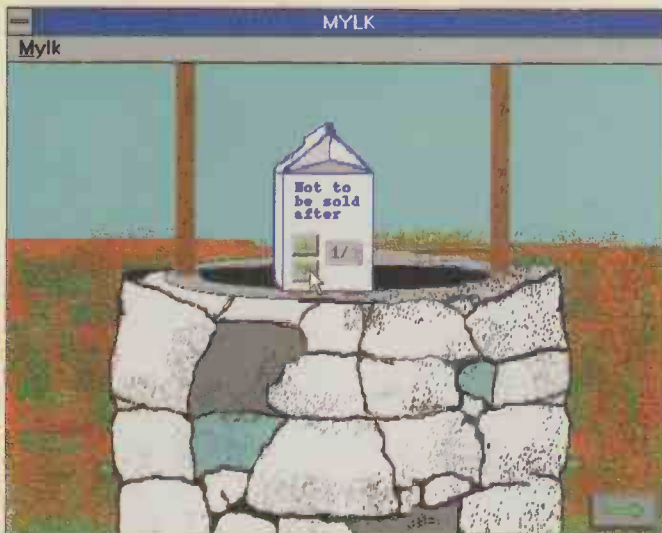
The game consists of a grid of tiles each bearing different symbols and the object is to press all the tiles down: for example, clicking on a tile with a + sign pushes down that tile, as well as its neighbours to the north, south, east and west. An "X" affects the NE, NW, SE and SW, and so on. A piece of cake really, except for the major irritation that once a tile is

down, clicking on another tile which affects that square will bring it back up. Earlier on, I thought it I might have had to make a straight choice between getting this column in on time and completing the first level. But having found the "hint" feature, I'm starting to get the hang of it now. Registration costs \$12.95, it's infuriating and addictive, so to preserve sanity I'll move on to *Stellar Explorer* (*Windows/Files/Stellar.zip*).

To boldly warp...

This is a relatively ancient game (1992 file dates) but one I'd never seen before. The screen consists of a ten-by-ten grid with a load of trekkie-titled buttons such as "Photon", "Phasers" and "Warp" (no, it's not from IBM, it comes from *Technological Computer Innovations of Lafayette*), and an impressive array of flashing lights. The object of the game is to "eliminate all the aliens before you are destroyed." However, this reassuringly American gung-ho mission doesn't involve any split-second arcade action — it's essentially a board game. There are sound effects though and various bits of the screen flash when something exciting is happening. Well, perhaps "exciting" is an overstatement. Personally I found it less interesting than *Notepad*, but if your idea of a challenge is to decipher (from the Help file) what sentences such as "When viewing the short range scan, warping is done within a quadrant" means, you may like it enough to fork out the \$20 registration fee. Meanwhile, I made my excuses and boldly went.

Boxes (also in *Windows/Files* on CIX as *boxes400.zip*) shows an immediate touch of class by playing non-stop *mid-Beethoven*. The game is a little like *Tetris*, in that blocks fall from the top of the screen. You have to guide each block to come to rest on a crate of the same colour. Pile three boxes on top of a crate, and you've cleared that crate — it disappears. Clear all the crates and you've completed the level. The sting in the tail is that the boxes fall in pairs of different colours. The first level is trivial, but once you move up from kindergarten level you begin to appreciate the sheer, dedicated, sadism of the *DynoTech* programmers. At championship level it's a serious mental health risk but great fun. Registration (which entitles you to many more levels) is \$15 for the standard *Boxes* and \$20 for the championship version.



Well, well, well —
it's Mylk

In the moo'd

Next came Mylk — “the mystical low fat adventure that will become your world” and a distinctly high fat 2.25Mb download. This was originally written for the Macintosh by Bart Gold and converted to Windows by Wayne Twitchell. It's written as a pyss-take of — sorry, tribute to — Myst, and no, I didn't make those names up. I found it, once more, in the Windows/Files topic but if you're not a CIXen, try emailing the author at bartacus@caprica.com for other sources. There's only one menu and the help file consists of “Click on everything — tables, stands, cartons and buttons”. It's also one of the first applications I've seen that uses the new Microsoft graphics system, WinG. It must be said, however, that pictorial content is not really its strong suit, but this is much redeemed by the storyline and gameplay.

Now, let's see if I can get this right: you're on this island, see; solve the first puzzle, and the ashtray with six little stones in it changes into an animated bull, which tells you that someone's been destroying the milk cartons. It could be Frances the chicken, or maybe Farmer Ben. Or was that Ben the Chicken and Farmer Frances? Never mind.

Check out the books in the barn, and examine carefully anything that looks like a milk carton. It may be animated, or depending on the sell-by date it may transport you to the magic mountain where the celebrated Swiss Army knife puzzle is to be found. Solve that one, and you're well on the way to discovering where the farmer keeps his moonshine.

Meanwhile, back at the ranch, you're this cow Elsie, if you see what I mean. Oh, and that thing with the stones in it isn't an ashtray at all; the

screen tells me it's a “forechamber imager”. Now, where was I? Down by the well, I think, where this milk carton appears to be some sort of time machine. Come to mention it, the manure heap smells a bit off, too, and I can't find the fruit machine any more — I'm sure it was there last night.

Nothing is quite what it seems, here. Mylk is delightfully weird, seriously puzzling, and was all done with Macromedia Director. There are lots of jolly noises and tiny animations to liven up the rather dull graphics, and it's absolutely free.

Finally, from the Winrobots CIX conference comes Robot Battle, by Brad Schick (robotbt@aol.com). This starts off simply

The 'infernally addictive' Puzzle



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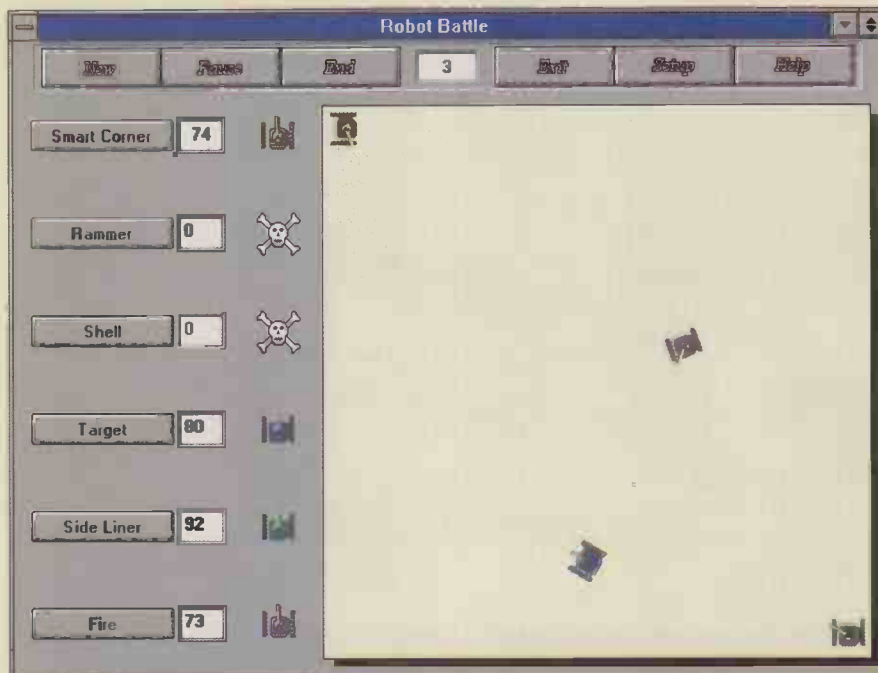
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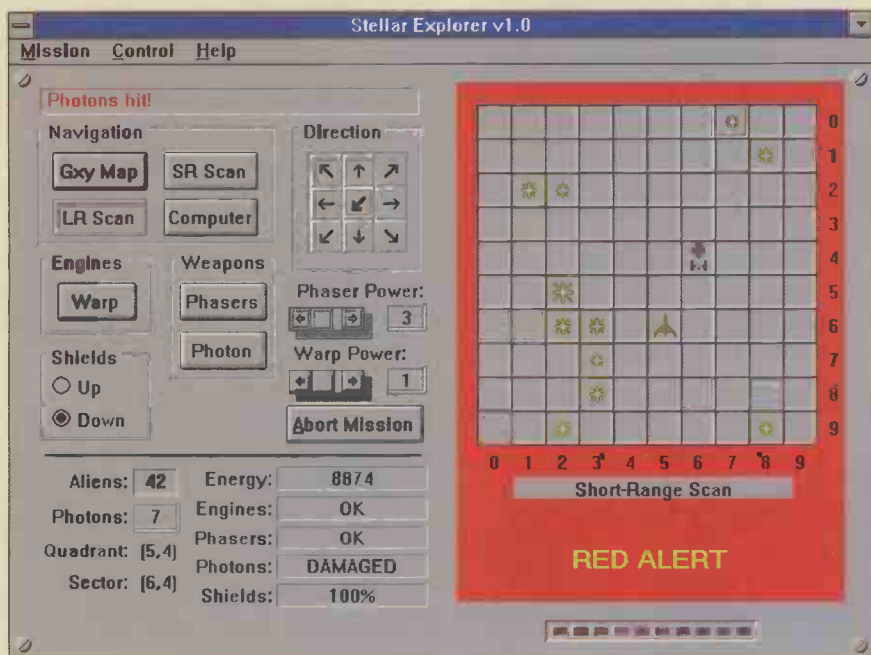
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enough: choose up to six robots, then let them get on with it. They are all represented by little tanks of different colours but they behave in different ways: the Rammer tries to destroy other robots by crashing into them; the Side Liner runs up and down the side of the arena desperately trying to avoid conflict, rather like the school weed at football. Eventually, one robot will see off all the rest and sit in a corner wagging its gun triumphantly and letting off the occasional celebratory round. The challenge starts when you begin designing your own robots, using what the manual refers to as "a simple scripting language". This uses commands such as "DtcCookieEvents (boolean)" which is "used to either turn on or off, handling of energy cookie detection events" so I must admit I have yet to really get the hang of this. Suffice it to say that you seem to be able to control all aspects of a robot's



Above Robot Battle — Sit back, relax, and watch the little blighters destroy each other



Left Warring with Stellar Explorer — will the engines take it?

behaviour and event-handling. What makes this game really different is that you can pitch your robot against others in an international contest. The next takes place on 1st November, with cash prizes for the winner and five runners-up. It costs \$10 to enter a robot, and \$25 to register the program, although you don't need to do the latter to compete.

Columnist in egg-on-face shock!

In the April issue of PCW, I wagged a stern finger at Nildram for releasing a shareware product which, in my opinion, was a crippled version of the registered edition and thus not really in the shareware spirit. I'm very pleased to report that despite this,

Screen Thief has been nominated for two international shareware awards. Well, I did say it was excellent, apart from that.

Feedback

In July's column about RAM upgrades, I mentioned that 30-pin SIMMs were rapidly falling out of favour and that most, if not all, PCI local bus motherboards will only take the 72-pin variety. "Thank you" to someone who signs themselves as Ivor B, for pointing out that there is an alternative to trading in your old SIMMs if you upgrade the motherboard. It's a SIMM Swapper, a 72-pin holder that will hold 4 x 30-pin SIMMs. It uses 8-bit or 9-bit SIMMs to make 32-bit or 36-bit 72-pin SIMMs. It

takes combinations of 256Kb, 1Mb or 4Mb 30-pins x 4, to give 1Mb, 4Mb, or 16Mb respectively. More details are available, Ivor tells me, from Linefeed, or HCS.

Going further back in time, to the days of disk spring-cleaning, Charles Drayson's question is so obvious that it never occurred to me at the time. He emailed me to ask: "Is there a text which describes the files which come with Windows so that I can try to identify those that didn't?" The good news is that there is. It's called LAYOUTS.WRI and lists every file on the installation disks, what each one does, and which disk it is on. There's just one tiny snag. Go on, guess. Yup, that's right; LAYOUTS.WRI is not, itself, one of these files. It's part of the Windows Resource Kit which can be bought from Microsoft as a book with disks or downloaded on line (sorry, I don't personally know of an FTP address). You should also find it on this month's cover CD. This is the Windows 3.1 version. I'm still looking for the Windows for Workgroups 3.11 version, but have so far only been able to find it in French, without the descriptions.

In my column in the May issue, I mentioned the curious email address of Hiroki Nakayama, author of Graffiti;

Ten Top Tips for Windows

Starting Windows To start Windows and a program, type WIN :program.exe at the DOS prompt. This works with associated documents, too — e.g. WIN :C:\DOCS\MYFILE.TXT will load the file into Notepad. (Thank you Adrian Waddingham.) Note that there must be a space between WIN and the colon and that this also suppresses the startup screen.

Fonts Write starts up with a strange font? Check that Arial is the first TrueType font listed in the [fonts] section of WIN.INI.

Fax/Modems If you use a fax package to wait for incoming faxes, you may find you can't use comms software without first closing it. Then there's the additional hassle of remembering to start it again. So try using the "Advanced settings" in Control Panel/Ports to set two COM ports to the same IRQ and address. Point the comms to one port, the fax software to the other. I don't guarantee success, but it works for me.

Control Panel Keep its parts beyond the reach of meddlers by adding a [Don't Load] section to CONTROL.INI, containing a list of entries in the format. For example, Fonts=1.

Program Manager If you don't like a program's icon, you can change it. Press Alt+Enter, "Change Icon", then "Browse". You can look in any file — PROGMAN.EXE has some useful "spares", MORICONS.DLL has a selection ready-made for DOS applications, and dutiful digging elsewhere (e.g. the .CPL files in WINDOWS/SYSTEM) will find more.

Screen Savers Forget your password? Delete the "password=" line in the [Screensavers] section of CONTROL.INI. The password will default to an empty string — i.e. you just press return to get back in.

Write To start Write with (say) Times New Roman as the default font instead of Arial, start Write, change the font and save as "Default.wri". Use File Manager to make this read only, and replace the Write Program Manager item with this file. As the file is read-only you'll be prompted to save under a new name each time.

File Manager It's not the easiest thing to remember, so here it is again: dragging a file to a directory on the same logical drive moves it; control + drag copies it. Between drives: drag copies, while Shift or Alt + drag moves.

Multimedia If you buy an internal CD-ROM drive and sound card, check that there's an audio lead to connect the two internally. That way you can play audio CDs without having to connect the socket in the front of the former, to the input in the back of the latter.

Cardfile Ctrl+Shift + letter takes you to the first entry whose title begins with "letter". If you want to "promote" an entry to be first in its letter group, type a space after the first letter in the index, e.g. "Personal Computer World".

=?ISO-2022-JP?B?GyRCQ2Y7MyEhTT
U0cBsoQg==?=. Reader, Richard-in-HR8, emailed me out of my misery by explaining that this was a part of the "MIME (Multi-purpose Internet Mail Extensions) thing for using non-ASCII characters in message headers and/or bodies. The syntax is weird and was chosen so as not to be mangled by certain mailers and to reduce ambiguity with 'proper' header lines." He then went on to kindly explain what it all meant: "The ISO-2022-JP specifies the character set in use; I think this one is a 16-bit thing. Anyway, it's probably Japanese." After that, it got complicated with references to Base 64 encoding and I was plunged back deeper into misery. I think I'll leave that sort of thing to people who know better in future.

Following my recent advice on spring-cleaning your system, I have heard from David Agbamu who found "somewhere on Compuserve" a program called "WinCrab". The accompanying text read: "Tired of the shrapnel Windows programs leave behind? WINCRAP displays the name information stored in Windows binaries

including EXE, DRV, FON, DLL etc. Clean up your hard disk by identifying un-needed files. Works great on the WINDOWS and WINDOWS/SYSTEM directory. Back up before using, just in case you delete something that is really needed. WINCRAP does not delete anything on its own, just a report. Must be run at DOS prompt, can be directed to file such as WINCRAP > CRAP.TXT. If you like it, send \$5.00 (beer money) to an out of work programmer. Steve Farkas, 3615 Longridge Avenue, Sherman Oaks, Ca. 91423, USA. 76507,1110@compuserve.com."

Although I haven't yet seen this myself, I think it's definitely in the public interest to report the existence of this delightfully-named product.

PCW Contacts

Tim Nott can be contacted either by post c/o PCW or by email on timn@cix.compulink.co.uk

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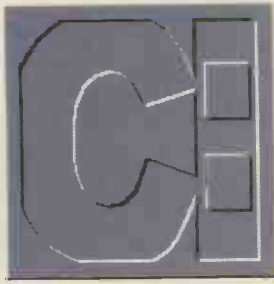
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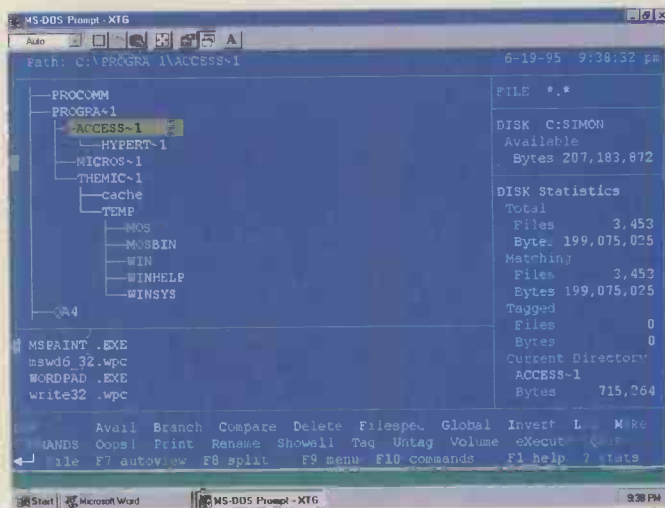
**How is Windows 95 is going to handle DOS?
Simon Collin explains. Plus, editing and re-booting
tricks in pre-DOS 5, and hush... hear that silence?**

Over the past few months there has been a mass of articles covering the forthcoming Windows 95 from Microsoft. All the reviews concentrate on the new user front-end, the networking and the long file names; none of them cover how Microsoft is going to handle DOS. Which is a shame, because the MSDOS section of Win95 is packed with new features.

Windows 95 is due to launch at the end of August, so if you're a DOS-aholic and are considering whether it's worth installing Win95, here are the main benefits and drawbacks of Win95 for DOS users.

The first thing you'll notice about the new product is that there's no underlying MSDOS. Instead, Win95 is the operating system, but it still retains support for MSDOS sessions and adds extra functionality. This all gets rather confusing when you first switch on your PC, since Win95 appears to load DOS and execute Config.sys and Autoexec.bat files. During this boot-up sequence, Win95 mimics normal DOS to allow any real-mode TSRs, drivers or other programs to load: these programs often look for DOS and Win95 is providing compatibility. Once they've been loaded, Win95 switches to protected mode and loads the rest of itself.

Now that Windows is up and running,



Win95 uses TrueType fonts for text display in a DOS box and adjusts point size dynamically with window size

it's time to forego that GUI desktop and get back to the DOS command line! Like Windows 3.1, MSDOS sessions (or VMs — virtual machines — as they are called in '95) start off in a window. There's no support for displayed TrueType fonts under DOS: the result is that as you re-size the window, the fonts change. For example, if you click on the maximise button, the DOS window grows to fit the available desktop,

Fig 1 Assembly listing for Reboot.com

START	MOV AX,0040	:set memory segment to 0040
	MOV DS,AX	:set up segment register
	MOV AX,1234	:load value to create a warm boot
	MOV [72],AX	:into memory location 72
	JMP FFFF:0000	:jump to BIOS init routine to reset PC

but still displays the bottom status bar and the top window bar (see screenshot below). Since the TrueType fonts are a bit skinny, you can go back to a traditional display by selecting "full screen".

Now you're up and running, it's worth pointing out one of the problems with '95: long filenames. These are great when the application supports them, but existing DOS applications (or old Windows apps) don't know what to do with them. As you can see from the screenshot, XtreePro is looking at the subdirectories created by '95 and has to truncate the long names with a '~' symbol. It does no harm, but it's annoying.

Other lower-level modifications mean that almost any MSDOS application will now run in a window and, if one crashes, you can kill a DOS VM by closing the window, rather than having to type "exit" (although you can do it this way too).

Microsoft has improved the use of memory, so now protected mode DOS drivers are loaded out of conventional memory altogether. For example, if you are connected to a LAN and have a local CD-ROM drive, '95 will replace these drivers with its own 32-bit protected mode drivers and shunt them out of conventional memory: the result is a saving of around 180kb.

You can run all the same commands as are in MSDOS 6.22 from the '95 command line. You can even get rid of the Windows GUI and only use the command line. Lastly, '95 will run Windows and DOS applications as fast as or better than DOS/Windows 3.1 on a similar base-level PC with an 80386 and 4Mb of RAM.

Oldies but goodies

I have noticed that you are beginning to exclude older users! That is, PCs running pre-DOS 5 which don't have all the features of the current operating system.

I have no particular desire to upgrade, since I have a basic 80286-based PC running its original version of DOS. However, since I wanted to try out some of your memory-saving tricks I soon began to get bored with editing Config.sys and re-booting the PC.

Fig 2 Assembly code for ASCII code 7

```

MOV DL,07      ;ASCII character code for a beep
MOV AH,02      ;send the character to the
INT 21         ;standard output device
INT 20         ;terminate

```

Fig 3 Creating sounds with the 8253 chip

```

MOV BX,0400    ;the frequency in Hz you want
MOV CX,0036    ;duration of sound in multiples of 1/18 of a
                ;second
MOV DX,0012    ;frequency divisor
DIV BX         ;calculate frequency value
MOV BX,AX      ;save result
MOV AL,B6      ;speaker control register setup
OUT 43,AL      ;send to 8253 chip
MOV AX,BX      ;restore frequency value to AX
OUT 42,AL      ;output lower byte of frequency value to 8253
MOV AL,AH      ;
OUT 42,AL      ;output upper byte of frequency to 8253
IN AL,61       ;get Timer 2 output port register value
OR AL,03       ;turn speaker control bits on
OUT 61,AL      ;switch speaker on
PUSH DS        ;start delay count, save segment register
MOV AX,0040    ;
MOV DS,AX      ;set segment register to BIOS data area
MOV BX,[006C]  ;get current timer value
ADD BX,CX      ;add delay value (set in second line)
OUT CMP BX,[006C] ;check for timeout
JA OUT         ;no timeout, check again
POP DS         ;end delay, restore segment register
IN AL,61       ;
AND AL,FC      ;turn speaker control bits off
OUT 61,AL      ;switch speaker off
MOV AH,4C      ;return to DOS
INT 21

```

Fig 4 Debug script

```

N SOUND.COM
E 0100 BB 00 04 B9 36 00 BA 12
E 0108 00 F7 F3 89 C3 B0 B6 E6
E 0110 43 89 D8 E6 42 88 E0 E6
E 0118 42 E4 61 0C 03 E6 61 1E
E 0120 B8 40 00 8E D8 8B 1E 6C
E 0128 00 01 CB 3B 1E 6C 00 77
E 0130 FA 1F E4 61 24 FC E6 61
E 0138 B4 4C CD 21

```

```

RCX
3C
W
Q

```

I have written this simple assembly-language script which carries out a soft reboot. Readers could use it for all sorts of reasons: to get rid of intruders who don't enter a password, to reset a PC and load a different configuration (perhaps with network or device drivers) or to test out new entries in the setup files.

The listing creates a small .COM file

called 'Reboot.com'; the assembly listing for it is in Fig 1.

You could change this routine to carry out a cold start by changing the value stored in location 0040:0072hex to any value other than 1234hex. The Debug script for Reboot.com is as follows:

```

N REBOOT.COM
E0100 B8 40 00 8E D8 B8 34 12
E0108 A3 72 00 EA 00 00 FF FF

RCX
10
W
Q

```

To create the COM file, type in the debug script as an ASCII file and redirect it to DEBUG to compile this into a COM file.

PCW As you point out, the newer versions of DOS, specifically 6.x, let you create Config.sys files with multiple configurations that can be chosen at boot-up time (as I've described in previous columns). For anyone with an older version of DOS,

your solution is a rather unobtrusive but very effective one!

The sound of silence

I am getting rather bored with the lack of sounds from my PC. Every other PC is now a multimedia monster, but mine remains resolutely silent. Is there any way of creating sounds from DOS?

PCW The basic PC sound generation hardware, coupled with the DOS functionality in this area, mean that all you're able to get is a feeble "beep" when you issue an ASCII code 7 character. However, even this aural feast isn't supported by DOS, so if you want to add sound to a batch file, you'll need to write a little assembly-language program that will output an ASCII code 7 character. The assembly code is very simple (Fig 2) and the following is its Debug script:

```

N BEEP.COM
E 0100 B2 07 B4 02 CD 21 CD 20

RCX
8
W
Q

```

This little program creates a file called Beep.com which you can include in any batch file. This is hardly going to set musical hearts racing, so you should turn to the timer chip in your PC for more sophisticated sounds:

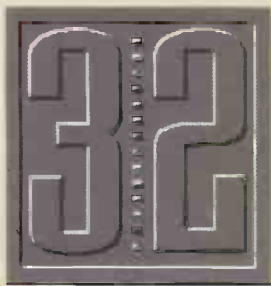
Inside your PC is an 8253 timer chip that contains three counters/timers which are used to time events under software control. The third timer, Timer 2, is the interesting one for our purposes, since it's connected to the speaker and can be used for create tones. To produce a "beep" of a different frequency, change the values sent to the 8253 timer and it will do the rest.

Fig 3 is a rather long but complete assembly language program to create sounds with the 8253 chip, and Fig 4 is its Debug script.

This program will produce a tone with a frequency of 1024Hz and sound this for three seconds. You can easily change these values or create a set of COM files that play different notes for warnings, buzzes or other effects.

PCW Contacts

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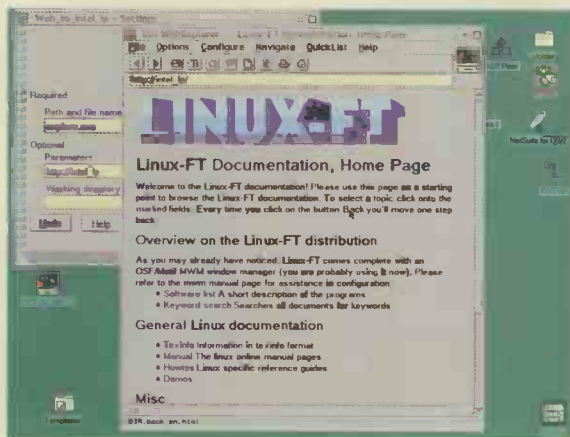


An even better FTP

Last month's LWPFTP taster has whetted many readers' appetites, so Chris Bidmead goes into more detail here. Plus, Ray Noorda's Caldera, and the trials and tribulations of Lasermoon.

A couple of months ago I told you of my delight at discovering NCFTP, the vastly improved version of plain old FTP that comes from NCEMRSoft. Several OS/2-inclined readers have got back to me to tell me about LWPFTP (Lynn's WorkPlace FTP) and I managed to sneak a screenshot of this into last month's column, although I didn't have time or space to tell you anything about it, except that you can get it from <ftp://tach.net/pub/os2>. One reader, Chumble@glassnet.com, writes: "This is probably the most powerful and integrated ftp util available especially for OS/2.... you will be truly impressed."

Well, yes I am, Clive. LWPFTP is a fully WPS-integrated FTP client that associates a folder on your desktop with a remote FTP site. You can set up multiple different folders for different sites, and then forget all about the complexities of conventional FTP because opening a folder automatically connects you to the remote site and populates the folder with the contents of the site. Actually, it does no more than create a bunch of named icon objects that correspond to what it finds in the remote directory it's pointing at. Directory icons and file icons are distinguished, and each has a pop-up menu that allows you to manipulate them like ordinary desktop objects. There's also a Settings option on the menu that lets you inspect the FTP information; this is the actual address and directory location of the remote file, the date it was first "discovered" when you originally connected to the site, the reported size of the file, and whether the file has been acquired — that is to say, FTP'd over to your local directory.



OS/2's WebBrowser reads the Linux HTML documentation across the office network

So these icons are sort of placeholders, rather than working representatives in the way the ordinary WPS objects are. This has the advantage that you can do marshalling operations on them after you've disconnected from the remote site where you discovered them, and without having had actually to download them all.

Typically you might use LWPFTP to connect once to collect the placeholders for a remote directory, and then come off line while you decide what you want to do next. When you've settled on which files or directories you want to download, you reconnect and then pop up their right mouse button menus and select Transfer. Or just double-click on them.

I can't do full justice to LWPFTP here, and you really do have to see it to believe it. But to cut to the bottom line, I'm not actually using it any more. As I told

Chumble, LWPFTP is a fascinating exercise, but I'm not convinced that you want to have everything integrated that closely into the WPS. At least, not on my ageing 50MHz 486 CompuAdd. Personally, I've gone back to NCFTP. But I'd certainly welcome any of your comments on this.

Caldera and Linux-FT

I also teased you last month with a picture of the Caldera desktop, and suggested you look at the Web page at <http://www.caldera.com> for further details. Cramming the information into the caption of a screenshot may have left you with the impression that this is just yet another Linux distribution, so let me set the record straight here. IMHO, this Novell spin-off is one of the most important developments that has happened to Linux since its inception. Important and controversial.

Ray Noorda, the industry father-figure who recently retired as CEO of Novell, was far from happy about Microsoft's success in dominating the PC desktop. Under his guidance Novell bought Unix from its originators, AT&T, with the idea of nurturing it into an alternative standard desktop operating system. But the effort foundered, not least because historical licence agreements attached to Unix made it too expensive to compete against Windows.

That Novell initiative is now done with. The new CEO, Bob Frankenberg, seems to have reached an accommodation with Microsoft, and Noorda has retired from Novell. But towards the end of his regime, Noorda encouraged a skunkworks project, at one time called Exposé. This was apparently intended to continue the desktop war with Microsoft prices by substituting Linux for Unix as the core operating system.

Exposé seemed to evaporate with Noorda's departure from Novell, and was hardly missed as it had been little more than a rumour. So I was astonished when I heard about Caldera a couple of months ago. Noorda has set the whole thing up as a separate company, migrated some Novell employees involved in the original scheme, and is going all out to launch Caldera by the end of this year.

Caldera will be based on the Red Hat distribution of Linux, with a wrapping of proprietary products to turn it into a ready-to-run, Internet-capable, guaranteed commercial quality X Window-based desktop

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operating system. It's this mixture of free-ware and commerce that's stirring up such passion among the Linux community, and a lot of this passion seems to be singularly ill-informed. The whole thrust of the GNU effort, of which Linux is a part, is the distribution of software *freely*. As Richard Stallman, the progenitor of GNU, is forever pointing out to us, "freely" doesn't necessarily mean "free of charge". I'm personally in favour of the right of individuals to travel freely across national boundaries. But I'll pay my air fare.

Having said that, I'm ready to share some of the cynicism about Caldera. Stallman's so-called "copyleft" licence is skilfully designed to allow freeware and commercial add-ons to co-exist and grow together. In theory, Caldera will be feeding back some of its own development effort into Linux, and the company cites the NetWare client software as an example. But the NetWare clients for other operating systems like Windows and OS/2 are freely distributable already, for the very good reason that they help promote the sales of NetWare servers.

Well, Caldera says it will shortly be sending me the "Preview" version of Caldera, so I'll let you know more when I get it. You can order it yourself from orders@caldera.com for \$29 a copy, but I should warn you that this somehow climbs to \$69 once Caldera has accounted for postage, packing and the exhausting task of mailing to a country that has the nerve to lie outside US borders.

Lasermoon woes

I've mentioned the UK-based Linux distribution and support company Lasermoon more than once in this column, but not perhaps as many times as I might. From several phone and email conversations I've had with its proprietors, Ian Nandhra and his wife, Lyn, Lasermoon seems to me (Sir John Harvey-Jones mode *on*) to be a well-intentioned, talented, over-stretched and fundamentally disorganised, typical British small company. Yes, I know this is pretty rich, coming from an ex-hippy who has to be chased every month by this magazine's production people to send in his invoices. But it's not meant primarily as a criticism; more an explanation to the readers who have emailed me saying they're having a hard time getting any response from Lasermoon. Bottom line: in my view, the company's doing an excellent job for Linux, but don't expect more than it can give.

This afternoon I had a very long phone conversation with Ian and Lyn about just

this. As I write, Lasermoon is putting the finishing touches to a distribution it calls Linux-FT, a product that is already going out of the door in temporary packaging because the demand is so great. "I have to say that the response has been overwhelming," says Lyn, whose job it is to fulfil the orders. "We've never had this number of people ringing up. It's taken us totally by surprise." Overwhelming. Not a marketing phase. Lyn means this literally.

Anticipating Caldera, Linux-FT is an Internet-ready bundling of Linux 1.2 which comes in a number of editions, depending on what you want to pay and what you need in the way of development tools and general extras. The version that arrived at my door comprises three main CDs containing the runtime, the source code and World Wide Web stuff, and another three CDs that hold snapshots of the three main Linux FTP sites. Oh, and another pair of CDs containing different developer versions of Motif.

That's eight CDs, and until the final printed packaging is ready, somebody at Lasermoon has to stuff each of those CDs into its case and parcel it all up so it doesn't get wrecked in transit. Meanwhile, somebody else (or, more probably, the same person, Lyn) has to respond to irate phone calls from people who placed orders ten days ago and wonder why nothing has arrived yet. ("We discovered we were dealing with a totally duff courier company, whose name I won't mention," says Lyn.)

At the same time, somebody else (Ian) is getting hassled by punters whose parcels have arrived but who are having trouble with the installation. That's when Ian isn't dealing with more advanced customers who've installed Linux-FT successfully and then wrecked it all by succumbing to the temptation to grab the very latest Linux kernel off the Net and inexpertly try to rebuild the package around it.

Some of these customers, says Ian, are very rude indeed. They can't see the dividing line between the kind of minimal support you might decently expect from a low-cost package, and full-scale consultancy for which £40 an hour would be considered cheap in most Unix circles. I know that none of my readers are going to fall into this trap, but to head off any possible trouble, here's a checklist that applies whatever Linux distribution you're buying:

- Are you expecting the kind of commercial support offered (but in my experience, rarely delivered) with products like Windows or OS/2? If so, Linux probably isn't for you — go and get Windows or OS/2.

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Or take the whole thing seriously and pay real money for commercial Linux support.

• Did you email your credit card number three days ago and are now getting very cross indeed that nothing has arrived? Cool down. Emailing CC numbers isn't particularly smart, and in any case email isn't a guaranteed delivery method. The vendor should be checking that your delivery address is the same as your credit card address, and will be emailing a confirmation before you receive any goods.

• Having problems installing? Have you read the documentation? Really? All of it? Nothing drives Linux support people madder than customers who ring up and say: "No, of course I haven't read the manual. I'm far too busy... I want you to talk me through it..."

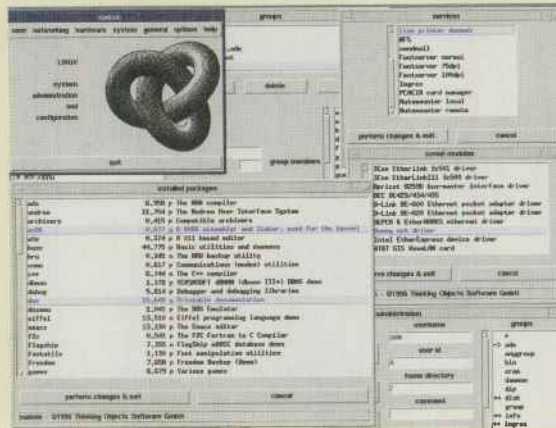
• Had a perfectly good working installation and then tried to "improve" it by downloading the very latest (and probably buggy) version of the kernel? Nothing wrong with that if you know what you're doing, Nothing particularly wrong if you don't, as long as you're prepared to mess around in your own time and have your first installation properly backed up. But Tech Support are not going to be particularly interested in sharing your woes.

You get the picture? This column doesn't endorse companies, but my personal tip, if you're at all interested in Linux-FT (and it's pretty good — get the full spec from <http://www.lasermoon.co.uk>) would be to grab it before Ian and Lyn get really fed up and go and join the Moonies.

New Windows API extensions for OS/2 Warp

I was out in New Orleans at IBM's Technical Interchange when the new API extensions to OS/2 were announced, so I had the opportunity to talk to developers and collect their reactions. The announcement caused an emotional stir, and the feedback I gathered was flavoured with more than the usual helping of politico-religious fervour. Broadly, attitudes polarised into two camps. "A betrayal by IBM," said some of them. "We've dedicated our efforts to the OS/2 API, and left the mass market and low markup to the Windows guys. Now IBM's lowered the drawbridge and is letting anybody in."

Less naive developers, realising perhaps that this attitude smacked of un-American restraint of trade, purported to embrace the new move warmly. Making it easy to port existing Windows packages to



Linux-FT comes bundled with a whole raft of useful software, including ImageMagick picture manipulation

OS/2 would rapidly expand the applications base and therefore raise the general profile of OS/2. A more sophisticated line of argument said that the ability to manage a common code base between OS/2 and Windows naturally cut both ways, also allowing OS/2 developers to broaden their horizons to take in the Windows market. And if you really did believe that OS/2 was the superior 32-bit operating system, a corpus of apps common to Windows and OS/2 would surely be the best way of demonstrating it to the public at large.

An entirely excellent and politically correct attitude. "We write great code for OS/2," said one of these optimists. "And it will look even better beside whatever the Windows guys have to throw at us." But I couldn't help feeling a sneaking sympathy for the painful honesty of the pessimists. Does IBM really know where it's going with all this?

Warp Connect

Well, we did it. I got back from New Orleans to find that Marcus, my (unfortunately) only occasional personal technician (only available to me when he's not hired out at a vast daily rate I would blush to mention in this modest column), had installed Linux-FT and hooked it into my network. It comes with TCP/IP all ready to go, so Marcus didn't feel able to take much credit for the fact that it was already chatting merrily to my OS/2 Warp Connect machine at the other end of the wire. I'd installed the beta copy of OS/2 Warp Connect the week before, and had made much to Marcus of the fact that I'd managed to get a convincing TCP/IP packet stream out of it, although the truth is that it too comes with TCP/IP all ready to go. There's a handy TCP/IP configuration package in Warp Connect that writes

addresses into the hosts file, so registering the new Linux box as "intel_ip" was a breeze.

When you're testing TCP/IP, the first thing you do is ping yourself. If you've never done it, it's not painful. Ping is a simple TCP/IP utility that sends out test data packets to an address you supply as a parameter, and it then reports if it receives acknowledgement of their arrival. So from the Warp Connect box I pinged myself and then pinged intel_ip. Everything pinged merrily, so the network was up.

The next thing you do is telnet across the network. Telnet is a serial terminal style of connection that allows you to log on to the remote machine through a character-based interface. Telnetting from an OS/2 command line window worked fine, and I was even able to run the Linux-FT script called Documentation that powers up Lynx, a character-based Web browser, through which you view the hundreds of pages of HTML documentation on the Linux CD-ROM.

So there was the Linux documentation on tap from my OS/2 desktop. Then I started to have crazy ambitions. OS/2 comes with its own graphical HTML browser, WebExplorer. What would it take, I wondered, to somehow feed the telnetted documentation output into Web Explorer, and view the remote HTML pages in living colour? Some weird and wonderful Rexx script involving pipes? I put the question to Marcus when I phoned him later that night, and I'm chuffed to say he didn't know the answer.

I'm chuffed because I'd already worked it out. You hardened TCP/IP hackers won't be impressed, but my goodness, I impressed myself. It's incredibly simple. Forget telnet; forget pipes. WebExplorer is a TCP/IP aware application. It talks down TCP/IP sockets to the Internet. And it can talk through those same sockets across my office network. Power up WebExplorer and write in "http://intel_ip" as the universal resource locator. True to its name, this finds the Linux machine and grabs the home page there. Thereafter you hop through the hyperlinked documentation just as if it were out there on the Internet.

Mmm, I think I'm beginning to get the hang of all this...

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please note our new address



Au revoir, CR

Unwanted carriage returns can be a real pain to handle. Tim Phillips takes you through the ins and outs of successful replacement, and goes on to tackle spacial equality and smart quotes, and offer some neat macros.

Having received a good deal of correspondence following my advice to a reader on finding and replacing carriage returns (CRs), I realise that it would be of benefit to cover the subject in more depth.

A standard problem of imported, pasted text is: you get a carriage return at the end of each line so it's a pain to edit and format. You want to keep the paragraphs but strip out the hard CRs, so it's a job that lends itself well to a simple macro.

The following method works for the text you find on bulletin boards, text copied from the Internet, news feeds, or for "repurposing" old ASCII text, and it saves you hours of work manually deleting the carriage returns.

First, you prepare your text by inserting a blank line between each paragraph. Then you search for and replace all the double carriage returns with a set of symbols not normally occurring in the document (in these macros I've used &@#). Then you find all the remaining (single) CRs and replace them with nothing. Finally, you find all the occurrences of the symbols and replace them with carriage returns to restore your paragraphs — it's a standard trick, and I claim no originality here. I have provided examples of the various commands [next column].

There are caveats, however: it wrecks tables, so cut and paste them into another document first; a good practice is to save under another filename before carrying out a search and replace, but Ami Pro 3.0 won't do this (the forthcoming Word Pro will) — it will only search for one special character at a time, so you can't search for

two CRs and therefore need to use a different trick. Thanks to reader John Cowin (who mailed me first), and others.

• WinWord version:

```
Sub MAIN
EditReplace .Find = "^p^p", .Replace =
"&@#", .ReplaceAll, .Wrap = 1
EditReplace .Find = "^p", .Replace =
"^s", .ReplaceAll, .Wrap = 1
EditReplace .Find = "&@#", .Replace =
"^p", .ReplaceAll, .Wrap = 1
End Sub
```

• WordPerfect 6.1 version:

```
Application (A1; "WordPerfect";
Default; "UK")
SearchString ("")
ReplaceString ("&@#")
ReplaceForward (Extended!)
PosDocTop ()
SearchString ("")
ReplaceString ("")
ReplaceForward (Extended!)
PosDocTop ()
SearchString ("&@#")
ReplaceString ("")
ReplaceForward (Extended!)
```

Finally, Ami Pro. You should replace every carriage return first, then search on the double occurrences of &@#. Next, replace those with a return, then delete all the single &@#s.

This is for a macro called crstrip.smm:

```
FUNCTION CRSTRIP1()
Replace(0 0 1024 "¶" "&@#" )
Replace(0 0 1024 "&@#&@#" "¶" )
Replace(0 0 1024 "&@#" "" )
END FUNCTION
```

For Wordstar for DOS users, there's also a freeware executable which strips CRs (but it's a 33Kb .EXE standalone file, so I can't include it here) available from the Wordstar conference on CompuServe. As it is freeware, I can pass it on to any readers who want it — but only by email.

Equal spacing

John Cowin has a useful technique for equalising the spacing after a full stop:

"As a documentation consultant, I am frequently faced with problems when integrating text from multiple contributors. Invariably, the contributor has decamped to another continent by the time I am ready to hurl the disk back at him. When this happens, I use similar techniques. For example, to replace all single and treble sentence spacing with double:

1. Search on .<space><space> and replace with \$%^&.
2. Search on \$%^&<space> and replace with \$%^&. Repeat this step to ensure there were no strings of four or more spaces (yes, it does happen).
3. Search on .<space> and replace with \$%^& (or .<space><space> — it doesn't matter at this stage).
4. Search on \$%^&, and replace with .<space><space> to return the text to its intended appearance.

There must be other uses for this approach. Basically, once you have protected or masked what you want to keep, you can wreak havoc around variations and still return to sensible formatting."

Text search tip

Can you carry out full text searching in Word? Too right you can. It can search across directories for any text string in any

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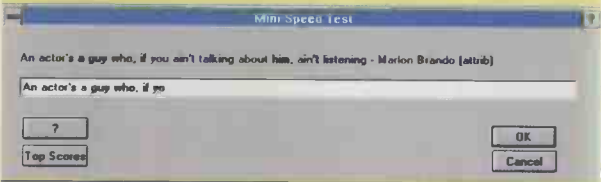
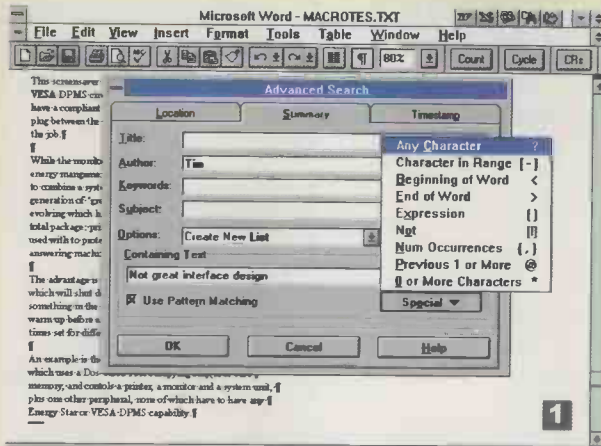
word file.

To find this magic function, select File, Find File and click on Search. This brings up a horribly designed dialogue box. The Location section allows you to set the directories you want to search and includes a check box to allow you to search subdirectories. Timestamp allows you to set a date filter, or specify the Author name. The Summary section has a little box at the bottom called Containing Text. Enter the text you want to find, including wildcards if you check the Pattern Matching box (wildcards are in a pull-down menu on the right). Searching isn't fast, but you get back a list of the documents with their place in the directory tree and a preview screen.

Why Microsoft buried the ability to search for text in a document four levels down the menu system defeats me. If anyone can supply a quick text search macro that throws up a dialogue box with the text to search for, in a named directory, I will be extremely grateful. One point to note is that the dialogue box settings are persistent, which isn't obvious, so take care to remove any unwanted author names or date filters from the dialogue before you complete the next search.

Wordstar 7.0 patch

If you feel that you were born to hack code, then try this if you use Wordstar 7.0: I found this patch while optimising a friend's Wordstar installation. The problem is that when you have a mouse driver enabled, the page review function is glacially slow. Fig 1 (page 300) shows the solution, as recommended by Wordstar technical support. I can't stress too strongly the importance of making backups of both these files before you try to hack them around.



1 Searching, using free text in Word for Windows

2 The typing tester in Ami Pro — by email only, I'm afraid

3 Stripping carriage returns in WP

Neat macros

Undaunted by our fix for his dayfinder macro — remember that we eventually distinguished between the Julian and Gregorian calendars (PCW, May '95)? — Graham Brown leaps back into the fray with some neat speed test macros. Type your selection and the macro returns your speed and accuracy, and if your accuracy

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Fig 1 The Wordstar 7.0 "solution"

You need to patch two files: WS.EXE and PREVIEW.OVR

● Firstly, the WS.EXE file:

What you see	What you type
C:\WS>	REN WS.EXE WS <Enter>
C:\WS>	DEBUG WS <Enter>
-	E A0D2 <Enter>
xxxx:A0D2 00.	21 <Enter>
-	W <Enter>
Writing xxxxx bytes	Q <Enter>
-	
C:\WS>	REN WS WS.EXE <Enter>
C:\WS>	

● Now, the PREVIEW.OVR file:

What you see	What you type
C:\WS>	DEBUG PREVIEW.OVR <Enter>
-	E AC36 <Enter>
xxxx:AC36 CD.	EB <SpaceBar>
33.	08 <Enter>
-	E ACD8 <Enter>
xxxx:ACD8 CD.	90 <SpaceBar>
33.	90 <Enter>
-	W <Enter>
Writing xxxxx bytes	Q <Enter>
-	
C:\WS>	

(Note: with debug you might see a "D" instead of a "-".)

is 100 percent, you might qualify for the hall of fame. Meanwhile, if you want to delete the high score table, just type c, then Enter.

He has supplied Ami Pro and Word versions. More would be welcome. The catch is that they are rather long macros; too long to reproduce here. But if anyone wants to email me I'll pass them on (via email only, I'm afraid).

Mr Brown also supplied an ingenious anagram master based on Word's Tools-GetSpelling command: "No programming involved, which, judging from my calendar program, is just as well," he adds modestly. Again, if you email me with a request for the macro, I'll pass it on.

See Fig 2 for this neat macro. Quick and easy to use, its only limitation is that it can only do one-word anagrams, so I'm confident that you won't be able to tell me what NERDS POWER PLUM CAR TOOL spells...

Smart quote solution

On the topic of WinWord AutoCorrect, Shane Devonshire of Walnut Creek, California, contacted me with a problem in replacing smart quotes. To be honest, he solved it himself, so I can't claim the credit for this one: "As you type, Word changes an ASCII apostrophe to a 'smart

apostrophe'. It does this in the document but not in the AutoCorrect dialogue box," he says. The problem comes when you try to AutoCorrect any word with an apostrophe in it, with smart quotes enabled (there's a check box in the AutoCorrect dialogue box); you can't, because AutoCorrect sees a smart quote.

The answer, as Mr Devonshire discovered, was to "force paste" the word with smart quotes, into AutoCorrect. First, type the word erroneously, then on the next line correctly, like this:

Tim's (with an ASCII quote)

Tim's (with a smart quote)

Highlight the incorrect one and copy it to the clipboard. Then highlight the correct one. Open the AutoCorrect dialogue by selecting Tools, AutoCorrect. You'll see the correct version in its place but the radio button above it will have Formatted Text enabled. Click on Plain Text instead. Then click in the Replace: box and manually paste the incorrect version from the clipboard by typing Ctrl+V. Note that you can't paste from the Edit menu in this situation. You'll now have an AutoCorrect entry that recognises words containing smart quotes.

Export problem

David Hurren emailed me to ask how to get WordPerfect 5.1 tables into a database. He

Fig 2 An anagram master based on Word's Tools GetSpelling command

```

Sub main
Dim x$(60)
st:
Redim x$(60)
Begin Dialog UserDialog 344, 104, "Anagram Master"
    Text 19, 8, 168, 18, "Please Enter Anagram", .Text1
    TextBox 17, 29, 310, 21, .TextBox1, 1
    PushButton 240, 60, 87, 15, "Solve", .Push1
    CancelButton 240, 79, 88, 16
End Dialog
Dim dlg As UserDialog
C = Dialog dlg
If C = 0 Then Goto fin
a$ = dlg.TextBox1
g = InStr(a$, " ")
On Error Goto err
If g > 0 Then MsgBox("Please enter your anagram with no spaces")
If g > 0 Then Goto st
h = InStr(a$, "?")
hh = InStr(a$, "**")
n = 2
If h > 0 Or hh > 0 Then n = 1
ToolsGetSpelling x$(), a$, " ", " ", n
Begin Dialog UserDialog 301, 238, "Anagram Master"
    Text 26, 25, 97, 13, "Words found", .Text1
    ListBox 26, 46, 253, 122, x$(), .MyListBox
    OKButton 190, 180, 88, 21
    CancelButton 190, 204, 88, 21
End Dialog
Dim dlg As UserDialog
N = Dialog(dlg)
If N = 0 Then Goto fin
Goto st
err:
MsgBox("Please enter only letters or ? and *")
Goto st
fin:
End Sub

```

receives a bunch of reports every month in this format and wants to export the data in them to Lotus Approach under Windows.

Provided you have a copy of WordPerfect 5.1 under which to open your file, it's not a problem. This is one of the times when WordPerfect's Reveal Codes feature is extremely useful. Call up the Reveal Codes function. At the start of the table, there's a code called TableDef. Just delete this code and WordPerfect has no idea that the data ever was a table, and it puts tab stops in there instead. You now need to put quotes around each item of data, so search and replace tabs with "," (quote, comma, quote). Search and replace returns with "[HRT]" (that's quote, return, quote) and add a quote at the beginning of the first record. Cut out the table text and save it in its own document as a text file. This can then be imported into any database as a comma-delimited ASCII file.

Breaking up is hard to do

We end this month's column with a rare Wordstar 5.5 query: Bill Bentley of Belton — try saying that after a night in the pub — reports that when he tries to break up a document into small chunks of text, they all save as plain text without formatting.

I've found a list of bugs in Wordstar 5.5 and my guess is that you're breaking up the document by selecting a block and saving it. This doesn't save the block style information. Instead, open a new document, copy the block into it and save it. It takes longer but you keep your text style, and as Wordstar supports multiple documents, you don't have to close the original.

PCW Contacts

And that's that for this month. Surface or airmail to PCW, otherwise I'm on email at wong@cix.compulink.co.uk and CompuServe 100436,3616

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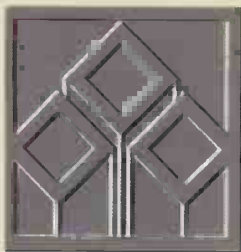
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THIS POEM THREE IT M SHORE YOUR PLEASED



It's a date

... says Stephen Wells, who looks at an easy way of arranging dates in spreadsheets, as well as discussing the ins and outs of decimal places.

As a freelance journalist, I don't send out many invoices a month. So it's long been my habit to create invoice numbers by simply repeating the date in reverse. An invoice dated August 31st this year would thus be numbered 950831.

This is not intended to be a secret code; it just avoids maintaining a log of invoice numbers. But it tickled me when one now-defunct magazine used consistently to record on their Remittance Advice slips my invoice date as a month after it actually was. When they quoted my invoice number, they didn't appear to notice that their subterfuge for delaying payment was immediately exposed.

I was reminded of this when I received the latest suggestions from this column's most faithful contributor.

Shane Devenshire, of Walnut Creek, California, has this wonderful ability to fiddle with spreadsheet functions until they produce useful solutions to everyday presentation problems. Although, bless his heart, he tends to start out with Lotus 1-2-3 and guess at the Excel version. So when I make sure everything's correct, I sometimes have to rack my brain.

He says dates are often recorded this way on mainframes and his first suggestion this month is for converting them into the traditional DDMMYY format. (Oddly, he doesn't confuse the issue with the usual American order of MMDDYY. Maybe he's an ex-pat or an anglophile.) If the number were 950831 in cell A21 and you wanted to convert it to 31/8/95, then in Excel in the appropriate cell you'd enter:

```
=DATE(A21/10^4,MOD(A21,10^4)/100,MOD(A21,100))
```

In Lotus 1-2-3 it would be

```
@DATE(A21/10^4,@MOD(A21,10^4)/100,@MOD(A21,100))
```

Another conversion which is often needed with many spreadsheet applications is that from decimal parts of an hour to minutes. Let's say that cell A17 reads, in hours, 9.45. The time is not a quarter-to-ten. It's 27 minutes past nine. How can you make it read, 9.27? Shane suggests this formula:

```
=INT(A17)+MOD(A17,1)*0.6
```

The Lotus 1-2-3 equivalent is:

```
@INT(A17)+@MOD(A17,1)*0.6
```

If you don't need to make further calculations from the result, you can use this formula to create a string:

```
=TEXT(INT(A17)+MOD(A17,1)*0.6,format_text)
```

where *format_text* is a Name with the definition, = "##.##"

1-2-3 users would enter:

```
@STRING(@INT(A17)+@MOD(A17,1)*0.6,2)
```

To make it a string that reads 9 hours 27 minutes, you could use

```
=TEXT(INT(A17),0)&" hours"&TEXT(MOD(A17,1)*60,0)&" minutes"
```

In Lotusese, that's:

```
@STRING(@INT(A17),0)&" hours"&@STRING(@MOD(A17,1)*60,0)&" minutes"
```

Shane also gives the timely reminder that Excel offers a jolly useful CONVERT function in its Analysis Tool pack. In Excel 4.0 you choose Options, Add-ins, Add, then pick the file, analysis.xla. In Excel 5.0, you choose Tools, Add-ins, and check the box by MS EXCEL 4.0 Analysis Tools.

For the subject in hand, you can convert hours to minutes. If A17 again shows 9.45 in hours, you'd put:

```
=CONVERT(A17,"hr","mn")
```

You'd get the result 567. Of course, if you're making manual entries in cell A17 (I mean, it doesn't contain a formula), in Excel you can enter the real time as 9:27.

Excel recognises the colon and in the Formula Bar spells it out as 9:27:00 AM (the Time format) although the cell will just display 9:27 (in the default format). If you want to convert that form into minutes (still 567) you'd use the HOUR and MINUTE functions:

```
=HOUR(A17)*60+MINUTE(A17)
```

Another variation is that Excel will accept the entry 9 space 27/60 and, if the cell is formatted for time, display that in hours as, 9.45. With default formatting it displays logically enough as 9 9/20.

Incidentally, apart from time, the CONVERT function will help you out with all manner of wonderful translations. You can go from teaspoons to fluid ounces, pints to litres, Fahrenheit to Celsius, horsepower to Watts, Joules to calories, meters to miles or inches, and even turn slugs into grams — the slugs not being the garden variety but the unit of mass.

Let's go round again

Finally, Shane has another suggestion about rounding. His last thoughts on this subject I included in the February column.

Rounding calculated currency amounts up or down can often give grief to spreadsheet users, whether in pounds, dollars, or ecus. It is not unusual, in just one invoice, for one rule to apply for, say, a trade discount, and another for VAT. And it can obviously make a difference whether each item is rounded, or just the total of a number of items.

Spreadsheet users frequently run into two problems: what is the correct method to use? And how do you make all the different financial statements balance?

I always follow three little rules:

- Be consistent. Establish a policy and stick to it.
- On the worksheets (even if not on the printed reports) always include a footnote briefly detailing the methodology used.
- Include in the worksheet (not in the printed reports) alternate ways of arriving at disputable totals as a cross-check.

But to get down to Shane's latest tip. Supposing you have a column of figures with odd decimal amounts. In the screenshot (*above right*), you can see that I've created them in the range A25:A35 with a simple formula.

If you wanted to total them as they are, you could just enter =SUM(A25:A35) in cell A36. But suppose you wanted to round each individual entry to two decimal places. I've done that in column B with the simple formula, =ROUND(A25,2) etc. Totalling the new figures gives a slightly different result. Neither answer is

ROUNDING.XLS:2		ROUNDING.XLS:1	
	A	B	
25	1.979	1.980	25 1.979 =ROUND(A25,2)
26	3.109	3.110	26 =1.13+A25 =ROUND(A26,2)
27	4.239	4.240	27 =1.13+A26 =ROUND(A27,2)
28	5.369	5.370	28 =1.13+A27 =ROUND(A28,2)
29	6.499	6.500	29 =1.13+A28 =ROUND(A29,2)
30	7.629	7.630	30 =1.13+A29 =ROUND(A30,2)
31	8.759	8.760	31 =1.13+A30 =ROUND(A31,2)
32	9.889	9.890	32 =1.13+A31 =ROUND(A32,2)
33	11.019	11.020	33 =1.13+A32 =ROUND(A33,2)
34	12.149	12.150	34 =1.13+A33 =ROUND(A34,2)
35	13.279	13.280	35 =1.13+A34 =ROUND(A35,2)
36	83.919	83.930	36 =SUM(A25:A35)
37		83.930	37 =SUM(ROUND(A25:A35,2))
38			38

Rounding decimal figure entries individually, with results on the left and formulas on the right

necessarily wrong. It just depends on the needs of the moment.

But Shane points out that taking another column just for rounding the entries individually can play havoc with your worksheet design, even if you hide column B. So he suggests using an Excel feature I've mentioned before: the Array. In the cell of your choice, you can just enter =SUM(ROUND(A25:A35,2)). To make it an Array formula, you hold down the Ctrl+Shift keys while you press Enter (Command+Enter on the Mac). Excel itself will run down through the range A25:A35, round each separate figure, then total the result. So, as you can see in the illustration, you get the same answer in cell B37 (where the Array formula is) as B36 (the sum of the individually rounded figures).

There's one other handy little Excel hint that can save book-keepers millions of milliseconds (which could add up to a coffee break). Instead of having to keep pressing a full stop key on the regular keyboard or the number keypad, Excel will enter decimal points for you automatically.

Just choose Options, Workspace and the Fixed Decimal check box. If the Status Bar is active (select Options, Workspace, Display Status Bar to turn it on), then the word FIX will appear in the far-right box in the bottom right-hand corner of the screen.

You can override the automatic decimal just by inserting a decimal point on

any entry.

How to format

When setting up a new Excel worksheet, I always find it useful to have both the standard toolbar and Formatting toolbar showing. I also take advantage of

the many artistically designed table formats which Excel offers. To display the Formatting toolbar, with the cursor on the toolbar, just press the right mouse button, leave the Standard toolbar checked, but also check the Formatting option.

To access the 14 built-in tabular formats in Excel 4.0, highlight the area of your worksheet to format, choose Format, and AutoFormat, and you arrive at the AutoFormat dialogue box. Having selected a format, you can edit out parts of it if you wish by just choosing Options.

Once back on your worksheet, you can apply that same format to other areas of your worksheet just by highlighting them and choosing the last tool in the Formatting toolbar: the AutoFormat tool. If you press Shift as you click on it, Excel will cycle through the last tabular formats you've used.

Incidentally, if you ever want to eliminate any borders on all or part of your worksheet, just highlight the area and press Ctrl+Shift+ - (hyphen).

Financial analysis

This month we can start to create the tabular and charted results of the 19 ratios in the financial analysis template for service companies — those which don't carry stock.

Those in the first group are called Liquidity Ratios, and in most industries they are all of the Times type (i.e. not a percentage, or in days, or some other form). Fig 2 gives a listing of the required formulae for the essential cells in rows 34 to 38.

Fig 2 Financial analysis template listing

	A	B
34	LIQUIDITY RATIOS	(TIMES)
35		=\$B\$1
36	Current	=Current_Assets/Current_Liabilities
37	Quick	=Quick_Current_Assets/Current_Liabilities
38	Current Liabs to Net Worth	=Current_Liabilities/Net_Worth

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Because this template uses Names throughout, the listing needs to show only column B. On the screen, exactly the same formulae are shown in columns C, D, E and F. Or they can be if you created the Names as explained in July's column.

The only exception is the date row which has $=\$B\1 in cell B35, then $=B35-1$ in C35, $=C35-1$ in D35, and so on. Rows 33 and 39 are blank, just to space out the groups.

Column G holds the average results for the company's industry. These ratios may be available from a commercial source like Dun and Bradstreet, or from a trade association, or the DTI (Dept of Trade & Industry). In the example given, the business is an advertising agency.

If you entered the sample figures for the Balance Sheet, given in July's column, and for the Income Statement, illustrated in last month's column, then you will see the results shown in Fig 3.

An Annual Income Statement shows what has happened to a company during a year. A Balance Sheet is a snapshot of the state of the business on the last day of a fiscal period (quarter or year). But reviewing a table of financial ratios for the past five years is like looking at a moving picture of the activities of the company.

Creating charts

You can compare the results with others in the company's industry. But more importantly, you can catch trends which may

need management's attention. Trends are spotted most easily with a chart. The template, written on Excel 4.0 but importable to other spreadsheets, is set up to create them easily. Excel offers a number of ways of making charts, but here's a quick way, using the mouse.

Open the worksheet we've been creating, SERVICE.XLS. Select the range, A35:G38. Select, Edit, Copy. Then select, File, New, Chart, followed by Edit, Paste Special. In the dialogue box choose Values in Columns, Series Names in First Row, and Categories in First Column.

Then select, Chart, Add Legend, and then, Chart, Attach Text and choose Chart Title. In the Formula Bar, enter an equals sign and select Window, SERVICE.XLS, cell A34. Delete the word "Title" on the end of the line.

That's it. You should now have the chart shown in Fig 4. You can see right away that this company is maintaining stable liquidity. The only thin end of a trend is the growth in Current Liabilities to Net Worth in '93 and '94. But is the company in a good position? Let's take a moment to examine these measurements of solvency.

A high ratio means higher than the industry or growing for the company. A high Current Ratio maintained throughout the year usually indicates a company has adequate clients' accounts coming due to enable it to pay the amounts outstanding to suppliers in the same period, after the

company's cash and sales income during the following weeks are included.

A low Current Ratio might indicate an inability to meet current obligations, but it can also be a sign of extraordinary managerial ability. Average interest rates reported in the news can be deceptive. Diligent financial officers will compare one-year and 30-day rates. Current liabilities can be a cheap source of funds when interest rates on short-term loans are below rates on long-term debt.

To summarise: the higher the Current Ratio, the better the indication of solvency, but the quality and management of assets must also be considered.

A high Quick Ratio implies that the company can meet unexpected demands for working capital. If it fell below one, the company would probably have to incur or increase long-term debt. In the example given, the company ratio is consistently above one and in line with its industry.

To summarise: the Quick Ratio differs from the Current Ratio in that the values of pre-paid expenses and other current assets are excluded. It measures quick assets, those that are highly liquid, meaning immediately convertible to cash.

The higher the Current Liabilities to Net Worth ratio is, the less security there is for the creditors of the company. In the example, the figure is not only higher than the average for the industry, but more worryingly, it is growing. From the stockholders' viewpoint, the more the suppliers' funds can be used instead of their own, the more beneficial it may appear to be. But when suppliers are pressing for payment, management attention is diverted from the business.

To summarise: this ratio contrasts the funds that creditors are risking against the funds invested by the stockholders or owners. It compares what's owed in the current year with what's owned.

Next month we'll look at some of the activity and gearing ratios.

	A	B	C	D	E	F	G
33							
34	LIQUIDITY RATIOS (TIMES)						
35		1994	1993	1992	1991	1990	INDUST
36	Current	1.14	1.18	1.31	1.24	1.20	1.20
37	Quick	1.14	1.12	1.24	1.24	1.09	1.10
38	Current Liabilities to Net Worth	3.55	2.65	1.72	2.03	2.19	1.96
39							

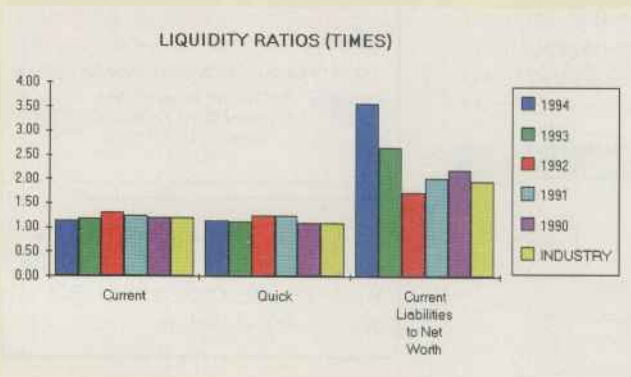


Fig 3 (above)

Example results for the Liquidity Ratios portion of the financial analysis template for service companies

Fig 4 (left) *The liquidity position of the example results in chart form*

PCW Contacts

Stephen Wells welcomes feedback on spreadsheets via PCW Editorial at the usual address, or at stephen_wells@pcw.cmail.com

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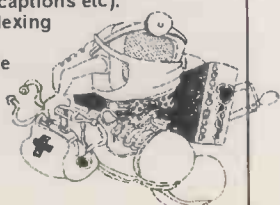
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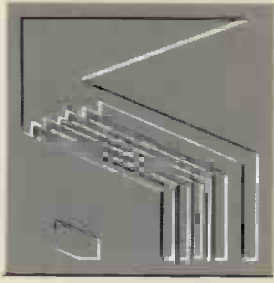
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Filleted Codd

Ted Codd's rules are quite involved; so Mark Whitehorn has wrapped up an easily digestible takeaway message on the subject of RDBMSs, with further reading recommended.

Over the past few months, I have covered the 13 rules that Ted Codd originally defined for RDBMSs. As I mentioned at the start, there is a fine line between accuracy and verbosity. Even though I have carefully trodden this line, it has taken a long time to cover all the rules; so long that it may be difficult to see the take-home message. Additionally, some of these rules have become less meaningful as the years have passed and RDBMSs have evolved.

With this in mind, it seems worthwhile

these as Whitehorn's Rules (I haven't even numbered them from zero); they are not definitive, neither are they complete. View them more as a starter set designed to promote discussion. If you think any are wrong, incomplete, or missing, then please let me know.

The following are *not* in order of importance:

- An RDBMS must store data as values in tables and not in any other way.
- It must be possible to declare a primary key for each and every table and it must be possible to use multiple fields to form a primary key.
- The RDBMS must ensure that any field declared as a primary key, or part of a primary key, is not allowed to contain null values.
- Every piece of information in a table must be accessible by using a combination of the table name, field name and primary key value.
- Null values must be not be treated as equal in joins.
- Joins on non-identical field types must not be allowed.

• When joins are performed on tables containing existing data, the referential integrity of that existing data must be checked and the join must fail if the data violates the proposed join.

• An RDBMS must maintain a data dictionary for each database which stores information about the joins between the tables, referential integrity, etc. Access to the tables which circumvents this data dictionary should be forbidden.

• Rules controlling data entry to specific

fields must be storable in the data dictionary and applied at the table level.

- The RDBMS must have a comprehensive control language (for example, SQL).
- In addition, the RDBMS must have a GUI interface which allows end-users to perform simple tasks such as querying, reporting etc.
- The results of queries (answer tables) should, whenever possible, offer the option of editing.
- It must be possible to alter multiple records with a single command.
- The RDBMS must support referential integrity, with cascade update, cascade delete and so forth.
- The RDBMS must support the maintenance of indices as well as sorting.

I must stress that this list merely represents a starting point for discussion so, contributions please. Meanwhile, I can explain some of my choices:

"An RDBMS must store data as values in tables and not in any other way" — this is the Same as Codd's rule 1 (see *PCW*, March 1995).

"It must be possible to declare a primary key for each and every table, and it must be possible to use multiple fields to form a primary key" — most Windows RDBMSs support primary keys but not all support the use of multiple fields as primary keys. I find this to be a mind-boggling omission for the simple reason that if they are not supported, it is impossible to make a many-to-many join.

For those who aren't familiar with the concept: suppose you want to keep a database which stores information about Students and the Courses they attend. You need a table for each, but how do you store the information about which student attends which course(s)? The problem is that each attends many courses and each course is attended by many students. Many-to-many relationships are common in the real world and hence they are common in databases.

If you were foolish, you might try to include a field in the Student table for every course that the student may attend. But how many fields do you allow? The average student might attend six courses a year but the very industrious could go to ten — an exceptionally gifted student might want to attend 12; so what if your system was to allow only for eight?

A much better way is to use a Students table only to store data about the students themselves; a Courses table to store data relating to the actual courses; and a third table to store information about who is attending which course. A brief examina-

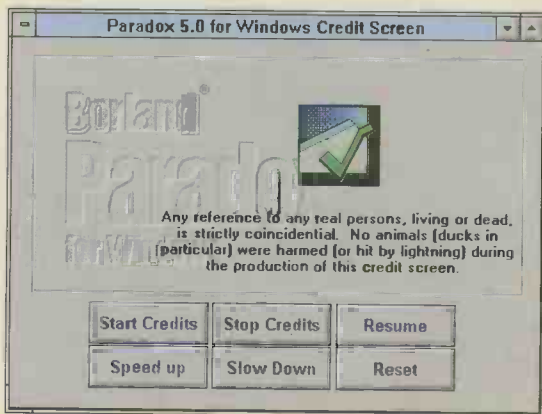


Fig 1 The gang screen in Paradox 5.0 for Windows

to try to determine some of the important characteristics we should expect from a modern RDBMS running on the PC. This does not include heavyweight, mission-critical RDBMSs, but it does include the Access, Paradox, dBase, Approach, Delta 5, dataEase, SuperBase type of products.

Before anyone asks, I'm not presenting

tion of the tables in Fig 2 should be enough to allow you to determine that Mike Wellington is attending Cytogenetics and Intro. to Polymorphism (among others). However, Sally Jones isn't attending either of those courses (despite attending 11 others). It should also reveal that if she wants to add Cytogenetics to her list of courses, all that is necessary is to add a single record to the Attend table with the entries 2 and 2.

Of course, you don't actually go to this table and write these numbers in; you use an attractive GUI interface which allows you to pick the student's name from one combo box and the course from another. Then the system writes the numbers in for you.

So, what has all this to do with multiple fields in primary keys? Hopefully, it is clear that ID has to be a primary key in the Students table to ensure that each student has a unique number. Similarly, CODE must be a primary key in the Courses. However, neither ID nor CODE on its own, can be the primary key in the Attend table. Instead, the primary key must be composed of both fields, used together. If both are used, the table can have multiple entries in the ID field, as it can in the CODE field as follows:

ID	CODE
1	2
1	3
2	2

But the following is forbidden:

ID	CODE
1	2
1	2

This actually matches reality very well since the same student, no matter how gifted, cannot attend the same course more than once (at least, not simultaneously).

Any RDBMS that doesn't support multiple fields as a primary key cannot manage many-to-many joins effectively.

Time wasting

Oh no, not another another gang screen

See the join?

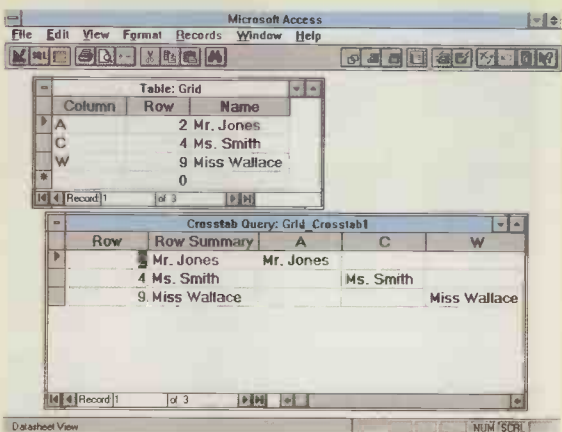
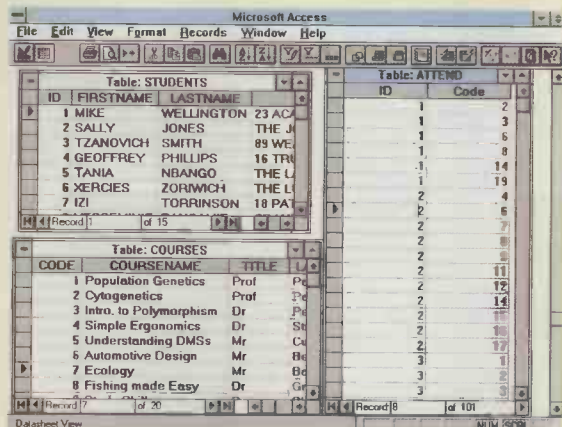


Fig 2 (top) Using a third table to create a many-to-many join between two others (see page 306)

Fig 3 (above) The solution to the problem of gridding data (see page 309)

(Fig 1). This time it's Paradox for Windows 5.0:

1. Turn ScrollLock on, NumLock on, and CapsLock off.
2. Select Help, About.
3. Press Alt Shift Z (that is, the three keys simultaneously).
4. Hold down Ctrl and Left click the logo in the Help About box.

Assuming that the wind is from the South, and that there are no more than two penguins in the room with you, the gang screen will appear (Fig 1) — note the snide remark about ducks.

To understand this, you need to know that: the code name for Access was Cirrus; and that the original Access gang screen shows a pair of ducks (Pairedux), which are destroyed by a lightning bolt from a small, fluffy cloud.

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In the MD's office

What do you mean "we don't know how many fault calls relate to this" - it's on the computer isn't it?

In the PR office

Do we have any contacts in the Belgian press?

In the research section

You mean we can't just look for everything in the database that mentions it?

In the library

I don't suppose you've got any back-ground on [fill in pet hate]?

In customer service

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Oh...
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Recommended reading

When I started to run through Ted Codd's original rules some months ago, I promised a book list of recommended texts and asked readers for suggestions. Thanks to all who contributed — I have grouped the books below (numbering system after Ted Codd):

Group 0: Readable, informative, non-rigorous.

Title	Author	Publisher	ISBN
The Relational Database	Carter	Chapman and Hall	0-412-55090-3
SQL and Relational Databases	Vang	Microtrend	0-915391-42-2

Group 1: Less readable, still informative, more rigorous.

Title	Author	Publisher	ISBN
An Introduction to Database Systems	Date	Addison Wesley	0-201-54329-X
Understanding Relational Databases (with examples in SQL-92)	Pascal	John Wiley & Sons	0-471-585-38-6

Group 2: Rigorous, not bedtime reading unless you're rather weird.

Title	Author	Publisher	ISBN
Relational Database Writings 1985 -1989	Date	Addison Wesley	0-201-50881-8
Relational Database Writings 1989 -1991	Date with Darwin	Addison Wesley	0-201-54303-6
Relational Database Writings 1991 -1994	Date	Addison Wesley	0-201-82459-0
Fundamentals of Database systems and Navathe	Elmasri	Benjamin Cummings	0-8053-1753-8

Group 3: Completely turgid, totally rigorous, not worth reading unless you are a masochist, but essential to have on your bookshelf. If you want to appear a true professional, scuff up the book a little so that it appears well-thumbed and annotate the margin occasionally in pencil. These annotations are better if they appear cryptic:

"!" is a good one.

"Really!" is excellent

"Really!?" is even better.

"No" is dangerously authoritative and best avoided

"Ted now considers this incorrect — Pers. Comm." is the ultimate, as long as you think you can carry it off.

Title	Author	Publisher	ISBN
The Relational Model for Database Management Version 2	Codd	Addison Wesley	0-201-14192-2

Joking apart, if you really want to know where Ted Codd's thinking went after the original rules, it's all in this book. But don't expect a light read. Incidentally, Codd deals with an interesting problem in this book: in 1988, H. W. Buff published a paper entitled "Why Codd's rule No. 6 Must Be Reformulated" proving that Rule 6 is flawed. Rule 6 says that essentially, all views (answer tables) should be updatable if an algorithm can show that it is "safe" to do so. (This statement is rather simplified, but see PCW June 1995 for more detail.) Buff's paper shows that an RDBMS can never support this rule because "there does not exist any algorithm which can decide, given any view, whether it is updatable or not". In this book, Codd has modified rule 6 by defining an algorithm which will identify a good percentage of updatable views. I knew of the problem from Codd's book but had never seen Buff's paper. I am greatly indebted to Mike Jackson, a Reader in Software Engineering at the University of Wolverhampton, who sent me a copy. For most of us, the fact that this rule is unenforceable under all circumstances is not crucial. What does matter is that RDBMSs like Access will let you edit most answer tables from queries, and RDBMSs like dBase do not.

Questions & Answers

Too small

"In the June issue, the screenshots containing SQL code are tiny and very difficult to read. Could you put the SQL in the text body where it can be more easily read?"
Yes, and sorry for the problem.

On the rack

"I hope you can help me with a query regarding Microsoft Access Reports. I have a table of data containing a person's name and a grid reference (e.g Mr Jones. A1). I would like to display a grid in a report with column headers from A to Z, and row headers from 1 to 24. I would then like to place the person's name in the corresponding grid reference. For example:

	A	B	C
1	Mr Jones		
2			
3			

...and similarly throughout the grid.

I would be grateful if you could give me some pointers as this is giving me some headaches, and sleepless nights."

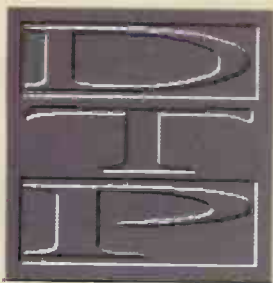
I think that a query would serve you better than a report in this instance: I have made a small table (fig 4) and built a cross tab query which should satisfy your needs. The SQL for the crosstab query is:

```
TRANSFORM First(Grid.Name) AS
[The Value]
SELECT Grid.Row, First(Grid.Name) AS
[Row Summary]
FROM Grid
GROUP BY Grid.Row
PIVOT Grid.Column;
```

I have made the fields Column and Row the joint primary key, which means that you can only ever have a single entry for each grid location. If you want the grid to be complete (that is, to show every possible cell, irrespective of whether or not it contains a person's name), you can add every single grid location to the table and leave the value in the name field null. Or, you could just add A1 to A24 and B1 to Z1 to the table, whereupon the answer table will obligingly show every possible location. If you don't want to see the Row Summary (which is inserted by the Access wizard), simply delete it from the query.

PCW Contacts

Mark Whitehorn welcomes readers' correspondence and ideas for the Databases column. He's on penguin@cix.compulink.co.uk



Swings and roundabouts

It's a funny old thing, Windows 95 — try running XPress 3.1 or Photoshop on it and it should tick along nicely, but try getting video drivers to work, and... Gordon Laing looks at it from a DTP point of view.

Video drivers are the bane of my life. The trouble is that I expect them to work flawlessly first time, and to continue to do so unprompted — which is about as reasonable as expecting any part of a computer to work first time and all the time, but for some odd reason I seem to be consistently caught out by video drivers.

I'll set the scene for my ranting: virtually all of you must have noticed that this is our Windows 95 issue; the cover and the huge wad of pages devoted to Microsoft's new baby (starting on page 101) are both a dead giveaway. What may not necessarily

come across in the feature is the varying amount of pain we all endured at PCW while trying to configure our systems under the new OS.

It has, in fact, been a whole year since I reformatted by hard disk, removing the curse of an early Windows 95 beta, then known as Chicago. Many new builds have arrived, tempting us to throw caution to the wind, but I held off for as long as I could. The one we all ended up installing *en masse* at PCW was dated about four months pre-release, but turned out to be rather good.

Upon installation it recognised both our Novell servers, connected without hassle to our network printer, even supported TCP/IP without complaint. Everyone was hooting with the joys of success. But it was then I noticed that virtually everybody was running in VGA.

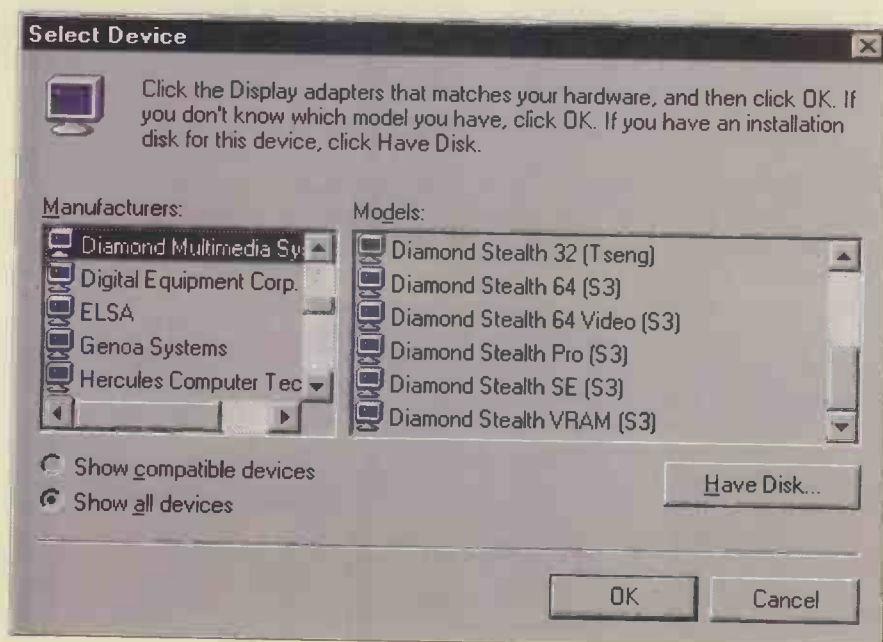
Call me a snob, but 640 x 480 in 16 colours, flickering away, doesn't do anything for me — particularly on a 21in monitor. I was merrily running in 1280 x 1024 at 75Hz under Windows 3.1 and naively expected this not to pose any problem for Windows 95. Reasonable? Of course not.

We all installed over existing versions of Windows 3.1 with multimedia, network and display options set and fully operational. The trouble was that it failed to recognise my graphics card, guessed incorrectly and cycled upon restarts between VGA and 1024 x 768, the latter interlacing horribly.

Nothing unusual about a Diamond Stealth 64 DRAM, I thought, but Windows 95 was mistaking it for something else. After numerous calls to the Microsoft helpline and swearing loudly at my machine (both about as useful as each other), I resorted to the Internet.

The Internet is great fun, but most evangelists aren't successfully finding

Hopefully by final release, most video cards will be supported by Windows 95. There was no Stealth 64 DRAM on my beta, however



answers to specific questions — they're merely browsing and randomly coming across interesting stuff. I took the bull by the horns, ran a Net search on Diamond Stealth and was pleasantly greeted by one of Diamond's home pages, complete with, joy of joys, Windows 95 known problems. Five seconds later I was printing out advice for those with Diamond Stealth 64 DRAMs who are running Windows 95.

I was instructed to set up the desired video mode with Diamond's S64DMODE DOS utility, swiftly dug out from my dusty system box. Then I manually selected the correct graphic accelerator chipset, restarted, and was there! Back to 1280 x 1024 non-interlaced with everything looking quite wonderful.

But curiously enough, there was a certain amount of localised flickering at the edges of objects, suggesting that I was driving the card or monitor too hard. But I was using exactly the same mode and hardware that worked perfectly well under Windows 3.1. Perhaps this is a Win95 problem

that will hopefully be fixed by the time the final release emerges. I hope so, or it may be time for another reformat as I rummage around for those old DOS disks.

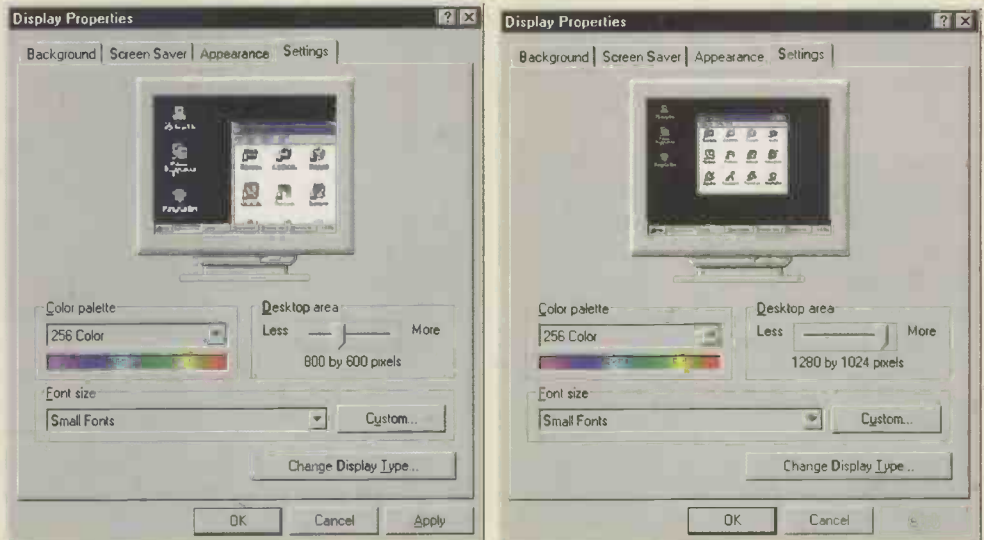
On a happier note...

It's not all doom and gloom, in fact quite the opposite, so while we're on the subject of Windows 95 I'll go over some of the graphics-related topics I've found so far.

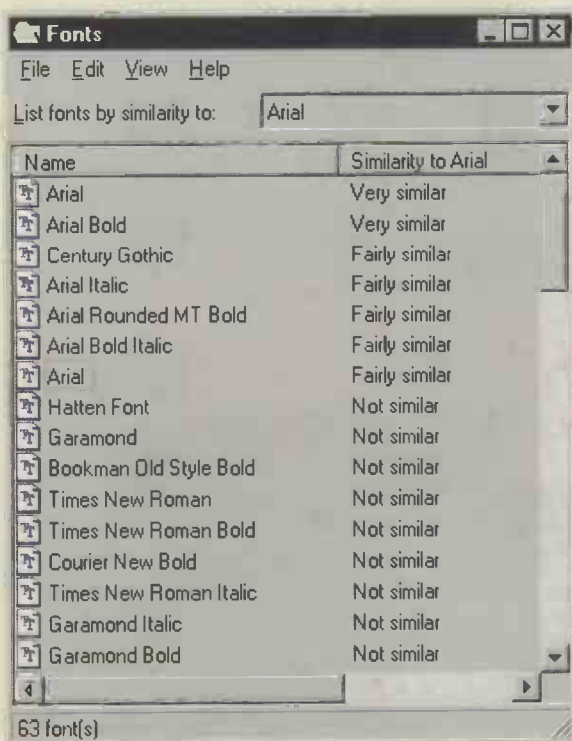
The first thing I tried was running all my

old 16-bit apps, including those with Win 32s. Photoshop 3.0 if anything ran a little quicker, but beware of "opening as", which in all instances resulted in a crash. Quark XPress 3.1 was fine, but 3.3 didn't want to know. To quote directly from the Windows 95 Beta Release notes:

"Quark XPress 3.3 will typically return an 'out of memory' error regardless of the amount of memory available to a given



The nice side of Win95. Above, the display properties showing what you should expect at different desktop resolutions. Below left, fonts listed by similarity using Panose matching information. Below right, opening a font file offers a neat preview of the typeface



machine. A patch, to upgrade Quark XPress 3.3 to 3.31, can be downloaded from CompuServe or can be provided by Quark. When installing Quark XPress on Windows 95, XPress's install program may stop at 99 percent complete on some systems. Selecting the Continue button finishes the install process."

CorelDraw 5.0 went about its business without a hitch, although the forthcoming version 6.0 is expected to be one of the first Windows 95 applications available. FreeHand experienced difficulties when running with network support, but this is promised to be fixed in time for the final release.

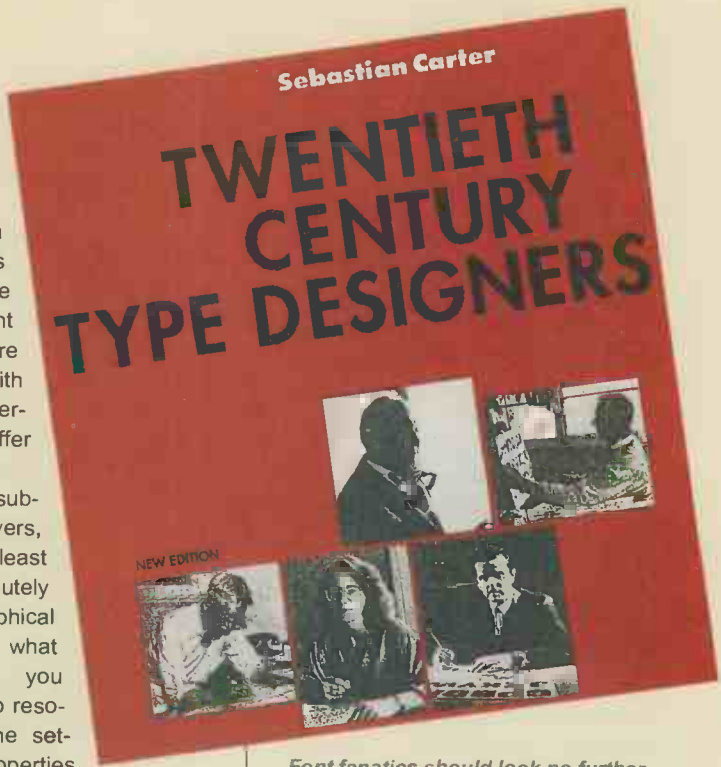
Fonts are handled interestingly, so long as you're using anything other than Type 1. ATM for Windows 95 was not out at the time of writing, so any cunning new facilities remained unknown. That said, Windows 95 has certainly improved its handling of TrueType and system fonts. Selecting the Fonts Control Panel brings up a Window with all your installed TrueType and system fonts — except there's now a new option in the View menu: "list fonts by similarity". Any Panose matching information is taken into consideration and all fonts are listed by similarity to the selected font file. See the screenshot on page 289 which proclaims very similar, fairly similar or not similar, to solve all those typeface arguments once and for all.

Perhaps more useful is the extremely

quick preview of any TrueType or system font. Just right-click the file, select Open and a window appears with examples of the font at various point sizes, and an entire character listing. With any luck the next version of ATM will offer this facility.

Returning to the subject of video drivers, Windows 95 has at least got one thing absolutely right: a decent graphical representation of what happens when you change the desktop resolution. Selecting the settings of display properties offers a picture of a monitor with a few objects on the desktop, including icons and a window. Adjusting the size of the desktop area from less to more updates the contents of the pretend monitor screen, indicating how the higher the resolution, the more you fit on, but at a smaller size.

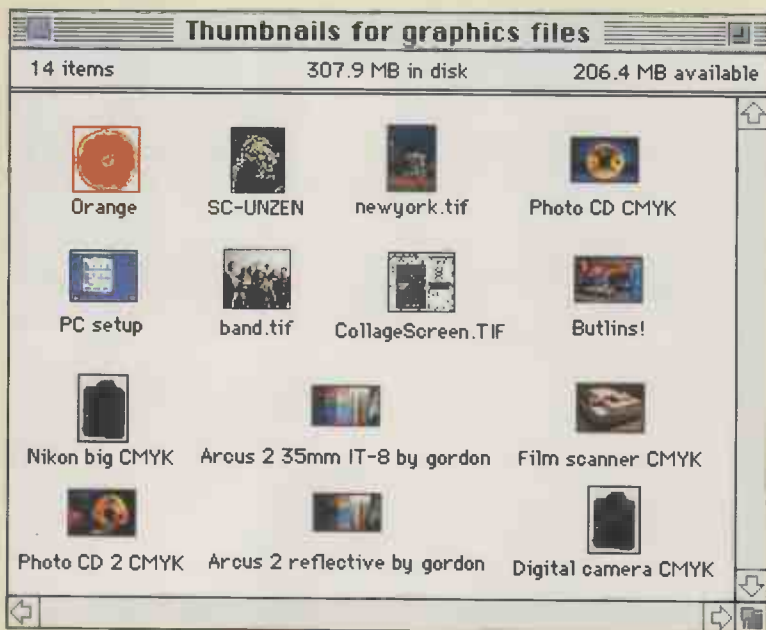
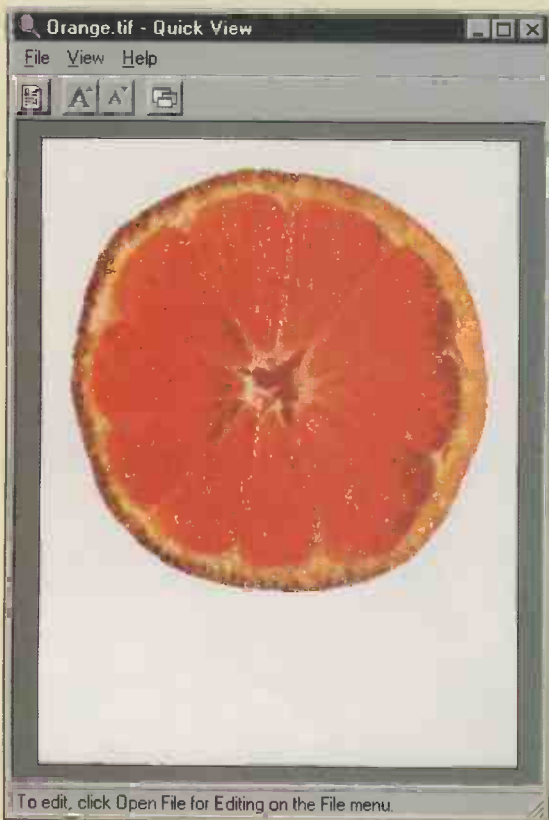
From this window you can also change the display type, which is where I ran into difficulties upon my initial Windows 95 installation. Two options are presented:



Font fanatics should look no further than two excellent new books from Lund Humphries

the adaptor type and monitor type. The theory is that Windows 95 has a list of every video card and monitor along with their specifications, so that once a pair has been selected, it knows exactly what the combination can and cannot do. No more selecting too high a resolution for your monitor's capabilities.

Sadly, the beta of Win95 I was installing



How can you tell what a graphic looks like without opening it? Windows 95 offers a quick view facility, left, which opens a preview in a few seconds. However, check out the Macintosh folder, above. Photoshop for Macintosh creates thumbnail previews for the graphics file icons. They may be small, but you can see straight away what they represent

had never heard of my monitor and mistook my graphics card for something else. Every time I speak to a video manufacturer I'm told they're feverishly writing updated drivers, so with any luck either Windows 95 will already be aware on release or there'll be lots of patch disks available direct from the developers.

Under the thumbnail

Speak to Mac users, and many, including myself, rave about thumbnail images used as the icons for graphics files. It turns out that what many considered to be part of System 7 is in fact a cunning piece of programming by Adobe on Photoshop. The fact that so many assumed it as part of the OS indicates Photoshop's huge installed Mac base.

The point of all this is that my initial disappointment in finding Microsoft not implementing thumbnail icons on Windows 95 could be alleviated in several ways. First, I'm hoping that it was left off because this is only a beta, although this is such a late stage in the development that if it were going to feature, it would probably be doing so already. Second, Adobe could perhaps implement it in the next version of Photoshop for Windows 95. Third, other manufacturers could do it, although the preview of Micrografx Picture Publisher for Windows 95 did not.

It *could* be that it's impossible, or that certain vital developers don't consider it important enough to program. If either of these are the case, that would be a shame since it's one of the neatest features I've come across.

Also sadly unsupported in the PCW office is the sharing of long filenames between PCs and Macs over a Novell NetWare 3.1 server. Unconfirmed rumours imply that this should work with an NT server, but we reckon that's just a conspiracy to persuade us to blindly swap from Novell. Whatever the reasons, it's a shame that the day both platforms can share long filenames and preview icons is likely to be a long way off.

One consolation is Microsoft's Quick View accessory which pops up as an option when you right-click a file. Text embedded in often complex word-processing files is separated from any complex formatting and presented in a flash. Good-size previews of graphics files are rapidly opened — well, most graphics files, anyway.


My QuickView didn't present itself as an option on JPEG files, while certain TIFF flavours cause difficulties. On the plus

Font of the Month

Neuzeit Grotesk


ABCDEFGHIJKLMNOPQRSTUVWXYZ
 abcdefghijklmnöpqrstuvwxyzß&1234567890

Alien Skin Textureshop by Uirtus



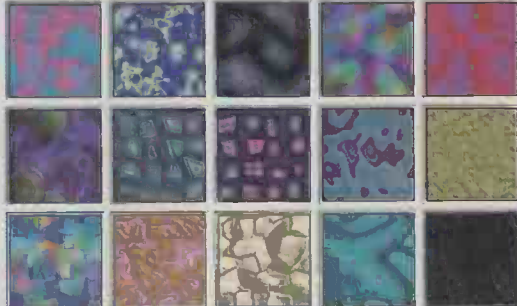
Mutation Rate

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none

Mutate



Bin 1

Bin 2

Bin 3

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Bin 5

Bin 6

Bin 7

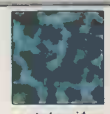



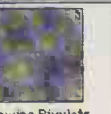


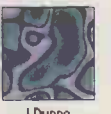

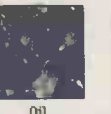





Control Mix

Fabric

Lumps

Stone

Wood

 Asteroid	 Cave Art	 Cool, Huh?	 Formica	 Glowing Rivulets
 gold foil	 Groovy	 I Dunno	 Not Mine	 Oil
 Polka Dot Mud	 Prismatic Stone	 Purple Dunes	 Purple Weird Stuff	 Salt Creature

Create...
Remove...
Remove...
Light...
Preview...
Quit

We're seeing lots of texture-generating utilities these days. Here's a quick teaser of Alien Skin — a full round-up is coming soon

side, it did recognise and successfully open normal TIFF, GIF, BMP, PCX and EPS files. It even showed the tiny previews that CorelDraw creates for CDR files. By default, all files are displayed 1:1, so you may have to scroll around large bitmaps. In these cases, select Page View to see the whole picture.

Anyone whose appetite has been whetted should check out our comprehensive Windows 95 feature in this issue.

Font of the Month

Continuing the theme of the past few months, here's another font which is used within the pages of PCW. DIN Neuzeit Grotesk, designed in 1928 by Wilhelm Pischner, is available in two weights: light and bold condensed. The latter is featured

here and is the one more commonly used in PCW. "Grotesk" was a term originally used to describe sans serif faces by those probably used to seeing conventional serifs, and is still in use today.

Type fans should check out two superb new hardback books, *Twentieth Century Type Designers* and *Typographers on Type*, £25 each and both published by Lund Humphries.

PCW Contacts

Gordon Laing would like to hear about any Windows 95 graphics experiences — hopefully the nice utilities, shortcuts and tricks, rather than the ones I've been having. Any thoughts? Write to the PCW address or email me as gordon_laing@pcw.ccmil.com

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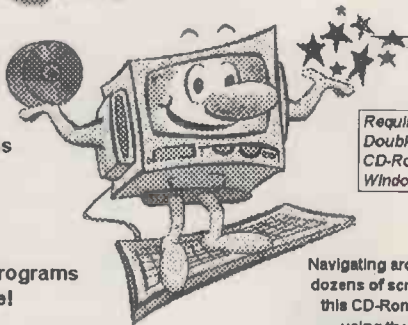
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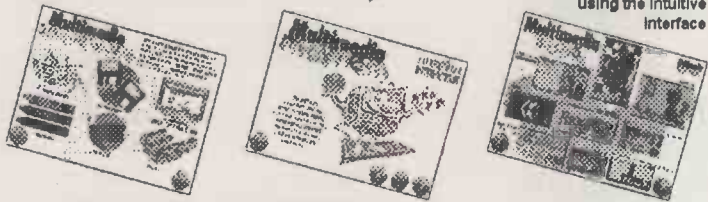
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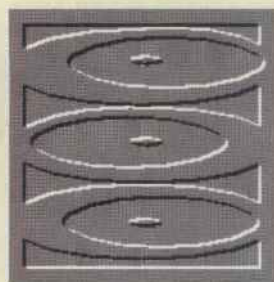
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Variations on the theme

In view of the release of Windows 95, Panicos Georgiades and Gabriel Jacobs make an educated guess at the forthcoming MPC Level III specification.

In 1990, the Multimedia PC Marketing Council published the first MPC (Multimedia PC) specification, known as MPC Level I, which was to create a standard for a multimedia computing platform on the PC under Windows.

Its purpose was to help both consumers and developers: in theory, by purchasing a PC that bears the MPC logo, a consumer knows that a CD-ROM title bearing the same logo will play correctly. In the same way, manufacturers of peripherals and PCs know what is expected of their multimedia products for the PC platform.

Because MPC Level I was very basic, a new specification, MPC Level II (MPC2), was published by the Council in 1993. This was an enhanced standard, even though the original MPC specification continues in full effect.

In either case, the details of these specifications seemed to define a PC of

approximately the same power as that in general use at the time. In fact, we've always been of the opinion that neither



standard was realistic, although their existence seems to have been a success. They are not the only reason why the PC platform represents the largest multimedia market in the world, but they have certainly played an important role.

MPC (Level I) required a 16MHz 386SX with 2Mb of RAM, a 30Mb hard

disk, a single-speed CD-ROM drive, a 16-colour display, and an 8-bit sound card. MPC2 raised the requirement to a 25MHz 486 with 4Mb of RAM, a 150Mb hard disk, a double-speed CD-ROM drive, a 256-colour display and a 16-bit sound card.

A new MPC specification is imminent with the arrival of Windows 95: Microsoft has published a PC 95 Hardware Design Guide to help hardware manufacturers and vendors take advantage of the new capabilities of Windows 95. The Guide makes a number of important and interesting recommendations (mainly for playback machines). We have not only used these, but have done some crystal-ball gazing too to "guesstimate" what MPC3, might look like.

The first, and probably the most important consideration, is the balance of power: basically, balance beats horsepower. It's no use having a very powerful CPU if your hard disk is too small, and/or if the transfer rate between CD-ROM and PC is too slow, and/or if the bus on the graphics card isn't fast enough to get all the data to the screen in time.

During multimedia playback, a CD-ROM drive is needed for reading data and a hard disk for reading and writing data. The CPU is used for decompressing data (sound, vision), and the video (graphics card) and audio (sound card) subsystems for playing data. A super-fast Pentium PC will not relieve bottlenecks created by a slow CD-ROM drive or graphics card; and it won't increase the quality of an 8-bit sound card, or the quality of a good 16-bit sound card played through tinny speakers.

It is therefore important to break down and identify the different parts of a multimedia computer in order to specify exactly what level of power and specifications are needed for each type of operation.

Turning initially to the local-bus mother-

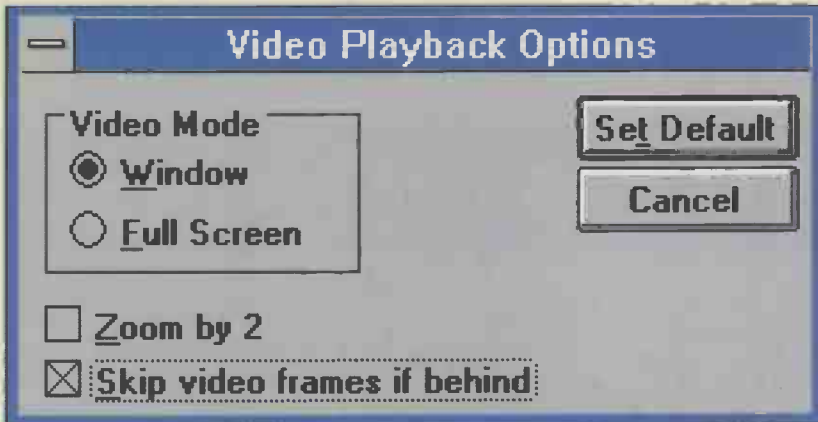
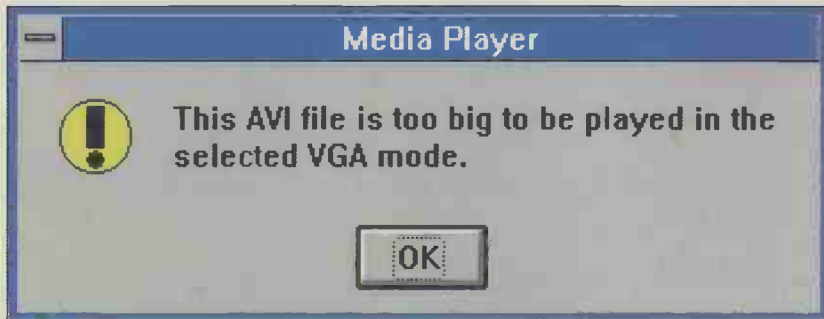
board and video card: all other things being equal, the performance of a computer with a local bus is about ten times better than one without. This is important for displaying digital video and most PCs sold today possess the feature. Microsoft recommends PCI over a VL bus. Will PCI feature as an MPC3 requirement? Probably not.

A graphics card these days should be capable of at least 800 x 600 resolution

Summary of MPC Levels I and II, and our guess at Level III

	Level 1	Level 2	Level 3 (Windows 95)
RAM	2 MB	4 MB	8 MB
Processor	"386SX, 16 MHz"	"486SX, 25 MHz"	"486, 66 MHz"
Hard Drive	30 MB	160 MB	500 MB
CD-ROM Drive			
Sustained Transfer Rate	150 KB/sec.	300 KB/sec	450 KB/sec
Maximum Average Seek Time	1000 ms	400 ms	300 ms
Other		"CD-ROM XA ready, multi-session"	(no change)
Digital Audio	11-22 KHz/8-bit	11-44.1 KHz/16-bit	8-44.1 KHz/16-bit
MIDI Polyphony	8-note	8-note	24-note
Video Display	"640x480, 16 colours"	"640x480, 65,536 colours"	"800x600, 65,536 colours"
Ports	"MIDI I/O, joystick"	"MIDI I/O, joystick"	"MIDI I/O, joystick"

Video



If you're having problems running full-screen video, Windows control panel enables you to reduce the window size. If video still appears to go out of sync with audio, try tagging the "skip frames if behind" box

with 16-bit colour (65,000 colours) and we strongly suspect that this will be part of MPC3. Multimedia applications use lots of colours to display photorealistic images. Although it's just about possible to display a single such image with 256 colours, you can't display two images using different 256-colour palettes if the display card can handle only 256 colours at a time. We recommend a 24-bit display card with at least 2Mb of video RAM.

Most CD-ROM drives sold today are double-speed (300Kb/sec transfer rate) as specified in MPC2, and titles written

assume double-speed data rate. At this speed, video clips at 320 x 240 resolution look okay because they play at an acceptable frame rate (number of frames per second) without so-called pixelation or blocking effects. The effect, a grainier image which, in the extreme, is made up of a series of blocks rather than dots, is caused by video compression so that the frame rate can be maintained.

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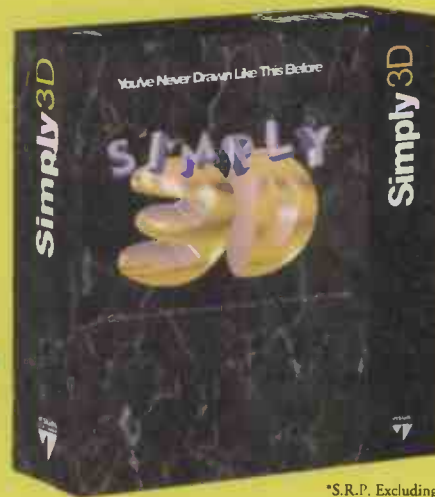
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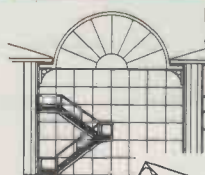
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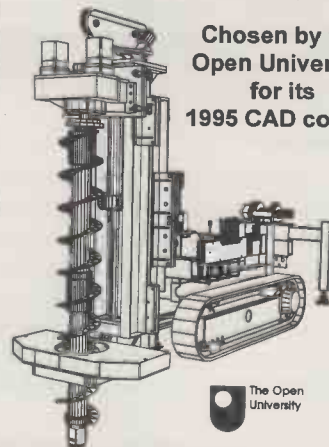
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that you get good double-speed performance — and check that it supports multi-session CDs. We would guess that triple-speed may be specified in MPC3.

Even though 8-bit sound cards are now uncommon, they are still sold in some shops; so insist on a 16-bit card. This will certainly be the MPC standard (in other words, no change from MPC2). Windows 95 multimedia applications will mainly be using compressed 16-bit digital audio.

As for other likely MPC3 sound specifications, it's difficult to guess what might become the likely requirements but we can be pretty certain about recommendations. If you're a developer, you should be looking at sound cards with digital inputs. And the trend is not always for higher specs: you could be getting more features if you look for a system that supports the lower 8kHz sampling rate (as well as the standard 11kHz, 22kHz, and 44kHz). The 8kHz rate is used by TrueSpeech compression in Windows 95 as well as for telephony applications.

Sound cards should also support general MIDI. This is a standard for assigning musical instruments so that a piece of music plays OK on different cards using different types of sound. Most cards sold nowadays support this standard, but you need to be careful of a number of factors:

- Multi-Timbral: the ability to play multiple musical instruments simultaneously. The minimum is 16 but we would recommend 24, or even 32 if you want true symphonic sound. We would hazard a guess that 24 will be the MPC3 standard.

- WaveTable synthesis as opposed to other types of synthesis (usually FM): WaveTable synthesis cards use actual recordings of instrument sounds and are about £30-£100 more expensive because they use extra ROM chips. They're a must if you wish to hear anything approximating music as opposed to computer-type squeaks.

- The card should have: a standard MIDI port which also supports joysticks (most cards do, but not all).

- The sound mixer on the card. This should mix input from four sources: WAV and MIDI from the card, CD-audio from the CD-ROM drive, and AUX In from an external input.

Microsoft specifies that input should have at least a 3-bit volume control (eight steps) with a logarithmic taper. They also specify that all sources are sourced with -10dB (Consumer Line Level 1mW into 600 ohms, 0dB) and without attenuation in order to ensure that the mixer won't clip (meaning that if a sound peaks, the audio

clicks instead of playing that sound). It also ensures that the mixer will output between 0dB and +3dB.

Riotous assembly

Among the many CD-ROMs that pass our way, one has impressed us tremendously: Assembly 94 — a computer demo party. There are extraordinary things on this CD: things you've almost certainly never seen before; things you never thought your PC was capable of displaying.

If you're a computer demo programmer (many multimedia authors started that way), or if you're at the very cliff edge of animation, you'll probably know about it.

Assembly is a yearly party attended by the animation-Meisters of the world, at which they show off their programming and artistic skills. Established in 1992, Assembly 95 is expected to be held in Helsinki between 10th and 13th August.

Among other things, the party features competitions involving animation, raytracing, computer art, and computer music — all the ingredients needed to put together a computer demo. The competition entries must be original, hand-drawn, or computer-generated works (nothing scanned). They are exhibited on a large 8m x 6m screen with Dolby surround-sound. All the participants are allowed to vote for the winners.

The Assembly 94 CD is available for the PC and Amiga from Sound Solution (about £25). If you would like to see a selection of the wonders it contains, they're included on this month's cover CD-ROM.

Cheaper CD-writer

Of course, whether or not you're into squeezing blood from a stone, as some of those demo authors seem to be (don't miss the 4Kb versions), the future for authoring has to be putting your work onto a CD-ROM without all the hassle and expense of using a professional firm to produce the discs for you. Last month we brought you news of the first CD-writer to break the £1,000 barrier, which seems to be starting a welcome trend.

It's been almost a year now since Yamaha released its CDR100, heralded as the world's only affordable 4-speed CD-writer — but there again, it depends on what you mean by "affordable". Two models make up Yamaha's Expert Series, the external CDE100 (at £2,199) and the internal CDR100 (at £1,899). Our current information is that by the time you read this, prices will have been heavily reduced and the internal machine will cost around

the £1,000 mark.

The units are SCSI-2, and there's multi-platform software support from distributors. Apart from Windows and Mac, there's software for Unix, Commodore Amiga, Windows NT and OS/2.

Although any blank media can be used, Yamaha only guarantees data integrity at 4-speed writing with either its own brand, or Kodak discs. Interestingly, the guarantee life of Yamaha's own blanks is 250 years, compared with only about 50 years offered by others. The choice therefore seems obvious; if you want to be sure that your great-great-grandchildren will appreciate your work, buy Yamaha.

The system can write the full variety of CD formats, including CD-DA, CD-ROM, CD-I, CD-ROM-XA, White Book MPEG, and Kodak PhotoCD.

AVI playback fix

Here's a problem which one of our readers has asked us to tackle: when trying to play video files from a multimedia commercial title, or when using Media Player, you get a message that the AVI file is too big to be played in the selected VGA mode.

The error is caused by the fact that some video drivers can't run digital video (AVI files) using the MCI (Media Control Interface) Video for Windows driver set to Full Screen. To get around this problem you should set the playback video mode of the driver to Window rather than Full screen. You can do this from the Control Panel, as follows:

1. In the Drivers section of the Windows Control Panel, choose (MCI) Microsoft Video for Windows.
2. Click on the Setup button.
3. In the Video Mode selection box, choose the Window option.
4. Click on the Set Default button and then on the Close button to exit.

The problem is known to occur with about a dozen makes of card and it's more likely to happen with those having 512kb or 1Mb of video RAM.

PCW Contacts

Panicos Georghiadis and Gabriel Jacobs will be glad to answer your questions. Either write to PCW, or email g.c.jacobs@swan.ac.uk

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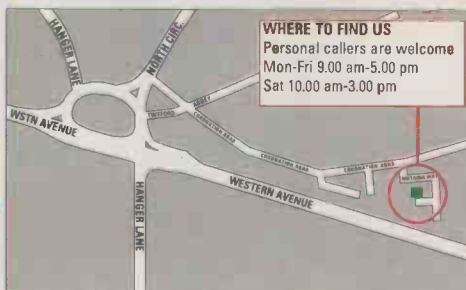
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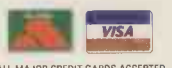
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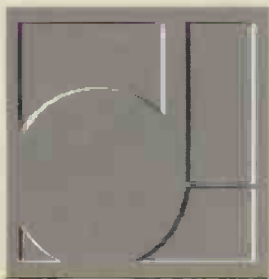
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Seriously sound

Serious sampling requires the best performance from your sound card. Steven Helstrip looks at how to achieve this with assistance from some upgrades, and to help your understanding of MIDI, explains Control Change messages.

Most sound cards perform a reasonable job when it comes to sampling, but more often than not there is a noticeable loss in sound quality. This usually occurs in the analogue-to-digital (ADC) process, where the audio signal is converted to digital information. To obtain the best results you should sample at the highest resolution and sampling rate available from your card: 44.1kHz 16-bit is the accepted standard. It is also important to use high-quality, shielded cables when connecting an external audio source to your card.

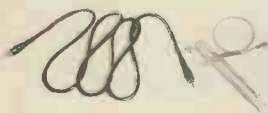
Nevertheless, even with the best cable money can buy, there will still be some distortion: this is because the ADC on a sound board is subject to interference from several computer components including the main processor, other expansion cards, and more notably, the power supply. To better your card's performance you can place it in the slot furthest from the power supply and away from others, particularly the graphics card.

If you do a lot of sampling from CDs it is worth investing in CD-Grab, a utility that copies the raw binary information from audio CDs onto your hard disk. It works better with SCSI CD-ROM drives but can be calibrated for other drives. AL Digital has just released a Windows version (costing around £99) that is also capable of grabbing CDi and MPEG files.

Since there's no analogue stage, there's no degradation of audio quality. Well, not until it's played back through your card's digital-to-audio converter (DAC). Some cards have better DACs



QED's
Digit can significantly improve the audio performance of the AWE-32



than others. The best I've seen and heard are those available from Turtle Beach (Tropez and Monterey) and MediaVision's Pro 3-D which have a respectable signal-to-noise ratio in excess of 85dB.

If you have Creative Labs' AWE-32 card, it is possible to add an external DAC because the card has a digital output in the form of an SP/DIF (Sony/Philips Digital Interface) connector. Using an external DAC dramatically improves the audio quality as the processing is carried out away from the computer, hence there is no interference from your PC and there are benefits from a stable power supply. Having searched for the best value DAC, I would recommend the QED Digit (from Turkey) which you can buy for under £100.

The Digit uses a bitstream DAC, with 256 times oversampling, and modestly filters ultra-high frequencies (-0.6dB at 20kHz,) helping to reduce noise even further. It comes with good, gold-plated interconnects and power supply, and substantially improves the AWE-32's performance.

Connecting it to the card requires a basic cable which can be made up with a "jumped" cable with a female phono plug on the other end. It is advisable to mount the phono socket on a blanking plate as this will reduce the risk of damaging the cable and the jumpers on the card. Creative Labs has made up this cable (with a blanking plate) to save you the hassle of getting the parts, and charges £15 including postage and packing.

What's new

Creative Labs was showing the new AWE-32 at a recent Windows 95 seminar. As you would expect it's plug and play, quite literally, but more interestingly it comprises some new software and hardware developments. The main control panel has been re-worked and has an on-screen piano to enable you to audition banks of sounds without launching a sequencer application. It will also allow you to replace preset instruments with new sound banks (SBKs). For example, if you have a piano patch that you use regularly, it can be accessed by selecting program change number 1 without sending any additional

bank change message. With the plug and play version it will be possible to install several cards to provide separate audio outputs and make use of any 1Mb SIMMs you may have lurking in your cupboard.

On the subject of RAM, I have finally found out why you can only access 28Mb of RAM even when you have 32Mb installed. It's because the hardware can only address 32Mb of data and the last four have been reserved for future WaveTable upgrades.

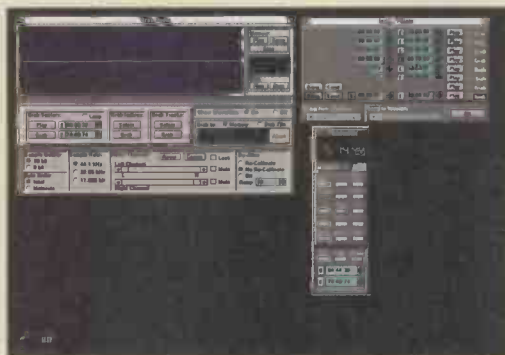
It has been rumoured that a new version of Vienna is on its way, but Creative Labs is reluctant to shed any light on new features. Although the current version is easy to use, it's lacking in features and simple tasks can be time consuming. With any luck, the developers will have taken a close look at Akai operating systems.

Since having mentioned that Creative Labs would supply Vienna free of charge to those who bought the card before its release, I have had several angry letters

because Creative has stopped being so nice and is charging £12 for the software... Sorry.

To fix the problems in version 1, Turtle Beach has announced version 1.1 of Quad Studio. There are a number of enhancements too, including more responsive meters with peak hold, better synchronising and the ability to replace or append existing mix sessions. A new Windows driver acts as a virtual MIDI port, making it possible to route MIDI Time Code from your sequencing application for synchronising the two. Other digital multi-track systems — SAW, for example — require an exclusive physical MIDI port to do this. Quad Studio is sensibly priced at £199. For existing users, the upgrade costs £9 and is available from Et Cetera Distribution.

After eight or so years of supplying FM and WaveTable chipsets to sound card manufacturers, Yamaha has decided to launch its own card, the SW20-PC. This is the first in the range and is an entry-level product based on the OPL4. It has a programmable DSP allowing several effects to be applied to audio in real time. The SW20-PC costs £149 from Yamaha.



CD-Grab copies raw binary information from audio CDs, onto your hard disk

Understanding MIDI

What are Control Change messages? What do they do and how do you use them? Having covered the basic principles of MIDI, we can now take a close look at CCs, or controllers (as control change messages are sometimes known).

CC messages are MIDI messages used to change the parameters, or settings, on a MIDI device. The most common controller is modulation: when you move the modulation wheel, or lever, on a synthesiser it sends a Control Change message (Control Change number 1) with a value between 0 and 127. Because modu-

MIDI control change numbers

0	Bank Select	72	Release Time
1	Modulation Wheel	73	Attack Time
2	Breath Controller	74	Brightness
3	Undefined	75	Sound Controller 6
4	Foot Controller	76	Sound Controller 7
5	Portamento Time	77	Sound Controller 8
6	Data Entry MSB (most significant bit)	78	Sound Controller 9
7	Volume	79	Sound Controller 10
8	Balance (between two sources)	80-84	General Purpose
9	Undefined	85-90	Undefined
10	Pan	91	Effects Depth 1 (External Effects)
11	Expression	92	Effects Depth 2 (Tremelo Depth)
12	Effect 1	93	Effects Depth 3 (Chorus Depth)
13	Effect 2	94	Effects Depth 4 (Celeste Detune)
14	Undefined	95	Effects Depth 5 (Phaser Depth)
15	Undefined	96	Data Increment
16	General Purpose 1	97	Data Decrement
17	General Purpose 2	98	Non Registered LSB
18	General Purpose 3	99	Non Registered MSB
19	General Purpose 4	100	Registered Parameter LSB
20-31	Undefined	101	Registered Parameter MSB
32-63	LSB for controllers 0-31 (least significant bit)	102-119	Undefined
64	Damper Pedal	120	All Sound off
65	Portamento on/off	121	Reset All Controllers
66	Sostenuto	122	Local Control on
67	Soft Pedal	123	All Notes Off
68	Legato Switch	124	Omni Mode off
69	Hold 2	125	Omni Mode On
70	Sound Variation	126	Mono Mode On
71	Harmonic Intensity	127	Poly Mode On

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Sequencers are for people who are producing their own demo tapes. Music-Time on the other hand is for musicians who want to record music onto a standard score page, and to print it out as sheet music. Many programs attempt to do this - only MusicTime makes it easy, fun and educational, while still giving professional quality results. MusicTime16 is just £125, and includes a free copy of Pianist Life.

Turtle Beach 16 bit sound card with ICS General MIDI synth and special ability to record samples and play them back from MIDI, optional RAM expandable to 12 Meg. Also works with hard-disk recording software (included), optional MIDI cable for use as a MIDI interface. This is a serious card for people who want to play more than games! £212

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D-Zone WorkStation Volume One

D-Zone currently offers nine dance-orientated sampling CDs for under a tanner. And despite having only a fraction of the samples when compared with Time + Space compilations (average price, about £60), they offer excellent value. WorkStation Volume One is one of the better CDs and contains 24 drum loops, or breakbeats, and one-shot samples from the Roland JD-800 and Proteus World synths.

The breakbeats vary in style from slow soul grooves to jungle beats and just about everything in between. The breakbeats are diverse in style, have been well produced, and last for around 90 seconds.

But there is no variation — just the same loop, over and over and over again. This is fine for mixing between records on the dance floor, but for sampling? Do we really need this much?

Samples from the JD-800 seem to be wasted since they have only been recorded at middle C. This works fine when sampling string pads, which the JD-800 does so well, but the piano and clav-type sounds need to be multi-sampled in order to sound any good. There are 75 samples from the JD: all the presets (and a few more besides), including organ, bass and synth patches. Proteus World samples are equally presented; all at middle C and not level matched.

For ten quid though, there are a lot of usable samples to be found on this CD. We have decided to put one of them on next month's cover CD, so I have chosen what I think is one of the better drum loops. You'll also find it as a sample bank for the AWE-32. It will load into the standard 512kb sample RAM.



CCs, most MIDI devices can utilise them in some way too; notably, effects units and other outboard gear. Of the 128 CCs a handful are undefined, leaving them free for you to experiment. From the control panel of your synthesiser or other equipment, you should be able to assign a control change number to a parameter which will allow you to edit or adjust the synth's setting from within a sequencer, etc.

Next month we'll look at how to do this, and set up mixer maps in Cubase to control external devices.

lation was the first controller to be implemented, almost every MIDI device responds to modulation by applying vibrato to the sound being played. Vibrato will be applied until the modulation wheel is returned to its original position, sending a value of 0.

There are two types of Control Change messages (128 of them in total). The first of these, modulation, is a Continuous Controller since it has 128 values, or steps. The second type of controller is a Controller Switch which sends either an "On" message or an "Off" message. When you use a sustain pedal, for instance, a

controller switch message is sent (CC number 64).

Not all synthesisers recognise every control change message, especially some older models, but most should respond to MIDI volume, pan, breath controller and effect controllers if the synth has on-board digital effects. Effects parameters include reverb depth, level and chorus depth, to name but a few. (See the table "MIDI Control Change Numbers", page 323.) All MIDI devices have a MIDI implementation chart (usually towards the end of the user manual) and list what CCs are supported.

It isn't just synthesisers that respond to

PCW Contacts

If you have written any utilities or can offer hints and tips related to MIDI, send them in to the usual PCW address, or to steve_helstrip@pcw.ccmail.com

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Lower your overheads

In search of some lean, mean data access, Tim Anderson bemoans the overhead of the Borland or Microsoft approach, and looks for something slimmer and faster.

The beauty of languages like Visual Basic or Delphi is that good-looking utilities can be knocked together quickly, without the need to understand the intricacies of the Windows API. In the real world, many such applications manipulate data: Visual Basic took off only when version 3.0 provided the built-in database functions via the JET engine (the same data access DLL which powers Microsoft Access). Borland's "VB Killer", Delphi, which borrows this same idea, uses the Borland Database Engine (BDE) to serve dBase, Paradox and Delphi itself.

JET and BDE are both core technologies for their respective vendors and they work well, as you would expect. Both are capable of handling several data formats, can plug into external database drivers and support a full range of network and client/server features. It sounds great, but how many of VB's 1.5 million users are developing client/server database applications? Often, the need is for easy access to local data within the context of an application that might be anything: comms package, video catalogue, game or multimedia presentation. Both JET and BDE represent overkill for this kind of general purpose use and while that may not matter, as long as there is plenty of spare horsepower in your PC, it can be significant, especially if you want to distribute your software as shrink-wrap or shareware.

Another factor is the volume of disk space occupied by the runtime files required to make it all work. Delphi is one of the worst offenders here, because alongside your application you need two

install disks for the Borland Database Engine and even more if you need the ReportSmith reporting tool. There are two ways to avoid this overhead. The hardest, but most efficient, is to roll your own database code in native VB or in a DLL. Failing that, there are add-ons that aim to be leaner, meaner and faster than the standard items.

I've been looking at SuccessWare's Rocket, a set of DLLs and VBXs aimed primarily at VB and Visual C++, but also usable in Delphi. (Clipper developers may be familiar with the underlying technology, then called the SixBase driver.) The memory savings are real. I created a minimal JET database application, opening a single table in an MDB and displaying a couple of

fields in bound text boxes. Using Heap-Walker, Microsoft's utility supplied with Visual C++, gave the following results on a 486DX2/66:

Application	Heap memory used	Load time
VB/JET 2.5	1.29Mb	4.2 secs
VB/Rocket	652Kb	2.2 secs
Delphi/BDE	1.3Mb	3.4 secs
Delphi/Rocket	544Kb	1.6 secs

For anyone familiar with dBase, Clipper or FoxPro, programming with Rocket is straightforward since it is firmly in the xBase tradition. Data is stored in DBF files and you can choose between Clipper or FoxPro format using Rocket's Replaceable Database Engine. The main Rocket .DLL contains functions which match the core xBase set, for example `sx_Skip`, `sx_GoTop`, `sx_Use`. You can include a subset of xBase functions in index definitions. For example: `UPPER("SURNAME") + LEFT(UPPER(FORENAME),3)`.

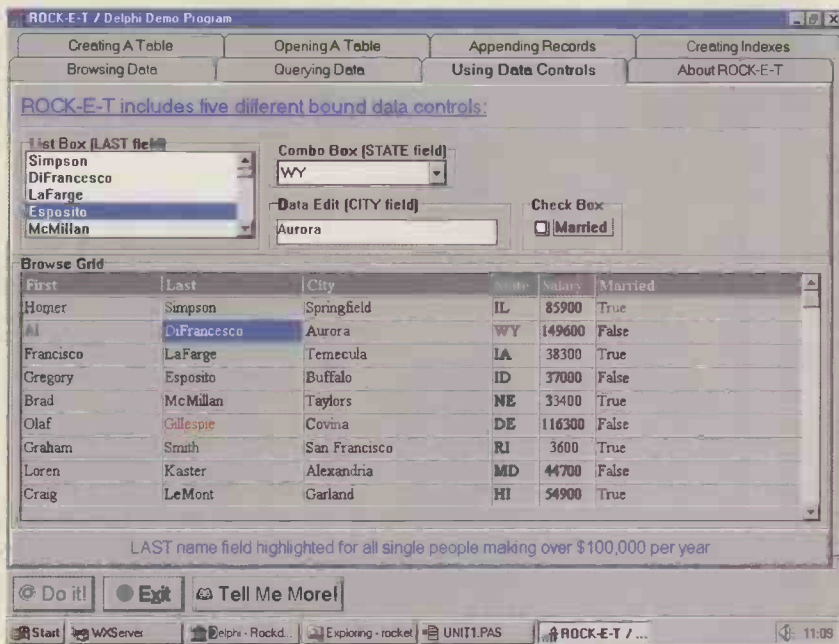
Including functions in index definitions is not my favoured practice (although in xBase, UPPER is hard to avoid). But the capability is vital for compatibility with

Using Rocket with Delphi

The shrink-wrap Rocket which I received from SuccessWare did not work with Delphi and errors occurred when I tried to install the VBX controls. Help was found on CompuServe, where SuccessWare have a section in the COMPB forum: there I found a file called ROCKET.PAS which installs a non-visual Rocket component into Delphi. This small component sets up all the types and functions used by Rocket; it also makes a call to Rocket's `sx_setStringType` function which tells Rocket to pass standard null terminated strings back to the calling application rather than VB-style strings.

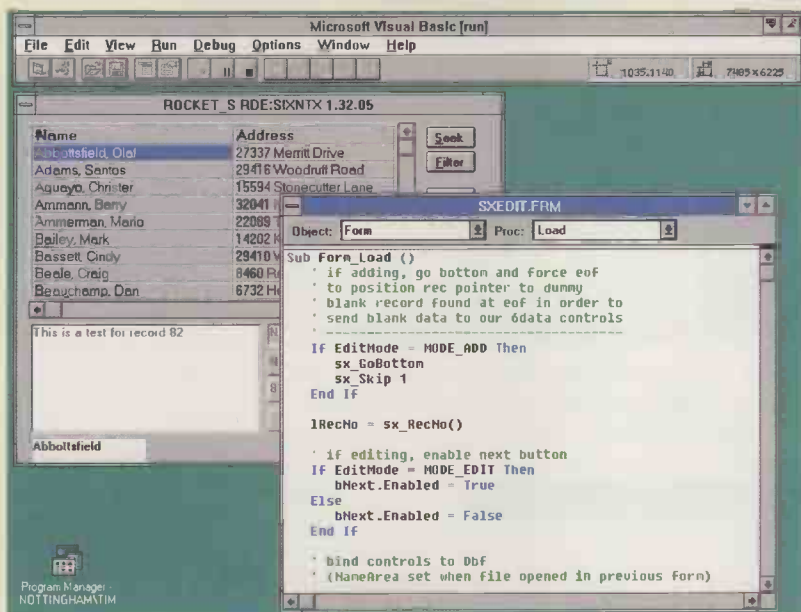
What SuccessWare didn't mention was that ROCKET.PAS refers throughout to the multi-user version of Rocket and I had been sent the single-user version. A search-and-replace operation sorted that problem. The company did advise changing the names of the Rocket VBXs from `6Brow` and `6Data` to `sxBrow` and `sxData` respectively — apparently, Delphi is not happy with VBX components beginning with a number.

With these steps completed, Rocket and Delphi worked fine. But it's worth noting that using VBXs intended for Visual Basic in Delphi is not always smooth going. The situation is likely to improve as Delphi becomes better established. But better still, by the time you read this, SuccessWare expects to have a VCL component that will render the Rocket VBXs obsolete for Delphi programmers.



Left This demo program, downloaded from CompuServe, shows that Delphi and Rocket can be a capable combination

Below Rocket brings Clipper-style programming to VB developers



includes CodeBasic for VB, CodePascal for Delphi or Pascal, and CodeBase for C/C++. For a VB programmer, the Rocket solution has additional features and is a little easier to program. Under C/C++, the offer of full source code makes CodeBase a superior choice: all the CodeBase products are supplied with the CodeReporter xBase reporting tool, whereas Rocket has no reporting features. Both products are xBase-orientated and, in a sense, outdated in their approach to data management, but they do come into their own for projects where the overhead of all that format-independent SQL handling is simply too high.

Acrobatics

Adobe Systems has worked hard to establish its Acrobat reader and associated Portable Document Format (PDF). Readers of this column may well have come across this utility since Borland uses it extensively for Delphi and C++ online manuals, and the *Visual Basic Programmer's Journal* publishes all its back issues in PDF format. Acrobat gives a close on-screen portrayal of a printed page: if you print Borland's manuals from Acrobat, for instance, you get something very close to the book manuals that can be bought separately. This close match between the printed word and online form makes Acrobat documents easy and cheap for the publishers to create.

I mention this here in the hope that visual tools vendors will read it and take notice. If so, please do not use Acrobat for online documentation. Why? The reason is that good online documents are not at all similar to printed books. The priorities for programmers are quick access to relevant information, good cross-references via hotspots, clearly legible screen fonts and easy copying of example code. Microsoft seems to understand this better than anyone and items like the Office Developer's Kit, the Developer Network CD-ROM, and the Books Online supplied with Visual C++, are a joy to work with. Sections are short, the display is highly configurable; a collapsible outliner helps navigation, and you can carry out fast searches across a user-defined range of books. By contrast,

existing indexes in old data files. Rocket has four `sx_Eval` functions which parse and evaluate xBase expressions, enabling them to be used by Visual Basic. It's messy, but a comfort for any xBase programmers struggling to come to terms with Windows.

A minimal Rocket application is simple: after adding `ROCKET.BAS` and a couple of VBXs to a project, a DBF file is opened with the `sx_use` function. `Sx_use` returns an integer representing a work area, identifying the table that has been opened. Each Rocket custom control has a `Dbf` property and by setting this to the value of the work area, the control is bound to the open table. A `FieldName` property identifies the required field. Now the Rocket functions can be called to step through or search the data, with the displayed values

being updated automatically. The bound controls supplied are a text box (which can also display pictures, stored by Rocket as compressed BMPs), check box, combo and list boxes, and a browse (grid) control. The browse control is free from the limitations of VB's grid, and claims to display up to one billion rows. Cells can be individually colour-coded and you can edit displayed data. Finally, two things that are difficult in native VB are easy with Rocket: data-aware controls have a `Mask` property which controls data formatting using standard xBase picture strings; and there's a set of encryption functions for automatic data encryption.

Rocket is rather good and fills a gap in both VB and Delphi. You can also use Rocket controls in Visual C++. It competes with Sequiter's CodeBase range, which

Acrobat restricts searches to one book at a time and text is in book-width lines that will not wrap. To further aggravate matters, Adobe has not yet developed Acrobat for Windows NT although it does promise to do so. Although still a minority taste, NT is widely used by developers because of its great stability. I've nothing against Acrobat, but I don't believe that it is a suitable tool for online programming documentation.

In the meantime, there is a way (undocumented) of using Acrobat under NT. In the Windows directory, copy ACROREAD.INI to ACROEXCH.INI. Edit the new file, and add the line
ATMOption=1
 to the [AdobeViewer] section. This makes Acrobat use TrueType fonts and thus allows it to run under NT, although the substituted fonts may mess up the appearance of the documents.

Clipping VB Pictures

Nigel James writes with the following question: "I enjoy reading your VB section in PCW — it has some useful info. I've

been writing VB programs for about 12 months now, mostly for use at work (the Bodleian Library Map Section, Oxford). I

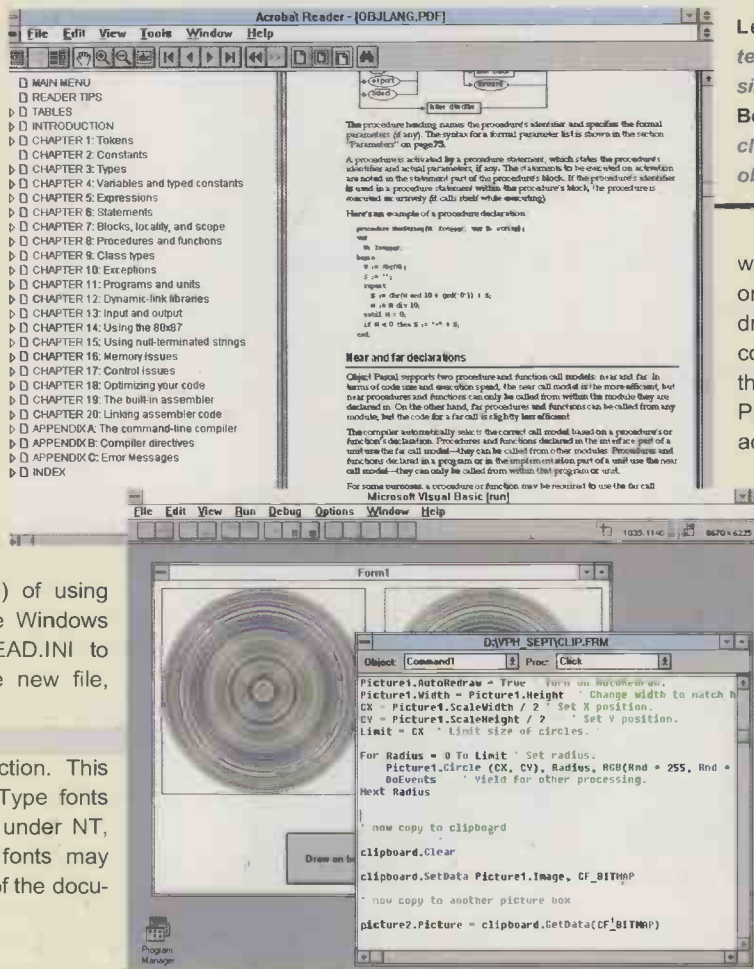


Fig 1

```

Sub Command1_Click()
Dim CX, CY, Limit, Msg, Radius ' Declare variables.
Const CF_BITMAP = 2
Picture1.ScaleMode = 3 ' Set scale to pixels.
Picture1.AutoRedraw = True ' Turn on AutoRedraw.
Picture1.Width = Picture1.Height ' Change width to match height.
CX = Picture1.ScaleWidth / 2 ' Set X position.
CY = Picture1.ScaleHeight / 2 ' Set Y position.
Limit = CX ' Limit size of circles.

For Radius = 0 To Limit ' Set radius.
Picture1.Circle (CX, CY), Radius, RGB(Rnd * 255, Rnd * 255, Rnd * 255)
DoEvents ' Yield for other processing.
Next Radius

' now copy to clipboard
clipboard.Clear
clipboard.SetData Picture1.Image, CF_BITMAP

' now copy to another picture box
picture2.Picture = clipboard.GetData(CF_BITMAP)

Picture1.AutoRedraw = False ' reset
End sub
    
```

Left When you re-size the text-viewing area in Acrobat, it simply makes the text smaller. Below Copying a bitmap to the clipboard via VB's Clipboard object

would appreciate your advice on how, or whether, graphics drawn on a picture box can be copied to other applications via the Clipboard. Presumably the PrintScreen key cannot be accessed in code, so how can I do it?"

VB has a Clipboard object which you can use for most clipboard operations. To place an item on the clipboard, first clear any existing data using Clipboard. Clear and then use the SetData method, specifying the format required. The example program in Fig 1, adapted from VB's documentation, shows how a graphic can be drawn on a picture box, copied to the clipboard and pasted into a second picture box. It requires a

form with two picture boxes and a command button:

It's important to set the picture box's AutoRedraw property to True before attempting to retrieve the image otherwise you will not get the results you expect. The reason is that drawing to a picture box with AutoRedraw set to False does not update the persistent bitmap for the picture box. Another point is that you don't need all the code in Fig 1 to copy an image from one picture box to another — you can do that directly with:

```
picture2.Picture = picture1.Image
```

The clipboard is essential, though, for pasting images into other applications.

PCW Contacts

Rocket is available from QBS on **0181 994 4842** and costs £115 for a single user or £195 for the multi-user version. CodeBase, CodeBasic and CodePascal is available from Sequiter on **0181 317 04321**.

Tim Anderson welcomes your Visual Programming comments and tips. He can be contacted via PCW at the usual address, or freer@cix.compulink.co.uk

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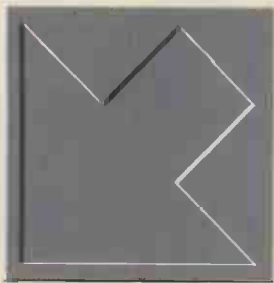


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It's time for take off

Take a Stealth bomber, apply a working Visual Basic program, and watch it move. Mike Liardet shows you how to make it pitch, roll, yaw, and spin, and explains the important technique of perspective projection.

In last month's column, I demonstrated how some simple matrix algebra operations could be used to twist, turn, move and stretch a computer representation of a three-dimensional object. But these manipulations would be of little interest to anyone unless they could actually be seen; so I also reviewed how a 3D computer representation might be projected onto a 2D screen, enabling the user to actually see a picture of what is happening. So much for the theory — this month we are going to tie up the project with a practical, working Visual Basic program.

Fig 1 shows the program in action. There are three main sets of command buttons held in the three frames labelled "Rotations", "Sizes" and "Moves". Each of the buttons in these frames applies a matrix operation to an underlying data structure. Following this, the image is redrawn from the data structure with its new position or orientation, thus appearing to the user as if he has directly manipulated the object in the desired fashion. The Large and Small movement options determine the amount of movement for each of the command buttons. The "Image Trace On" option button simply prevents the screen being cleared before a new image is drawn, so that the history of previous positions can be seen. "Reset" puts the object back into the middle of the display area at a reasonable distance and in a standard orientation. "Exit" has the usual effect.

The shape which is manipulated by all these operations is supposed to be a Stealth bomber, but it is admittedly rather

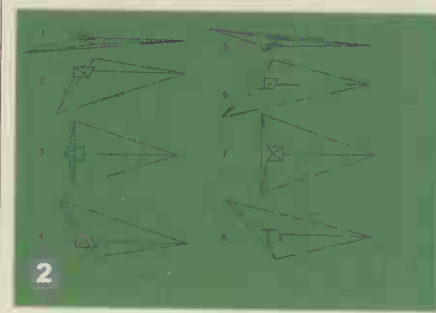
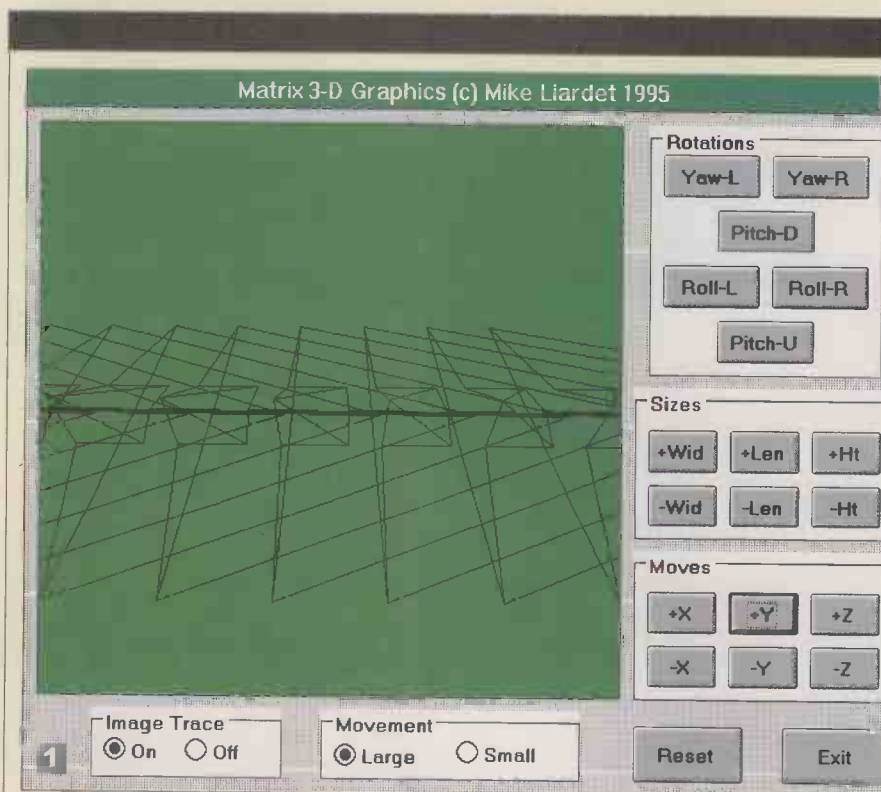


Fig 1 The 3D graphics program in action. The shape that is flashing across the display area is supposed to be a Stealth bomber, but is unlikely to fool the discerning PC user

Fig 2 The effect of the "Roll-R" command button: the shape rotates about its longitudinal axis, eventually moving through 360 degrees and returning to its original position

crude in appearance and somewhat closer to a paper dart than any real aeroplane. It is not too difficult to modify the program to create a more realistic shape, but it is convenient to have a simple shape for the initial development work: it can be drawn quickly and it's reasonably easy to see what is happening with it when testing the code.

The display in *Fig 1* was generated by using various command buttons to achieve the shape with the desired orientation and size, and positioned at the far left of the screen. At this point, the Image Trace option was selected along with Large Movements. Repeated presses of the Moves "+Y" button caused the shape to "fly" across the display area from left to right in several large steps, each time leaving its trace behind.

Fig 1 shows the effect of just one of the command buttons but there are many other possibilities. *Fig 2* shows what happens when the "Roll-R" button is used. This causes the shape to perform what is, in effect, an "aileron roll" to the right. At each press of the button, the shape rotates a little further about its longitudinal axis, eventually moving through 360 degrees and returning to its original position.

All the other rotations are possible as well, using the other rotation command buttons. The Pitch buttons cause the shape to rotate about its lateral axis. From normal horizontal flight the "Pitch Up" command makes the shape's nose point up and "Pitch down" makes it point down. The yaw buttons rotate the shape about its normal axis causing it to point to the left or right as appropriate. In a real plane, this sort of movement would be made by the rudder (which is controlled by the pilot's feet on the pedals). The pitching and rolling rotations are effected by pushing, pulling or turning the control column (or joystick) in the pilot's hands.

It's also possible to change the shape of the object — something that is impossible in a real aeroplane. *Fig 3* shows what can happen if the "Sizes" buttons are used. The images numbered 1 to 4 were produced by repeatedly using the "+Len" button. Images 5 and 6 show the shape getting wider (the "+Wid" button). Finally, the shape is made taller with the aid of the "+Ht" button.

The shape can be moved anywhere within the three-dimensional space that it occupies by using the "Moves" buttons. We have already seen it moving from left to right (the Y direction). Up and down motion is possible using the "+Z" or "-Z" buttons. *Fig 4* shows the shape moving in

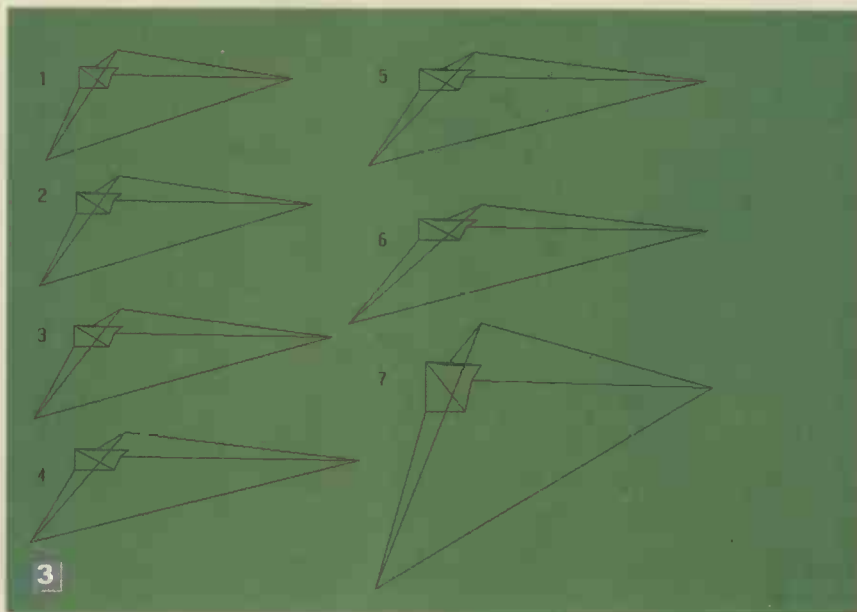


Fig 3 Unlike a real aeroplane, this one can change its shape: images 1 to 4 show it getting longer; then in 5 and 6 it becomes wider; finally, image 7 shows it suddenly having grown a bit taller

Fig 4 The effect of the "+X" command button: this brings the shape nearer and nearer to the viewer, with a larger image at each stage

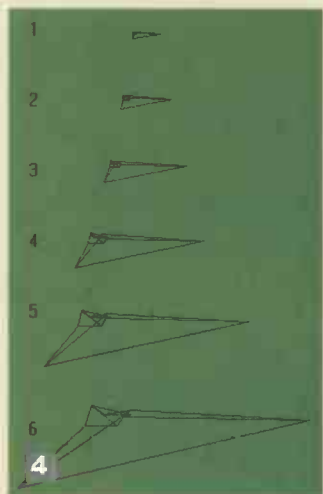
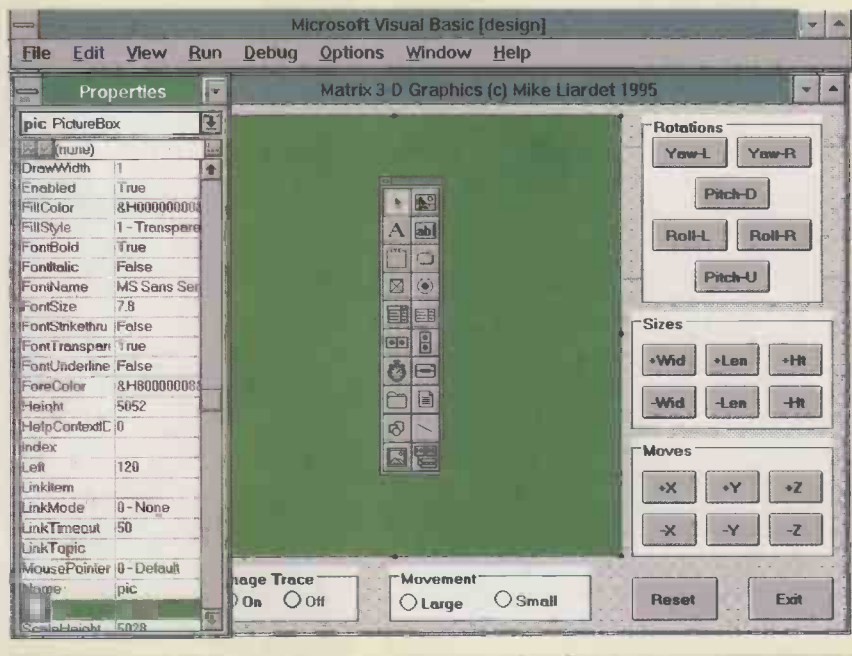
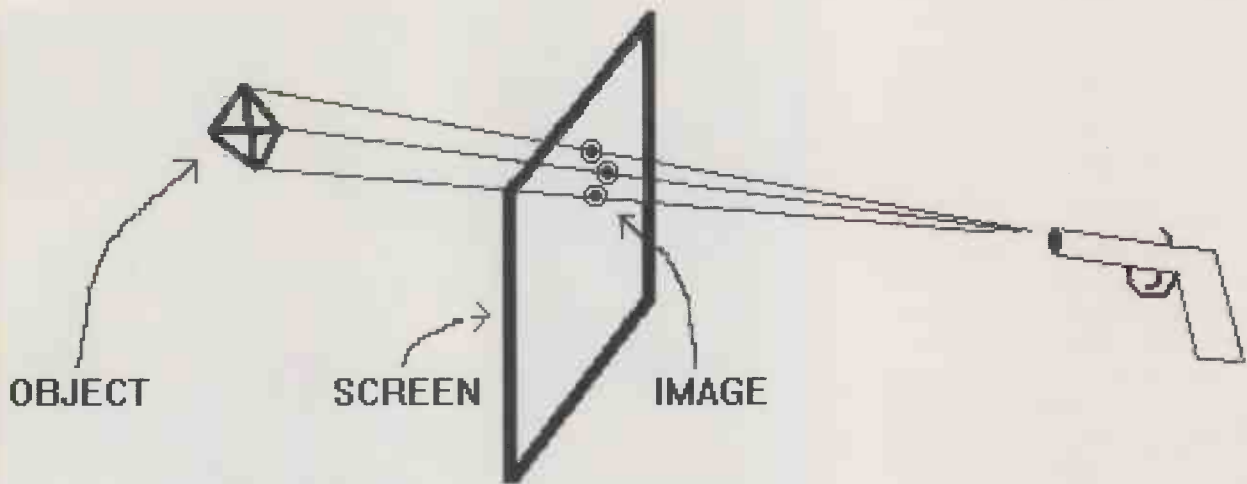
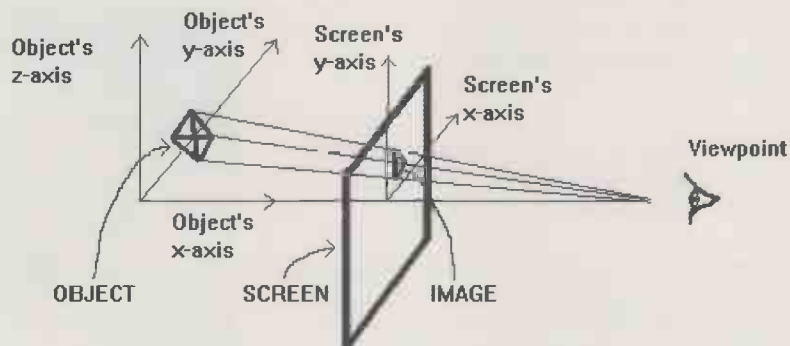


Fig 5 Form design for the program: there is only one form, with no special hidden tricks behind the scenes other than the control arrays which are used to simplify the processing of most of the command buttons

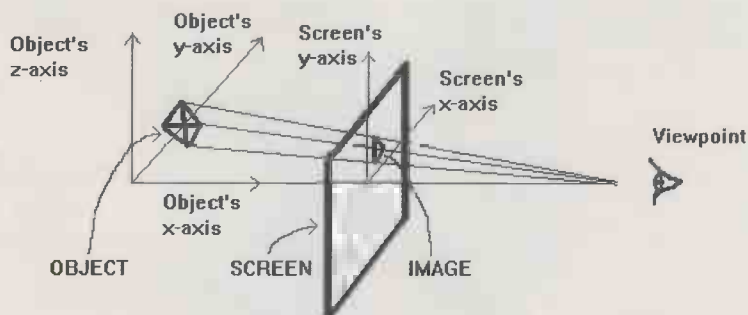




6



7



8

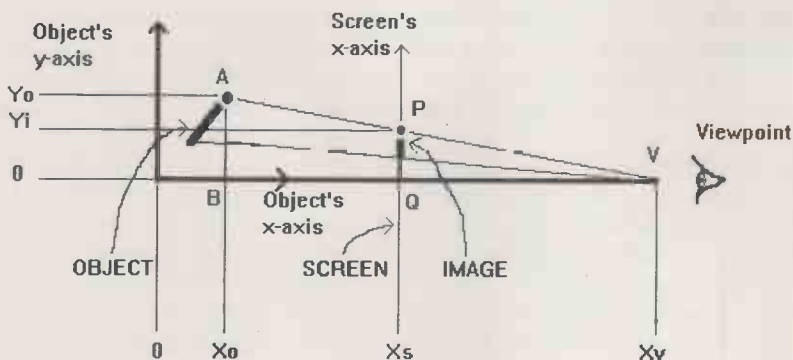
Fig 6 How to produce a perspective projection: simply shoot through a screen at prominent features on the object and the bullet holes will create the drawing for you! **Fig 7** Putting the perspective projection on a less destructive and more mathematical footing. **Fig 8** Looking straight down on the scene in Fig 7, from a position on the object's negative Z axis. This view shows how the (horizontal) X co-ordinate of the perspective projection is calculated

the X direction, which moves it towards the viewing window. At first (image 1), it is at some distance from the window, and it therefore appears to be fairly small. Repeatedly pressing the "+X" button gradually brings it nearer, and consequently it appears larger.

If the button is pressed for long enough, the shape eventually fills the entire screen as it gets very near the window. Ultimately it will crash into the window, ironically crashing the system at the same time. This is caused by an arithmetic overflow error resulting from the enormous co-ordinate values that are generated as part of the calculation. Visual Basic ought to fail gracefully when this happens, with an appropriate error message, but on the development machine (a 486 with numeric processor) it simply falls over completely, sometimes necessitating a reboot. There is a fairly simple cure for this problem: do not let the shape get too near the window, for instance, by disabling the "+X" button when the shape's X co-ordinate exceeds a certain value.

Perspective projection

Three-dimensional objects can be shown on the screen using plan and elevational drawings, or with axonometric and isometric projections. These techniques are primarily used for technical drawings, and in architecture. They are useful because they preserve much of the original 3D information in the 2D image, including many of the angles and lengths. Unfortunately, they do this at the expense of realism, and for recreational purposes the perspective projection is



9

preferred. This is the technique used in the program presented here, and since it is so important we shall take a close look at the way in which it works.

Perspective projection provides a view of an object which is identical to the view that might be obtained on photographic film, using a camera. Although art teachers generally teach perspective drawing in terms of parallel lines meeting at a single point, using illustrations of long, straight, railway tracks converging as they near the horizon, this methodology is only necessary to help human artists get their perspectives right. Computer-generated perspectives are not built in this way.

Fig 6 shows the general principle behind a computer-generated perspective. Imagine an object (in this instance a tetrahedron, or four-faced "pyramid") lying behind a transparent screen, with a gun pointing at it from the other side. Imagine firing the gun through that screen at a prominent feature in the object: the bullet hole in the screen marks the point where that feature is to be located in a perspective projection of the object. But if the bullet misses the screen altogether, then this is an indication that part of the object would not normally be visible through the screen "window". In Fig 6, the whole object can be seen in the top right quarter of the screen and the three bullet holes represent the location of three of the tetrahedron's vertices.

To put the method onto a more mathematical footing we must include axes for the object and for the screen (Fig 7). The object is located in 3D space relative to its X, Y and Z axes, and its 2D image is drawn relative to the screen's X and Y axes. The gun is replaced by an eyeball "viewpoint", and the bullet paths are replaced by straight lines drawn from the viewpoint to points on the chosen object.

Notice that the screen axes are parallel to two of the object's axes and that the

Fig 9 Looking from the side of the scene in Fig 7, from a position on the object's negative Y axis. Here we see how the (vertical) Y co-ordinate of the perspective projection is calculated

third object axis (the X axis) is perpendicular to the screen, hitting it right in the middle and then continuing on to the viewpoint. The precise location and orientation of these axes is arbitrary. For example, we could have an angled line from the object's origin going through the screen's mid-point, and we need not even have the screen perpendicular to it (although this would produce distorted images). I have set up the axes in this way simply to make the maths as easy as possible.

Fig 8 shows the same scene as Fig 7 but in just two dimensions; looking directly down from the direction of the object's Z axis. It shows how to calculate the horizontal co-ordinate for the projection. We see that one of the vertices (labelled A) in the original object has co-ordinates (X₀, Y₀) (its Z co-ordinate is irrelevant here). The screen and viewpoint are located at a distance of X_s and X_v respectively from the object origin. The vertex A is projected onto the screen at point P, and for the horizontal co-ordinate of the projection we need to determine the value Y_i for this point in terms of the other values.

The calculation turns out to be fairly easy. The gradient of the line VP is the same as the gradient of VA, so we have:

$$AB/BV = PQ/QV$$

Plugging in the co-ordinate values of the points A, B, P and so on, we get:

$$Y_0 / (X_v - X_0) = Y_i / (X_v - X_s)$$

Some simple rearrangement of this equation gives us:

$$Y_i = Y_0 * (X_v - X_s) / (X_v - X_0)$$

which is the horizontal value (on the screen) for the perspective projection.

Fig 9 shows how to work out the vertical screen value. A similar line of reasoning

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produces:

$$Z_i = Z_o * (X_v - X_s) / (X_v - X_o)$$

When programming the projection we have to decide on appropriate values for the screen position and viewpoint (the values X_v and X_s). The program contains reasonable values for these variables, hard-coded as constants, but there is nothing absolute about them. It would even be possible to arrange for these values to change dynamically if that was appropriate to the application.

It's important to keep the object, screen and viewpoint in the right order, as strange effects will be produced if the object and viewpoint ever end up on the same side of the screen. Assuming they

are in the right order, then the general rule is that the further away the screen is from the object, the smaller that object will appear. This corresponds to the real life observation that distant objects look small.

On the other hand, moving the viewpoint closer to the screen allows more of the scene to be viewed, thereby corresponding to the real life observation that one can see more out of a window if one stands close up to it. Moving the viewpoint can also be thought of as being like the operation of a zoom-lens on a camera: when the viewpoint is close to the screen one gets a wide-angle view, and when it is distant it becomes like a telephoto image.

Theoretically, we can allow the viewpoint to go all the way back to +infinity, and with the aid of some mathematical chicanery with the aforementioned calculations, the perspective projection then turns into a simple elevational view.

There are plenty of possibilities for improving the program presented here. There is no validation of user input so it is comparatively easy to crash the program, for example by flying the shape slap into the viewing screen. It is also easy to lose track of the shape altogether by sending it out of sight of the screen. Visual Basic itself handles the clipping of the image as the shape moves out of range, so this is not an error condition as such, but implementing "Wraparound" space could help here, so that the shape reappears at the left having gone off the right-hand side and reappears at the bottom, having vanished from the top.

It is a fairly straightforward matter to set up a more interesting object by modifying the code in the routine PolyObjectMake. Indeed there is no reason why several objects should not be set up and dealt with simultaneously. This is not very difficult to program, but of course the more lines, faces and vertices in a scene, the longer it takes to draw. So if the scene gets too complicated, it may not be possible to see it without frustratingly long delays.

When designing a new object it is a good idea to first sketch it fairly accurately on paper, labelling the vertices and deciding on their co-ordinate values. For very complex objects it may be worthwhile implementing some "service" routines that can set up subcomponents of the object in one go. For example, if the object contains a number of cube shapes, then it might be useful to have a subroutine that can create the vertices, edges and faces of a cube, located in any position.

Curved surfaces can be approximated by a number of flat faces and these are best built up by using special purpose routines rather than by trying to work out the co-ordinates by hand. For instance, a circular cylindrical shape might be set up as a hexagonal (or decagonal, etc) cylinder and it is a fairly straightforward matter to let the computer calculate the vertex co-ordinates for these approximations.

The program does not perform any hidden-line removal so it always displays all the lines in the object, whether or not they would normally be visible from that angle of view. With more complicated objects this can be confusing. It is sur-

Fig 10 Visual Basic Code from the MATRIX.FRM module

```
Option Explicit
Dim poly As PolyXD

Sub cmdExit_Click ()
    End
End Sub

Sub cmdReset_Click ()
    'Make a 1000 by 1000 by 1000 cube centred on origin
    'CuboidMake poly, 1000, 1000, 1000
    PolyObjectMake poly
    'Set pic with 4000 x 4000 area and origin in middle
    optOff = True
    optSmall = True
    pic.Scale (-2000, 2000)-(2000, -2000)
    PolyDraw poly, pic, optOff
End Sub

Sub cmdRot_Click (Index As Integer)
Dim ang As Single
Static r(3, 3) As Single
    If optSmall Then
        ang = pi / 8
    Else
        ang = pi / 4
    End If
    Select Case Index
    Case AXIS_X
        MatRotate r(), ang, AXIS_X
    Case AXIS_Y
        MatRotate r(), ang, AXIS_Y
    Case AXIS_Z
        MatRotate r(), ang, AXIS_Z
    Case AXIS_MX
        MatRotate r(), -ang, AXIS_X
    Case AXIS_MY
        MatRotate r(), -ang, AXIS_Y
    Case AXIS_MZ
        MatRotate r(), -ang, AXIS_Z
    End Select
    MatApply r(), poly
    PolyDraw poly, pic, optOff
End Sub
```

Fig 11 Visual Basic code from MATRIX.BAS module

Option Explicit

```

Const MAX_DIM = 4 'allows for homogeneous coords
Const LAST_DIM = MAX_DIM - 1
Const MAX_EDGES = 1000
Const LAST_EDGE = MAX_EDGES - 1
Const MAX_VERTS = 200
Const LAST_VERT = MAX_VERTS - 1

'ID for rotations/translations, etc about the various
axes
Global Const AXIS_X = 0
Global Const AXIS_Y = 1
Global Const AXIS_Z = 2
Global Const AXIS_MX = 3
Global Const AXIS_MY = 4
Global Const AXIS_MZ = 5

Global Const PI = 3.141593

Type vertex
  coord(LAST_DIM) As Single
  xProj As Single
  yProj As Single
End Type

Type edge
  pt1 As Integer 'index to start point of edge
  pt2 As Integer 'index of end point of edge
  partof As Integer 'ID of part that it belongs to
  mark As Integer 'used in edge elimination
End Type

Type polyXD
  numDims As Integer 'number of dimensions in use
  numParts As Integer 'number of parts in poly
  numVerts As Integer
  vert(LAST_VERT) As vertex
  numEdges As Integer
  edge(LAST_EDGE) As edge

```

End Type

Global picBox As Control

```

Sub CuboidMake (poly As polyXD, x As Single, y As Single,
z As Single)
'Make a Cuboid centred on the origin, sized x by y by z

'Start with an x by y rectangle in the xy plane
poly.numDims = 2
'poly has four 'parts' (the four edges)
poly.numParts = 4
'Set up the four vertices
poly.numVerts = 4
poly.vert(0).coord(0) = -x / 2
poly.vert(0).coord(1) = -y / 2
poly.vert(1).coord(0) = x / 2
poly.vert(1).coord(1) = -y / 2
poly.vert(2).coord(0) = x / 2
poly.vert(2).coord(1) = y / 2
poly.vert(3).coord(0) = -x / 2
poly.vert(3).coord(1) = y / 2
'Set up the four edges
poly.numEdges = 4
poly.edge(0).pt1 = 0
poly.edge(0).pt2 = 1
poly.edge(0).partof = 0
poly.edge(1).pt1 = 1
poly.edge(1).pt2 = 2
poly.edge(1).partof = 1
poly.edge(2).pt1 = 2
poly.edge(2).pt2 = 3
poly.edge(2).partof = 2
poly.edge(3).pt1 = 3
poly.edge(3).pt2 = 0
poly.edge(3).partof = 3
'Add the third dimension
DimensionAdd poly, -z / 2, z / 2
'Change verts to homogeneous coords
HomogCoords poly
End Sub

```

prisingly difficult to implement hidden-line removal, and it is computationally expensive, so any implementation is likely to be slow with a semi-interpreted language like Visual Basic.

Adventurous souls are welcome to try the hidden-line problem. It's a good idea to make all the components in the scene convex (that is, with no cavities) as this makes the problem slightly easier. Concave objects can always be broken up into two or more convex objects (for example, the single polyhedron shape in the program here could be made convex if the tail and main body were treated separately). Once there is hidden line capability in place, the object can be made more interesting with some clever use of Windows APIs (Application Programmer Interfaces)

which allow the faces to be filled with colour, rather than displaying a simple outline drawing, as at present.

As it stands, the program makes a rather poor flight simulator and with some mathematical effort could be made to work more like a real flying aeroplane. The intention here is to simulate what is in effect a radio-controlled plane, since the view in the window is of the plane rather than from the plane. Some extra effort is needed with the matrix transformations so that the plane always rotates about its own axes rather than the invisible, fixed, co-ordinate axes.

Once this has been done, it is only necessary to move the plane in the direction in which it is pointing. Obviously, real planes (Harriers excepted) don't fly side-

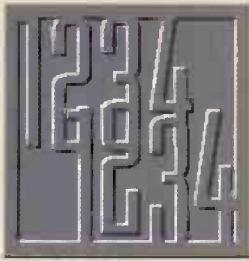
ways, backwards or vertically under normal flying conditions; so this plane could be made to simply follow its nose, possibly in conjunction with a throttle, to determine how much it moves after each redraw.

PCW Cover Disk

The full code for this month's Low Level is on the cover disk given with this issue of PCW.

PCW Contacts

Mike Liardet is a freelance programmer and writer. He can be contacted via the PCW editorial office or on email as mliardet@cix.compulink.co.uk



Pretty poly!

A Prime Number Problem followed by a Genial Gallimaufry!, presented by Mike Mudge.

PROBLEM ONE Polynomials with Many Successive Composite Values

If $f(x)$ is an irreducible polynomial with integral coefficients (satisfying a certain condition), then, according to V. Bouniakowsky, there exists a smallest integer m greater than or equal to one such that $f(m)$ is a prime. Denote this by $p(f)$ (Fig 1).

The smallest prime value of the last polynomial has no less than 70 digits.

K.S. McCurley considered $p(Xd + k)$ maximised over k less than or equal to m and established (Fig 2).

Results quoted from *The Little Book of Big Primes* by Paulo Ribenboim, Springer-Verlag, 1991. ISBN 0-387-97508-X. Investigate results of the above type, using polynomials chosen (systematically) by yourself and a region of integer arithmetic appropriate to the hard/soft-ware available. The idea being to, somehow, correlate everyone's attempts and form an overall picture of the behaviour of $p(f)$ rather than just looking at rather esoteric computations such as those listed above.

Feedback, both positive and negative

David Wells, the author of *The Penguin Book of Curious and Interesting Numbers*, can be contacted c/o Penguin Books Ltd, 27 Wrights Lane, London W8 5TZ. He has indicated that Penguin has no intention of producing a revised edition in the foreseeable future, although he has enough material to markedly increase its size.

d	m	max $p(X^d + k)$
2	10^6	$p(X^2 + 576239) = 402$
3	10^6	$p(X^3 + 382108) = 297$
4	150000	$p(X^4 + 72254) = 2505$
5	10^5	$p(X^5 + 89750) = 339$

Mark Lewis of Bristol refers readers to the "most interesting combinations problem" from a recent *Sunday Times* Brain-teaser:

How many ways can n -bubbles be nested? e.g. $n=3$ we find $b(3) = 4$, thus



Show that $b(10) = 1,842...$ regard this as PROBLEM (STB).

Jason Moxham of Southampton has now found a multi-perfect number approximately

$$6.2234 \times 10^{449}$$

such that $\sigma(x_0) = 9x_0$. He is attracted to the problem of ten-fold perfect numbers but still has a total of only 1,143 compared with the 1,605 cited by R.K. Guy in the new edition of *Unsolved Problems in Number Theory*. Any advice for Jason?

Gareth Suggett of Worthing, a very regular correspondent, wonders: Would a *Numbers Count* World Wide Web page have any value? He sees a big problem in that the HTML coding system used for most Web pages is no better at handling mathematical equations than whatever typesetting system PCW currently uses. However, MathSoft, the producer of Mathcad, has now issued its own free Web browser which will read Mathcad

documents as well as HTML.

Comments?

Robert Matthews has written to give the substantive reference to his article "Pi in the sky" (see *Numbers Count*, PCW July 1995; *Nature*, volume 374, 20 April 1995, pp681/2). It is clear from this article that 10_6 random numbers were sampled, not 10_2 as reported by Adrian Berry.

Steve Leach of Banbury refers to some alternative astronomical investigation involving random distributions: this involved the distribution of craters on the surface of Venus and is alleged to have disproved the existence of active volca-

noes. Does anyone have further details of this study? In particular the tests for randomness.

I have recently been made aware of a publication called M500, ISSN 1350-8539, published by the M500 Society of The Open University "providing a forum for the publication of its readers' mathematical interests". I am not sure if it is available to a general readership but certainly some of its material would interest *Numbers Count* readers. Response from an M500 member would be appreciated.

Complete or partial responses to the problems presented here may be sent to Mike Mudge, 22 Gors Fach, Pwll-Trap, St. Clears, Carmarthen, Dyfed SA33 4AQ, tel 01994 231121, to arrive by 1st September 1995. Solutions received will be judged using suitable subjective criteria, and a prize in the form of a £25 book token, or equivalent overseas voucher, will be awarded by Mike Mudge to the "best" solution arriving by the closing date. Such contributions should contain a brief description of the hardware used together with details of coding, run times and a summary of the results obtained. Additionally, readers' comments upon the general or specific structure of this article would be welcome.

Fig 1

$f(x)$	$f(m)$ is composite for all m upto:	$p(f)$
x^6	3905	3906
$x^6 + 1091$	7979	7980
$x^{12} + 82991$	170624	170625
$x^{12} + 488669$	616979	616980

PCW Contributions Welcome

Mike Mudge welcomes readers' correspondence on any subject within the areas of number theory and computational mathematics, together with suggested subject areas and/or specific problems for future *Numbers Count* articles.



Size doesn't matter

...except when you're dealing with ever-expanding mail messages and trying to plan a network. Stephen Rodda looks at how things are developing in this area, and at one possible way of avoiding credit card fraud.

In 1993 the average size of a mail message on a specific network was 2.5Kb. In 1994 it grew to 25Kb. This year, as people realise how to add more and larger attachments, it looks set to grow to 250Kb. Where will this leave us in the future? With the growth of the number of Internet connections and with access to the Internet allowing multi-megabyte downloads of World Wide Web pages, video files, sound files and so on, Internet access is going to be a major factor in the

planning of a network and, of course, an email system.

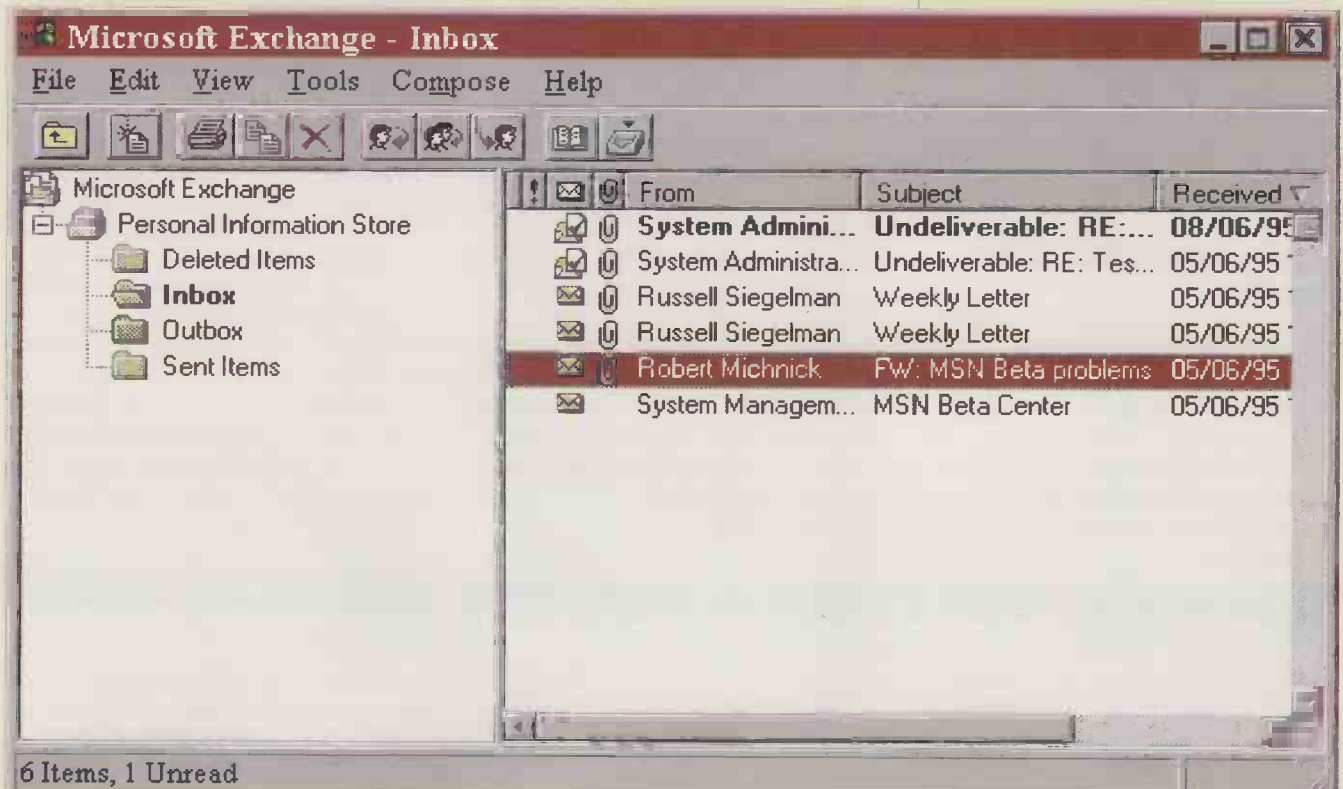
Where do we go from here? Storage is a primary consideration. My bet is that servers' space requirements will be expanded in roughly the same sort of time-frame as is required for a 20Mb drive to become outmoded. At the turn of the decade, you may remember, a 20Mb disk drive was reasonable for a machine which ran a word processor, a spreadsheet and a database. But now, a 200Mb drive

doesn't seem enough. Fileservers and networks are going to have to come to terms with a new explosion in data requirements. I attended the EEMA (European Electronic Messaging Association) conference recently, and it seems that my concerns are shared by many email administrators.

I spoke to the director of IT at a large Swiss multinational, who said that his users were accessing the World Wide Web by email and retrieving large numbers of WWW pages. We came to the conclusion that, in order for his company's network to return to operating properly, he would have to initiate a programme of replacing his networking hubs with ATM-type hubs. These sense where the data is going and switch the network so that rather than one large network with only one connection is available at a time, it becomes a series of smaller ones, allowing concurrent connections from machine to server and machine to machine.

He also felt that his fibre-optic backbone wasn't going to be as fast as required, and that he'd have to arrange for a series of backbones to augment the data-carrying capacity of the first. Lotus Notes seems to be the main "culprit" since users appear to include attachments along with the original message in any reply they might make. The problem is exacerbated

Microsoft Exchange, which interfaces with the Faxination fax server



CLASSIFIED

by multi-addressed messages, where the network traffic is proliferated by these replies going to all the original addressees.

This poses the question: "What can I do about this state of affairs to get the most out of my network as it stands?" The obvious answer lies in training, and the selection of a threaded mail package. The package, much like CIX or the Microsoft Network, allows a graphical representation of which message is a reply to which other so that they follow on, on-screen, and users see where the message lies in the structure of a conversation, or thread. This, combined with training (normally the Cinderella of IT) would probably go as far as anything to cut down on the volume of email traffic. Of course, there are other methods of saving traffic; the most obvious of which is object linking, rather than embedding.

While at this conference I took the opportunity of visiting the associated exhibition where I saw many interesting developments, including the linking of X500 directories from various vendors. This will probably occur in the near future and allow X400 email to be implemented without knowledge of the somewhat cryptic X400 addressing style.

I also came to the conclusion that there are now *three* network classifications according to size: LAN, WAN and what I call a GLAN (Global Area Network). This entails access outside the framework of your organisation, and would typically be implemented by use of the Internet.

Beating the fraudsters

We all know the risks involved when transmitting credit card numbers over the Internet. The less law-abiding among us can easily install a "packet sniffer" in an Internet node, and by simple recognition of the typical 1234-5678-9012-3456 type of card number, can print out a list of the card numbers transmitted over that segment. It struck me that the simple expedient of formatting a message differently (until the perpetrators caught on, of course) would enable users to send their credit card numbers as plain text, while defeating the sniffer approach.

Such a message could look like this:

- 4 Please
- 9 send
- 2 me
- 9 a
- 8 copy
- 4 of
- ...and so on.

Of course, more sophisticated methods exist which involve encryption using the

American DES or the public key cryptography (PGP) methods. I had the opportunity of looking at some, and when I receive the evaluation copies, I'll report back.

Mac fax

Among the products on display at the exhibition was the first integrated fax system I have ever seen which lets Mac users share a computerised fax/modem and send graphics, as easily as their PC counterparts. Until now this hasn't been the case, since in order for the Mac to send a graphic it has had to be printed. While there are fax packages with built-in PostScript interpreters, and any Windows NT Server-hosted fax package will allow Macintosh users to print PostScript to any printer whether PostScript or not, the small problem of transmitting the recipient's fax number within a PostScript file still exists.

This problem seems to have been solved by Fenestrae (Latin for "Windows") whose Faxination fax server ties in with MAPI (Microsoft) mail packages. It allows routing over a WAN if available, so that call charges are minimised; batching of faxes, again minimising call charges; the use of a DDI (direct dial-in) connection to determine the mailbox to which to route the fax; and it interfaces with Microsoft Mail and Exchange.

Another item which I found interesting was a program, developed by French Canadians, to deal with the problem of transmitting accent marks over 7-bit mail systems. Of course, there's precious little an accent does in French save change the pronunciation, but in other languages (e.g. Dutch, since I know a little) there are words which are only differentiated from one another by their accent marks: for example, *voor* ("for") and *"vóór*" ("in front of"); and *"een*" (the indefinite article) and *"één*" ("one"). Here, accents are of paramount importance, especially in legal transmissions. Until this software was available, the only options open to speakers of languages like this were either to use 8-bit mail systems or to uuencode or use a similar system of encoding 8 bits into 7 bits. I shall be looking at this software in a future issue of *PCW*.

Windows 95 patch

And finally this month, there's a patch for those of you using Windows 95. It entails possible slow registration with a NetWare server and it's called NWLSP.EXE. It contains new login code for NetWare servers and, once run, should be moved into the System folder of Windows 95.

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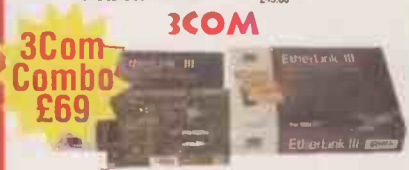
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Questions & Answers

A remote chance

How do I connect to a NetWare LAN remotely?

This question is a combination of various queries I have received. There are basically two methods: using a remote login program, which enables transport of the networking protocol over a modem link; or simply running a program which takes control of a machine at the network end of the link, transferring the screen image to the remote machine and copying mouse and keyboard actions over the line to the networked slave machine.

They both have their pros and cons; the first method, using a package such as NetWare Connect (from Novell), enables the remote machine to log on to the network. The problem here is that any frequently run program code should reside on the local machine (it can take 40 seconds just to load LOGIN.EXE over a comms link), so you should identify the programs' run and make sure they're available and on the locally defined path, so that they run before DOS searches the Novell-defined path.

Files may be transferred by issuing a simple copy command, or dragged from the network drive and dropped on a local drive (if you are running Windows).

The other method of remote access is useful if you're accessing a large database or an accounts program (both are essentially the same thing). To access a database, it's usual to copy the whole contents of that database through the network link, to the workstation's memory, a bit at a time. The trouble is that if you're running a remote logon type of program, you may find the time taken to perform simple operations prohibitive. The remote-control type of package scores here, since you are limited only by the local LAN speed and by the time it takes to transfer the contents of the screen to the remote machine. Programs which fit into this category are Laplink for Windows, Carbon Copy and PC Anywhere. The disadvantage here is that you'll need a machine to act as a host; the remote login programs will run either on the file server or on an old 286-type machine which may be lying around unused.

Share and share alike

With reference to your July '95 column, I'm very interested in the part dealing with CD-sharing, which could be the answer to a prayer. (I don't fancy the Novell server solution.) Any chance of some clarification on the following four points? And how about a major hand-holding article on this?

- Is "Attach" the Novell command, and if so, why the "Map"? We don't use WfWG so I'm not familiar with peer-to-peer networks.
- What devices/drivers/protocols are needed?
- When playing with Win95, I couldn't understand the bit about named access lists. It didn't seem to give me any security.
- Is speed across an Ethernet 10Mb/sec okay?

I took the beta off, because even loading with VLM in DOS it was not satisfactory with Novell 4.1, in particular because every time I used dialup it lost all my network connections. Do you know if NDS support will be available on release? I'm limited to build 347.

hg@cix.compulink.co.uk

Thanks for requesting a hand-holding article on sharing CDs. I'll probably get around to this in the near future, so keep your eyes peeled. The Novell fileserver solution to CD-sharing is problematic, since you do need to take into account the size of the CD — NetWare will cache it just as if it's a hard disk and will need commensurate memory even for a slow-access medium such as the CD. I appreciate that NetWare 4.x poses problems for Windows 95 in its current Final Beta Preview configuration, in that it uses NDS and

therefore the shells are different. Novell seems to be committed to supporting Windows 95 with NetWare connectivity, although it has said the same of Windows NT, and Microsoft has had to deal with the provision of NetWare connectivity.

Novell, too, still seems to be saying it will support Windows NT, but nothing concrete has arrived except for a couple of NetWare connectivity betas. I suspect the same will occur within Win95: Microsoft will write the connectivity option for NetWare. I can't envisage any Novell connectivity allowing a Windows 95 machine to ape a NetWare server, though. Perhaps that's the delay with Novell's Windows NT offering. They might be trying to prevent a NetWare drive from being shared over the NT network. You rightly say that NDS support is not currently available with this version, but I really shouldn't worry about it. My bet would be on NDS availability by shipping time. Any device drivers and protocols you'll need to run are those which deal with the CD itself (useful when you're going to access it) and those which deal with the network. Both of these should either be picked up automatically by the installation Wizard with plug and play, or you can easily add them later by confirming that you want to use NetWare file and printer sharing protocols, or by adding your CD driver (most likely, as I said, to be picked up automatically).

You ask about a couple of NetWare commands, Attach and Map. Attach is a way of logging in to another fileserver without using the Login command; the Attach command will emulate the Login command so far as a connection to the named server is established, but differs from Login in that Login will break any connection currently in use, and will run a login script too. Attach does neither of these.

Map is the command you'll find in the login script; it attaches a drive from a server to an unused drive on the local machine. A typical MAP command might be

```
MAP K:=SERVER/SYS:APPS/WORD
```

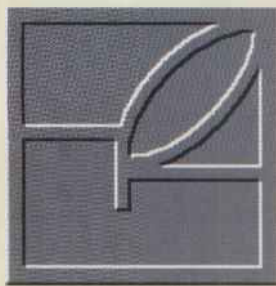
As it is configured (providing you opt for Netware emulation), you need to know nothing about peer-to-peer networking since the Windows 95 machine gets all the logged-in data from the Novell server. The server performs the user validation and then the Windows 95 machine allocates the same attributes as a Novell server, but on a share-by-share basis. This means that you could allow full access by everyone to all your applications (assuming they are in one directory and that directory is shared), but restrict your data to a certain number of people on the network and allow the NetWare server to deal with their logging-in verification, and the Windows 95 machine to determine the access restrictions applied.

As far as named access lists are concerned, they don't seem to be visible in the version of Windows 95 I am using for this test, although like yours, it's build 347. Perhaps you haven't got your machine set up as a NetWare-compatible server?

With regard to data transmission over an Ethernet network, think about the relative data transfer rates of a hard disk and of a CD. A hard disk is an order of magnitude faster than a CD. If Ethernet is fast enough to make a fast hard disk in a file server a more attractive option than an older, slower hard disk in a workstation, it won't slow a CD's (already slow) access time.

PCW Contacts

Stephen Rodda is an independent computer consultant specialising in DTP and networking. He may be contacted as **the_bear@cix.compulink.co.uk**



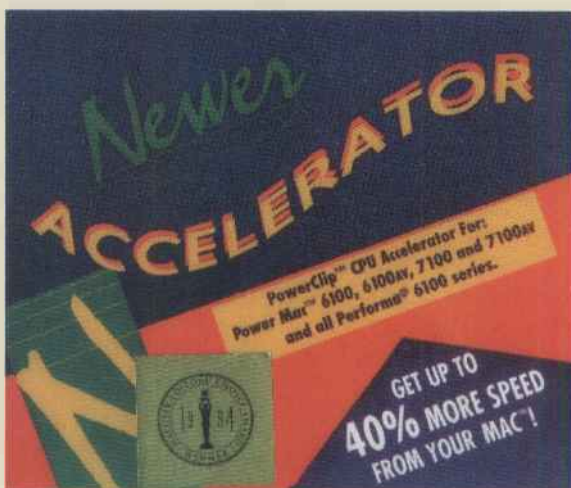
You've got the power

If you're feeling left behind by the latest round of machines with increased clock speeds, Chris Cain tells you how to boost the performance of your current Mac with the addition of an easy-to-fit 'bolt-on' goody. And if you're bored with waiting for Doom II, try Dark Forces to while away the time.

As regular readers of *PCW* may remember, I upgraded my trusty Centris 650 to a PowerMac 7100/66AV just prior to last Christmas. At the time, its 66MHz clock speed put it firmly in the middle of the PowerMac range, with the 60MHz 6100 at the entry level and the 8100/80 firmly on top. I was pleased as punch with the performance, and especially impressed by the almost flawless backwards compatibility with my existing 68K applications.

Seven months down the line, and Apple has revamped its machines and 66MHz is now the slowest PowerMac it sells. Even the new, entry level Performa 5200 moves along at 75MHz, and in some cases, it's possible to write programs for the newer 603 processor that run slightly faster than they would on an equivalent 601. The 7100 now sports an 80MHz chip and top of the range is the 604-based PowerMac 9500/132.

Things certainly move fast in this industry, so two months ago I decided to redress the balance: I can't afford a new machine but a quick phone call to the US resulted in the arrival of a PowerClip from famed Mac hardware developer, Newer



Technologies. The PowerClip is a small device that fits over the top of the clock chip on 6100 and 7100 motherboards, and allows you to crank up the speed of your Mac.

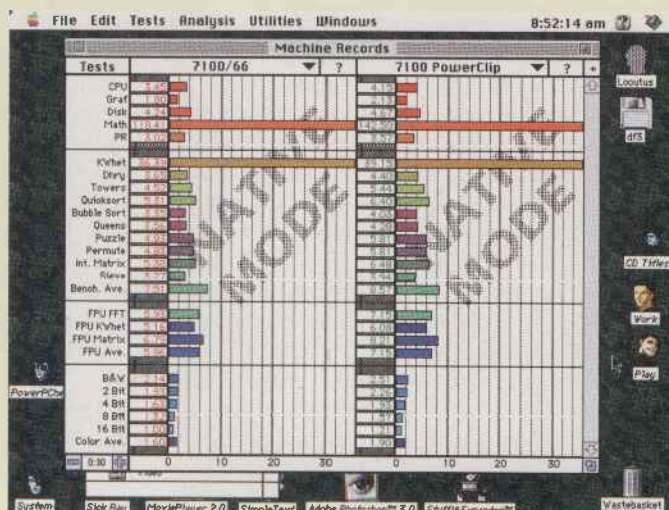
I've seen advertisements for this type of product in the past but have never quite had the guts to install one. Most required

a "black belt" level of precision soldering or the complete replacement of the main CPU, and once you'd fitted it into your machine that was that. PowerClip, on the other hand, requires no soldering and can be removed as easily as it is installed.

Installation is a matter of opening up your case, locating the clock and attaching the clip. Switches on the side allow you to set the speed anywhere between 20 to 100MHz, and for the 7100 Newer Technologies recommends starting in the 72MHz range and moving up until your machine begins to exhibit problems on booting.

Once you hit this stage, the last stable speed is the best for your system; component tolerances change from motherboard to motherboard, so some experimentation is required. Cranking up the processor will make it run hotter, so Newer provides a small CPU fan which

Left Keep up with the Joneses with PowerClip from Newer Technology
Below Old and new clock speeds compared



takes its power from the hard drive power lead.

Nothing ever goes quite as smoothly as it should: getting to the clock on the 7100 requires the removal of the hard disk and the drive bay chassis, then everything has to be put back before you can see if it works. To try another speed, you have to repeat the whole process. I started at 72MHz and worked my way up to 80MHz, becoming increasingly annoyed with Apple internal design.

My 80MHz 7100 ran fine for the next week and the difference was clearly noticeable in applications, such as Microsoft Word and Adobe Photoshop, and graphically intensive games like Marathon. Finally I could have a full screen display, albeit in low resolution, without any annoying graphical glitches. Everything was great until I downloaded and installed Apple's System 7.5 Update 1.0.

Due to the nature of this update (reported in *Hands On Mac*, PCW June '95) any accelerated Mac running at the same speed as another official model will not load the system software properly once the update has been installed. The first and most obvious give-away is a missing Mac OS splash screen on startup. This situation forced me to remove the PowerClip and go back down to 66MHz.

Thankfully, there's now a software patch from Newer Technologies, and anyone in the same boat can download a copy of this from the company's page on eWorld. My machine is back up to speed and has been working well — so far. If your old 6100 or 7100 seems a bit slow and you want to boost the performance, I can heartily recommend the PowerClip.

Dealer Dilemma

While reinstalling the PowerClip this month, I had to pay a visit to my local Apple Centre, having damaged one of the connections on the Mac's internal SCSI lead. With rapidly approaching deadlines a quick replacement was in order, so I shot down the road to sort things out.

After 15 minutes of waiting, and having explained to three different people exactly what internal SCSI was, the sales staff finally told me the lead was an engineering spare and that Apple Centres don't keep them in stock, as standard. I could place an order for one, which would arrive in a couple of days, but then I would have to bring my machine into town for it to be fitted. The whole thing, including service, would have set me back £19.95.

Diving into another dealer, which also sold various brands of PC-compatible,

Utility of the Month

Winner of the September "Utility of the Month" award is the shareware package, Graphic Converter, by Thorsten Lemke. Currently in version 2.1.3, this a top-notch piece of image editing software that is now accelerated for PowerMac. Thorsten has kept his code up to date with Mac system changes and this is the best release yet.

Graphic Converter is best described as a simplified shareware Photoshop, with all the drawing tools you would expect from a traditional bitmap painting program. There are image enhancing routines like sharpening, dithering, gamma correction, and resolution and bit depth alteration. Over 50 image import filters are built in, including GIF, TIFF, Windows Clipboard, BMP, PCX, JPEG and Autodesk FLIC format.

The package also has a Slideshow option which displays all the pictures in a specific folder. The time between each picture displayed can be set in seconds, or you can choose to use a mouse click — ideal for presentations. The title of an image and its details can be displayed on the same screen or an additional one, in any font size and style available on your Mac.

There's much more to Graphic Converter than there is space available here in which to write about it. So if you're interest in image editing, I strongly suggest you take a close look at this latest version.



resulted in the same story — although they at least knew what SCSI was. I was just about to leave when I saw internal leads hanging on the wall of the PC counter. There's no difference between a Mac cable and a PC cable, but as an official Apple dealer, the shop couldn't sell me one to use with the Mac. I walked out, walked back in, asked for a PC internal SCSI lead, and paid £14.95. The 7100 was up and running in minutes.

As someone who uses PCs regularly, as well as Macs, this situation beggars belief. Apple really needs to sort out its dealers and what items they stock. The company is selling computers, not televisions, and it is not unreasonable to expect that users will want to open them, add new hardware and generally improve performance. Treating people with kid gloves is fine, until it starts to get in the way.

Quality Quicktime

During the last few issues, we've looked at QuickTime 2.0 and the quality of its software video playback. This varies greatly depending on the type of compression used during recording, and recently I came across what has got to be the best system I've yet seen. The compression is TrueMotion S, developed by US-based The Duck Corporation.

In tests with the standard Apple Movie Player, TrueMotion S sequences mastered for thousands of colours ran extremely smoothly on my 7100, in some cases at full screen, by only drawing every other line; a trick employed by many new games to speed up graphics (including Electronic Arts' Super Wing Commander



*Why are they smiling?
They've just been
encoded with
Trumotion S*

and Dark Forces from LucasArts). Any developers who want to improve the quality of video in their products would be well advised to check this out.

The demo clips I looked at were from Horizons Technology, of San Diego. Full details are given in the *PCW Contacts* box below.

Dark side of the Mac

While everyone who likes playing games on their Mac is still waiting for Doom II (currently suffering distribution problems), Virgin Interactive and LucasArts have released Dark Forces. Set in the Star Wars universe of George Lucas, it casts you as Kyle Katarn, a ruthless mercenary now employed by the Rebellion.

Using a Doom-like 3D engine, the game has you running around trying to find information on the Empire's latest secret weapon. More dangerous than the Death Star, with which you

Forces plays extremely well on the Mac. The graphics on our test version don't move quite as smoothly as the original, even on a PowerMac, but the increasingly addictive gameplay cannot be faulted. All the atmosphere of the movies is there, complete with sampled laser sounds, digitised voices and stirring Star Wars music. Characters in the game include Darth Vader, the legendary bounty hunter Boba Fett, Imperial Probe Droids, and that funny sewer monster from the first film.

The arrival of this game on the Mac, and especially the PowerMac, is a significant step towards getting more machines into people's homes. Consumers looking for a home computer want to play fast-moving action adventures, as well as balance their bills in a spreadsheet and write letters in a word processor. Apple needs to support firms like LucasArts if it wants to

*Get a big gun, take on the Empire and
be home in time for tea, with Dark
Forces*



expand out of the DTP, education and multimedia markets. Other titles planned for the Mac by LucasArts include Full Throttle (reviewed in this issue on page 281).

Dark Forces requires a 68040 Mac or PowerMac, System 7.1 or higher, 256-colour 13in monitor (or larger), CD-ROM drive, 8Mb of RAM and 5Mb minimum available hard disk space. Potential players on eWorld can download a demo of the first level, à la Doom, from the commercial game demos folder on ZiffNet.

Softly does it

A recent visit from those nice people at Insignia Solutions resulted in a Beta copy of the eagerly awaited SoftWindows 2.0 for PowerMac. SoftWindows is a Microsoft Windows emulator for the Mac, and up until now has only emulated Real Mode as used on a 286 processor. SoftWindows aims to give full 386 Enhanced mode emulation.

Early tests carried out in the VNU Labs reveal that the new version achieves what it sets out to do and even runs hardware-intensive multimedia titles and games like Doom, albeit slowly. Is it a feasible alternative to Apple's 486 DOS Card? Look out for a full review of the finished product as soon as I receive it.

And that's it for another month. In the next issue, along with the latest news from the Apple world, we'll be looking at customising your desktop for that personal look and feel. Until then... *may the force be with you.*

PCW Contacts

Chris Cain welcomes all comments, questions and suggestions from Mac users and can be contacted via the usual PCW address or by email as chris_cain@pcw.ccmil.compuserve.com, chris@cix.compulink.co.uk or cain@eworld.com

Apple 0181 569 1199

Newer Technologies

001 316 685 4904 (US)

Dark Forces costs £49.99 from Virgin Interactive Entertainment on

0181 960 2255

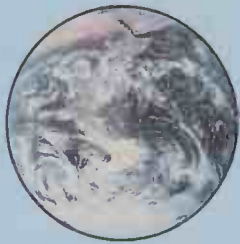
Insignia Solutions 01494 459426

Horizon Technology, 3990 Ruffin Road, San Diego, CA 92123, USA

Graphic Converter is downloadable from the Hot Files section of eWorld, and costs \$30 to register in Europe (\$31 in Germany with tax).

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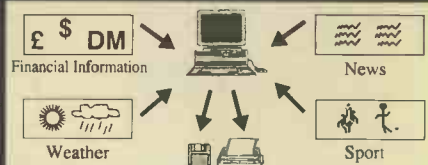
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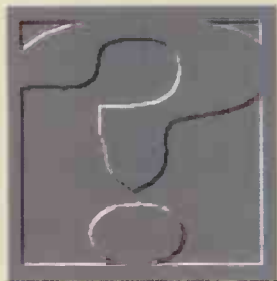
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Any questions?

If you've got a PC problem or think you could help out other readers, contact Frank Leonhardt.

Catching the right bus

I have a question regarding PC bus standards; ISA (8-bit and 16-bit), EISA, VLB, PCI and so on. I am trying to find out which cards can be plugged into which sockets. For example, an 8-bit ISA card can go into a 16-bit ISA slot but where does EISA/VLB fit in? Can an ISA card (8-bit or 16-bit) be used in an EISA or VLB slot? Is PCI compatible with ISA?

Paul Gleeson

In the beginning, there was the IBM PC bus. Actually, that's not true: there were plenty of bus standards before the IBM PC (please don't write in).

The IBM PC had a simple 8-bit bus which could only operate at 4.77MHz. IBM's first 16-bit machine was the AT. This needed a 16-bit bus to go with it, so the AT-bus was devised. Initially operating at 5MHz and later at 8MHz, this extended the original PC-bus by adding a second connector for the extra eight data bits, four address bits, IRQs and DMA channels. The AT-bus, running at 8MHz, is what has become known as the ISA bus. It will accept the old eight-bit cards in the first half of the slot, as long as they operate at 8MHz instead of just 4.77MHz — and they nearly all do.

By the mid-eighties it was obvious that the ISA bus wasn't up to it, so IBM dreamt up the 10MHz, 32-bit MCA bus. This didn't go down very well with the industry because it was totally incompatible with the old ISA cards. And just to make sure it failed, IBM threatened to sue anyone who tried to make an MCA compatible machine without paying them lots of money for the privilege. This was an offer everyone could refuse.

A group of PC manufacturers got together to develop Enhanced ISA (or EISA). Incidentally, this is the point when the AT-bus became known as Industry Standard Architecture (ISA). EISA used a special double connector which would

accept both new and old standard cards. Unfortunately, EISA was rather expensive to implement so it only found favour with high-end machines such as file servers.

By the early nineties, the industry was ready to have another go — it needed to because high-performance graphics and multimedia were coming along. VESA (the Video Electronics Standards Association) came up with a standard local-bus connector (VLB) which was added to the end of the ISA slot. A VLB card would plug into the ISA slot and the VLB extension connector at the same time. An ISA card could fit into the slot as well; it just wouldn't mate with the VLB bit. It was cheap and simple and lots of people jumped on the bandwagon.

We'd probably all be using VLB now if it hadn't been for Intel releasing PCI (which is nothing like ISA). Technically it's quite good, but if anyone else had tried to force it on the industry, it would have gone the same way as MCA. Anyway, Intel makes most of the world's Pentium motherboards, if you want a Pentium, you tend to get PCI with it. And of course, Intel makes and sells the chips necessary to implement PCI. But it does have its limitations and these may begin to show during the next year or so. Intel's answer is for a machine to have more than one PCI bus, but VESA has other ideas. The association has come up with the VESA Media Channel (VMC) bus which tackles the problem of high-volume data from multimedia devices from a different angle.

Help with upgrading

Your recent articles in PCW about hard disk upgrading have been useful to me as I am considering doing this. But I have a couple of queries.

Firstly, you say that IDE drives over 512Mb need special driver software. Would this still be the case if a drive over

512Mb was divided up into partitions which were all smaller than 512Mb? Would FDISK be able to correctly partition such a disk?

Secondly, am I correct in suspecting that if I buy 16Mb of 30-pin SIMMs for my current 486, I would be unable to transfer them to a new computer in a few years' time because it would only accept the 72-pin SIMMs (which are rapidly becoming the norm)? Or does there exist a device to convert 30-pin to 72-pin SIMMs?

Sebastian Wills

[<seb@empyr.dircon.co.uk>](mailto:seb@empyr.dircon.co.uk)

As far as breaking the disk into partitions goes to get more than 516Mb of space — nice try, but no. It is to do with the way the BIOS works, and FDISK goes through the BIOS to access the disk at a low level. The highest physical sector at which a standard BIOS can access is 1024 x 63 x 16 (tracks x sectors/track x heads). With 512 byte sectors, this gives you 516Mb. If you modify the BIOS (by replacing it with special drivers) you can pretend you have 256 heads instead of just 16, which gives you 8Gb to play with. This all works because modern IDE drives translate the physical track/sector/head requests to their own internal address — the BIOS is none the wiser.

You're quite right about the 30-pin SIMMs; I'm not spending a penny more on them myself. If you need more memory, it might be the right time to upgrade your motherboard as well. Some dealers still allow you to trade in 30-pin for 72-pin but this may not be the case by the end of the year. If you are planning to buy RAM which you can transfer to a new machine, make sure it is 72-pin.

Although there is no way to convert 30-pin parts to 72-pin, you can get dual-standard motherboards with sockets for either.

Disk drive conflict

I own a 486DX-50 with an IBM Spitfire SCSI-2 hard disk which is controlled by an Adaptec 1542C SCSI controller. Everything was working out just fine until I decided that I needed to get another hard disk.

You may be wondering why I need another hard disk when I already have 1Gb of storage. The reason is that I have a number of confidential files on my PC which I don't want people to get their hands on. My plan was to get an IDE hard disk and an IDE removable hard disk bracket, so I could save all my work on this and then simply take it out when I

wasn't using my PC. So I managed to obtain an ALPS DR311 105Mb IDE hard disk which I put into my machine — and that's when the problems started.

Basically, I want to have my SCSI hard disk as "C" and my IDE hard disk as "D". The problem is that if I set the AMI BIOS to say that my IDE hard disk is "C", the SCSI BIOS will automatically assign its hard disk to "D". If I set the AMI BIOS to say that the IDE hard disk is "D", the SCSI BIOS automatically assigns its drive to "C" but just sits there when it should be saying "Starting MS-DOS". Please could you help me with this problem as it's driving me mad.

Mike Sewart

<CC061MSS01@nottingham-trent.ac.uk>

When the PC starts up it assigns letters to disks, or disk partitions, in the order they are found. Because the motherboard BIOS gets the first look-in, it finds its own IDE drive partitions first. Then the BIOS on the SCSI board has a go and adds its drives to those already present (i.e. drive A: and drive C:). There is nothing much you can do about this.

When you set the IDE drive in the BIOS you are actually configuring the physical unit, which should be zero or one. In order to avoid confusing users, these are sometimes called "C:" and "D:" in the BIOS, and assuming that none of the physical disks contained more than one partition, it would probably be true. Unfortunately, for your purposes, it's a red herring.

It is technically possible to re-map the drives once the system has booted but there is quite a high risk that the utility software will become confused by this, and you may end up losing data. Microsoft used to supply a utility called Assign for doing this with DOS, but they have dropped it after version 5.0; it will work with later versions, but use it at your own risk.

Unless any readers have a reliable fix for this one, the obvious solution would be to swap the IDE drive for a SCSI and set its LUN to something below that of the Spitfire.

Faster cards and IDE for EIDE

In the near future, I intend to use my home system for communications. To cut the cost of on-line charges I hope to purchase a V.34 modem; however, I have found that the serial ports on the computer are of the 16450 type and may not be fast enough. Do I need to

Putting the boot in

Further to the correspondence (in PCW March '95) on preventing a PC's boot from being interrupted, Robin Collins has sent me the following tip:

"I work in a school with a few standalone machines, although most of our stuff is networked. I share David Waller's feelings — pupils hacking machines can be a pain. The answer is Bootlock. This is a shareware program that allows you to install a device driver in Config.sys that will disable Ctrl Alt Del, Ctrl C, and Ctrl Break. It works, and is less tiring than applying the Vulcan nerve pinch."

purchase a faster I/O card with the 16550 AFN port, or is there something better?

Additionally installed on the computer is an IDE CD-ROM drive on the same channel as the hard disk, which affects the 32-bit disk access in Windows. I have read about a new Enhanced IDE (EIDE) protocol which enables four IDE devices to be used with two on each channel. If purchased, would the EIDE controller allow the reinstatement of 32-bit disk access? Is it easy to change IDE for EIDE cards and are there problems regarding compatibility?

Finally, my computer has a VL-Bus Super-I/O card. What is the difference between this and a Multi-I/O card?

Stephen Evans

<sre2@coventry.ac.uk>

A 16550 is a better serial communications chip than the 16450 or 8250 because it has a 16-byte internal buffer. This can prevent data loss while the CPU is very busy, as sometimes happens under Windows. Nevertheless, a 486 processor should be able to manage without one under most circumstances. Before you go swapping boards around, it would be a good idea to make sure you actually do have a problem.

The 16550 is pin-compatible with the 8250 or 16450, so if you have one of these chips in your system you can swap them over. However, most machines these days included an 8250 compatible as part of a multi-function chip which cannot be changed.

I'm not exactly sure why your IDE CD-ROM drive is spoiling the Windows disk access. However, there are some problems using EIDE with Windows 3.1 32-bit file and disk access at present: basically, if you try to use the enhanced features of EIDE, then the standard IDE drivers which are part of Windows aren't going to

work. Hopefully, this will be remedied by Windows 95, but until then you should switch your EIDE BIOS addressing from LBA back to the standard CHS.

As to your final question: the only difference between a Multi-I/O card and a Super-I/O card is in the name that each manufacturer chooses to call their boards.

The right connections

I have five computers with the following specification: 386DX/2 33MHz processor (128Kb cache), 4Mb RAM (upgradable to 32Mb), 260Mb disk, Windows 3.1 and DOS 6.2. I want to connect them in a LAN — what software and hardware do I need? And do you know of a good book that explains about connecting LANs?

Robin Normanton, Swindon

There are two systems I recommend for people wanting to experiment with LANs: Little Big LAN and Windows for Workgroups. Little Big LAN is remarkable because it is incredibly good value for money. At present the software costs about £79 for the entire network. It also allows you to use any odd network cards or interfaces you have to hand on the same network, including serial and parallel cables. And just because it's cheap, it doesn't mean it's light on features.

If you are more interested in standardisation and want more control over the network, like a client-server system, Windows 3.11 for Workgroups is a good place to start. You'll need to buy a copy of the software for each machine on the network, together with a network adaptor card. If you make sure any cards you buy are NE2000 compatible, you shouldn't have too many problems.

The manuals which come with each of these products give a good grounding in the theory, as well as the practical problems of setting up a LAN. The Windows manual is particularly good for beginners.

PCW Contacts

Bootlock

A1 Shareware 0181 806 5769

Frank Leonhardt is an independent computer boffin who can sometimes be contacted on 0181 429 3047 or via email as frank@dircon.co.uk or leo2@cix.clink.co.uk. Letters may be sent to PCW at VNU House, 32-34 Broadwick Street, London W1A 2HG, but individual replies are not normally possible. Please do not ask about cover disks or CD-ROMs!





Some day my prints will come

... is what you may frustratedly be thinking, but without any idea of how to go about buying or upgrading a laser printer. Fear not, however, for Eleanor Turton-Hill is on hand to show you what to look out for.

Laser printers used to be huge, expensive pieces of equipment found only in the offices of large corporates and graphics bureaux, but now they're small desktop devices producing a higher quality of output than ever before. More importantly, laser printers are finally affordable to small businesses and home users. In fact, you can now pick up a laser printer from your local dealer for as little as £300.

Laser printers work in pretty much the same way as photocopiers, using a laser beam to produce the final result. The major difference is that instead of copying an image, the image is created in the computer and sent down a cable to the printer. Laser printers have three major advantages over other types of printers: they're fast, they're quiet, and they produce the best-quality output.

Like most other products in the computer industry, laser printers are buried in a confusing swamp of technobabble and jargon. Here's a rough guide to help you translate some of the strange speech used by your dealer.

GDI (Graphical Device Interface) Printers

One technological change which helped push the price of the laser printer down was the use of GDI technology. GDI printers use an innovative printing method whereby rasterisation takes place in the host PC rather than in the printer itself. Traditionally, the printer would have a whole load of complex electronics built into it to process incoming data, but in a GDI

printer all this work is done on your PC. This makes printing a more direct process because GDI cuts out the intermediary translation process which most printers use. Instead, it uses Graphical Device Interface code directly from Windows.

Despite the recent enthusiasm for GDI, the technology does have some major disadvantages. The most obvious is that GDI printers operate under Windows only. You can print from DOS applications, but only if they're running in a window, and then only with additional emulation (usually an early version of printer control language). Additionally, GDI printers are heavily dependent upon the host processor. This is usually listed amongst the advantages of GDI because the faster your processor, the faster the printed output. However, processor dependence cuts both ways: if you've got a slow processor, you'll have slow printing.

Quality of output

Several factors influence output quality, but the major one is the resolution capability of your printer. Until recently, 300dpi (dots per inch) was about the best you could expect from an office printer, but now the market is littered with 600dpi printers. These will give you significantly better results, particularly when printing scanned images or graphics. At 600dpi, four times the number of dots are produced per inch of paper, resulting in a smoother tone gradation and a final image which looks pretty much like a black and white photograph.

Another factor which will affect the qual-

ity of your printer output is the use of edge-enhancement techniques. These are used by some laser printers to adjust the arrangement of dots on the page, so that stepped edges are smoothed out, making the resulting print appear to have a higher resolution. This works by modulating the power of the laser to fill in the dots at the edges of characters with smaller dots so as to produce crisper looking text and smoother images. Different manufacturers have their own forms of this. RET (Resolution Enhancement Technology) belongs to Hewlett Packard, but others you may come across are PQET (Print Quality Enhancement Technology), used by Lexmark, and FEIT (Fujitsu Enhanced Imaging Technology). Many printer manufacturers use these edge-enhancement methods to improve the quality of 300dpi output. This is worth looking out for, especially if you print a lot of complex graphics, but remember to compare the price with a true 600dpi printer — the price difference is often small.

Paper

High-resolution printers are all well and good, but their performance is restricted by the quality of paper you use. The jagged edges of unenhanced 300dpi print become visible when using ordinary copier-grade bond paper. At 600dpi (or enhanced 300dpi) the quality improves, but any higher resolution than this will not be noticed unless you invest in a better quality paper.

Having said this, laser printers are not affected by paper quality to the same extent as inkjet printers. The way inkjets fire ink directly at the paper means that poor-quality absorbent paper leads to visible feathering of characters. With laser printers the print quality never quite suffers to this extent, but smoother paper will noticeably improve resolution, especially when using high dpi levels.

Poor-quality paper can produce side effects when used in laser printers. The drum inside the printer can become scratched, rapidly wearing out the surface and leading to deterioration in print quality and, finally, replacement of the drum. It's important to follow the manual's guidelines as regards paper quality and weight, which is usually recommended as 75gsm copier paper which costs about £2.50 for 500 sheets. Better quality paper at 80 or 90gsm costs more than twice this amount.

The way in which paper is stored is important because extreme heat or humidity can affect the way in which it feeds through the printer. Curled or damp paper

will soon cause paper jams and seize up the system. There are other considerations when it comes to paper. If you do a lot of printing on heavy paper or card, then you should take note of the way in which the paper passes through the printer. The normal paper path involves turning the sheet through an S-shaped bend, but many lasers include a straight-through path which prevents the paper from curling as it travels through the machine. Others provide an envelope feeder, too, which will allow you to stack and feed multiple envelopes so you don't have to feed them through singly, by hand.

Upgrading

If your printer does almost everything you need but lacks functions in certain areas, then you could consider upgrading as an option rather than spending vast amounts of money on a new machine. Lots of accessories and extras are available for printers including font cartridges, memory, and various networking add-ons.

Memory

One point to check when you buy a printer is the amount of memory it has, and to what extent it's upgradable. The printer should come with at least 512Kb of memory, but if you print full-page graphics, make sure you have 1Mb — if you make heavy use of soft fonts or Postscript, buy 2Mb to 4Mb. If you do buy a printer with a small memory, make sure it's upgradable to 2Mb in case your needs change later, and check whether the printer will accept industry-standard SIMMs (Single Inline Memory Modules). This type of memory can be obtained from a number of manufacturers and is usually cheap, whereas some printer manufacturers force you to buy their own proprietary memory on circuit boards or chips, sometimes costing extortionate amounts of money.

Fonts

Fonts can be a bit of a minefield if you want to upgrade. The first thing you should be aware of is how many resident fonts

you have in your printer. These are the fonts that are hard-wired into the printer, and most lasers come with at least six. Sometimes, printer ads are a little deceptive when it comes to resident fonts, often claiming to have an unbelievable number of them. This is because 14pt Times Roman is counted as a different font from 12pt Times Roman, and each point size underlined, italicised, lightened or boldened is counted as yet another. Always ask the dealer for a list of the typefaces so that you know exactly what it is you are being offered.

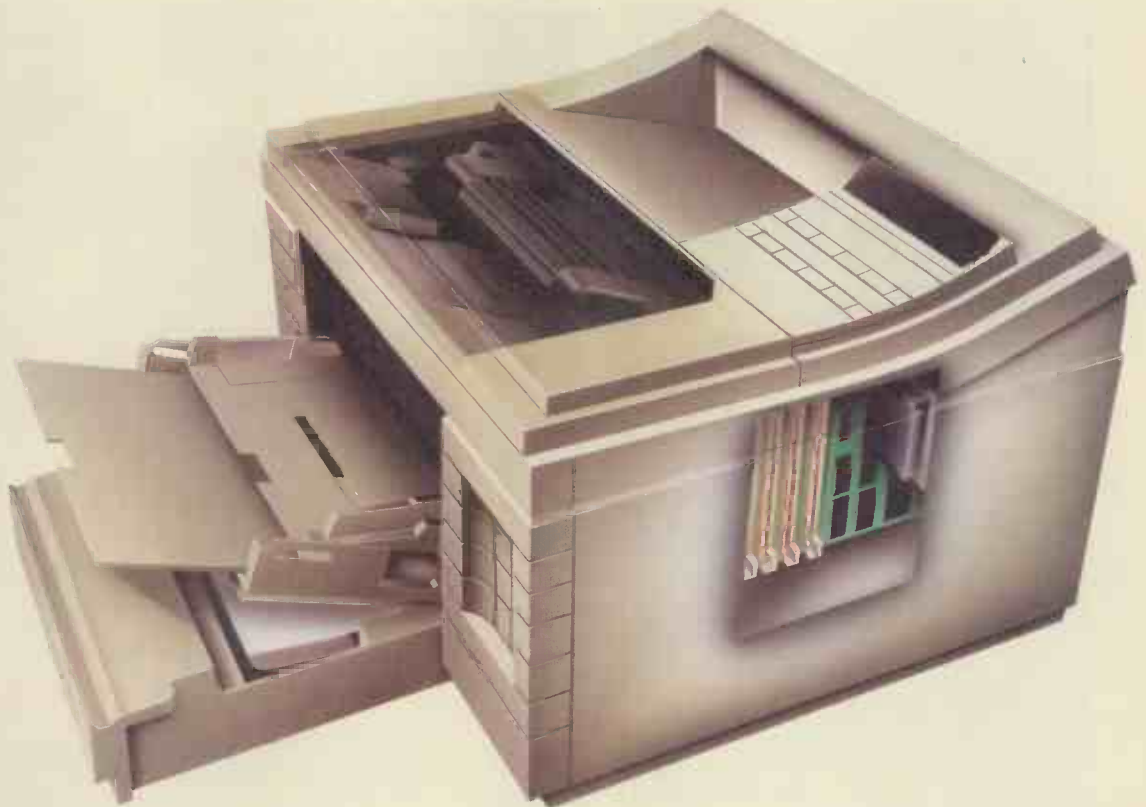
When it comes to upgrading your font options, you need to look at non-resident fonts. These come in three forms: bitmapped fonts on cartridges, bitmapped fonts as software (soft fonts) and scalable fonts. Font cartridges fit nicely into a slot in the printer and are faster than software-based fonts. They don't demand any extra memory or take up hard disk space, but unfortunately, are more expensive and less flexible than soft fonts. However, it's wise to make sure that upgrading your font collection with a cartridge is an option, so check that the printer accepts HP Laserjet II cartridges as these have become the industry standard and are widely available. Soft fonts are cheaper than cartridge based fonts, but they take up space on your hard disk and must be loaded into printer memory each time you use them. This is okay if you have the space, but can otherwise be a hidden

cost. Soft fonts can be easily manipulated, mixed and matched on the page, and in this respect they're better than cartridge fonts but not as good as scalable fonts.

The fact that cartridge fonts and soft fonts are bitmapped means that the point size of each font is stored in a separate and unchangeable file, whereas scalable fonts (as the name implies) can be rendered in any point size. PostScript provides the best option if you want to produce complex graphics or text which wraps itself around circles for instance. The cheapest PostScript printer will generally cost over £500, so it's often cheaper to upgrade than it is to buy a new one — but only just.

Upgrading can be done in a variety of different ways depending on what printer you already have, and how much aggravation you're willing to put up with. The easiest (but not necessarily the cheapest) way is to buy a PostScript cartridge. This will require 2Mb to 4Mb of memory, so the cost will depend on what memory you already have in your printer. A cheaper way of upgrading is to buy a software PostScript emulator. These are sometimes difficult to fine tune and they tend to be memory-hungry, both on your system and on your printer. They can produce good results, but can be inconsistent depending on the level of true PostScript compatibility.

For a detailed guide to products, see our laser printer group test next month.



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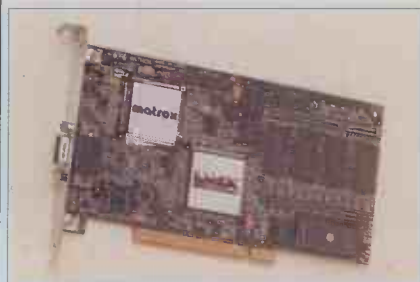
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Personal Computer World

NEW
FORMAT!

Dear Readers

In the '80s and early '90s Personal Computer World's editorial pages started on about page 100. The front of the magazine was devoted to adverts which allowed our readers to compare prices, and find the best deals on PC hardware and software.

By the middle of this year, the number of pages of advertising at the front had mushroomed to 350, making it increasingly difficult to find the editorial.

So we decided that starting this month, we would move the whole lot into this new section at the back of the magazine.

It means our editorial pages are now right at the front, but it also means you can still rely on our many adverts for competitively-priced PCs, peripherals and software.

At the beginning of this section, you'll find the **PCW Buyers Charter** and order form which include important advice on how to buy safely.

After the advertisements, you'll find our **Advertisers Index**. Lastly, **Chip Chat** remains in its original position at the back of the magazine.

I hope you agree it's a big improvement but if you don't, do let us know.

Ben Tisdall
Editor



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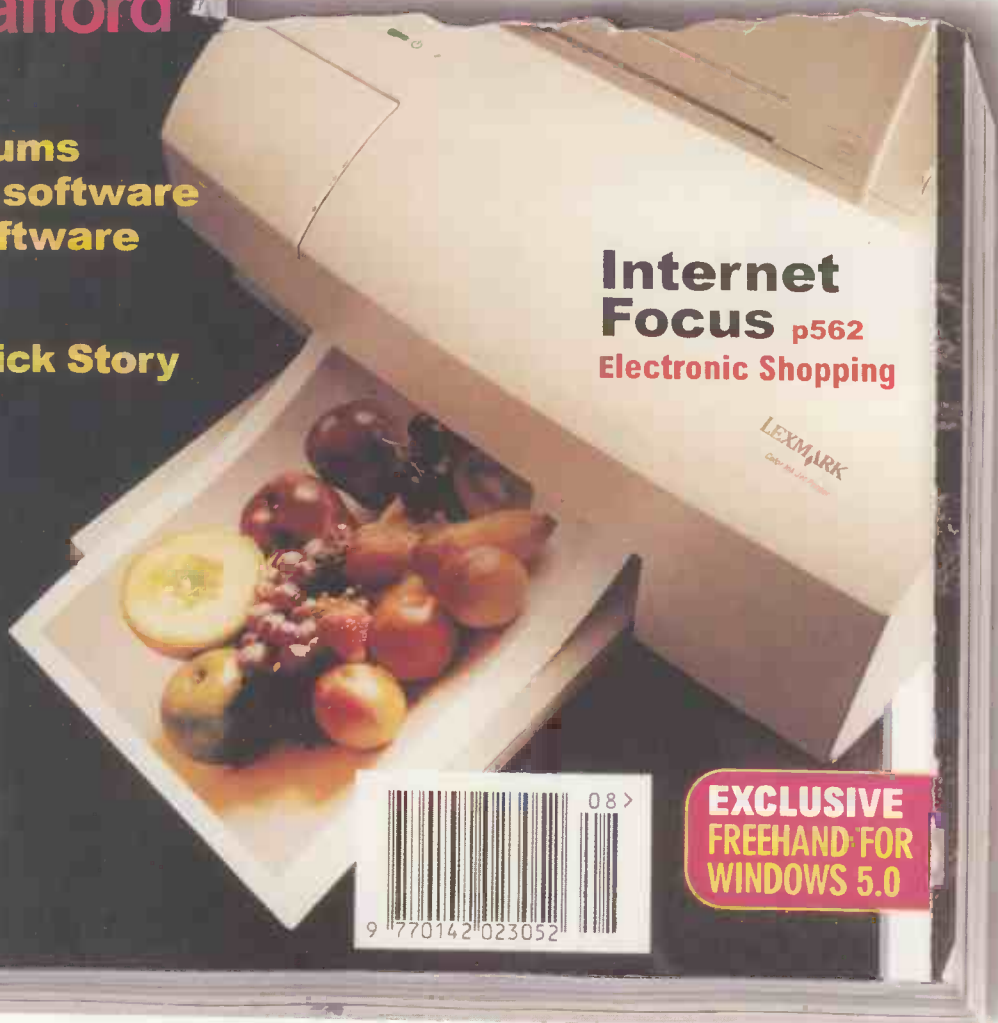
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Buyer's Charter

MAIL ORDER PROTECTION SCHEME

Hello, I'm Anthony George, your Customer Services Manager. My job is to assist you when things go wrong or when you have a complaint about advertisements in *Personal Computer World*. If you encounter a problem, write to me with details of the complaint and I will contact you.

Ten rules to buy safely

1. Always use a PERSONAL COMPUTER WORLD order form.
2. Keep a copy of the original advert.
3. Keep copies of all correspondence, and if you speak on the phone make a note of who you spoke to.
4. On large orders obtain a written quotation.
5. Wherever possible pay with a personal credit card. All transactions over £100 should be covered by the card company's insurance scheme.
6. Does the price quoted include everything discussed? Is VAT extra?
7. Check how they will deliver and if times are guaranteed.
8. Is telephone support or on-site maintenance included in the price? If a return to base warranty can be extended, how much does it cost?
9. Check that all branded components are genuine.
10. Is the supplier reputable? Do they comply with BS5750 or ISO900? If in doubt, ask to see customer testimonials.



Personal Computer World Buyer's Charter

When you purchase goods as a private individual reader from an advertisement appearing in this magazine and pay in advance of delivery, and that supplier ceases to trade and subsequently goes into Receivership, Liquidation, and/or Bankruptcy, you may be protected under our "Buyer's Charter" providing you have:

1. Not received the goods for which you have paid or had your money returned.
2. Followed all our guidelines when placing your order.
3. Retained a copy of the magazine's original Order form and the original advertisement, together with comprehensive proof of payment.
4. Submitted a detailed claim in writing to the magazine's customer services manager not earlier than 28 days and not later than three months from the official on-sale date of the magazine from which the goods were ordered. For example, by the end of June for the May issue (which is on sale at the beginning of April).

The following limitations apply:

1. Personal Computer World's liability under the Buyer's Charter will not exceed £2,000 in respect of any claim submitted by any one Private Individual Reader or more than £100,000 in respect of claims in any one calendar year. Any additional payments are at the sole discretion of the Publisher.
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3. The "Buyer's Charter" will not safeguard any commercially orientated outlet, neither will it cover goods which are purchased outside Great Britain or any goods which are obtained for resale.



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SALESPERSON'S NAME	COMPANY
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.....
.....
..... POSTCODE POSTCODE
DATE OF TELEPHONE ORDER / / TIME	DATE OF TELEPHONE ORDER / /
ORDER REFERENCE NUMBER (IF QUOTED)	ORDERED BY: <input type="checkbox"/> TELEPHONE <input type="checkbox"/> FAX <input type="checkbox"/> POST
DISPATCH REFERENCE NUMBER	ADVERT APPEARED IN PCW: ISSUE DATE PAGE

QUANTITY	DETAILS OF ORDER	UNIT COST £	TOTAL £

METHOD OF PAYMENT	SUB TOTAL
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<input type="checkbox"/> C.O.D <input type="checkbox"/> CHARGE CARD <input type="checkbox"/> OTHER (SPECIFY)	CARRIAGE
CREDIT CARD COMPANY START DATE / /	SURCHARGES
CHARGE CARD COMPANY START DATE / /	VAT
CARD NUMBER EXPIRY DATE / /	TOTAL
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

DELIVERY DETAILS	AGREED DELIVERY DATE / /
DELIVERED TO (ADDRESS) (IF DIFFERENT FROM ABOVE)	<input type="checkbox"/> TERMS OF WARRANTY <input type="checkbox"/> MONEY BACK
.....	<input type="checkbox"/> RETURNS POLICY <input type="checkbox"/> COST OF EXTENDED WARRANTY
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- OPT-III PC Card @ £169 - a precision, state-of-the-art proven design - a half-length card with integral UHF tuner and four acquisition circuits, that offers an ideal combination of high performance, stability and reliability.
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- OPT-III Dos Software (included) - features 'Fastext' page facility, 16 page review. Automatic printing and saving of pages (ASCII or 'raw'). Automatic saving of share prices as ASCII data, (includes 'Teletext 2000' - all 2000+ overnight closing share prices) - easily import this ascii data into your spreadsheet for subsequent analysis/graphing. 'Live' dynamic 'Carousel'. 'SetClock' clock feature. Device driver for custom programming etc.
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Software	
OPT-III Dos Software (included)	
Save pages to disk as ASCII or 'raw'	<input checked="" type="checkbox"/>
Automatic shares price retrieval	<input checked="" type="checkbox"/>
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Save pages as ASCII, BMP or 'Raw'	<input checked="" type="checkbox"/>
'D.D.E.' 'live' links to spreadsheets etc	<input checked="" type="checkbox"/>
Sample DDE file/graph for Excel for Win	<input checked="" type="checkbox"/>
Sample DDE file for Lotus 1-2-3 for Win	<input checked="" type="checkbox"/>
Sample DDE file for Quattro Pro for Win	<input checked="" type="checkbox"/>
'Carousel' feature with dynamic update	<input checked="" type="checkbox"/>
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Free Windows Developers Toolkit now available on request - phone for details.	<input checked="" type="checkbox"/>

The image displays several screenshots of the teletext software. The top left shows a 'PORTFOLIO' window with columns for 'AC', '\$/£', and 'NEWSTEXT.XLS'. The top right shows a 'Prices' window with a list of stock prices and a small bar chart. The middle left shows a 'Teletext on 3' window with a 'TV GUIDE' and 'SPORT' section. The middle right shows another 'Prices' window with '511 Shares A-E' and '512 Shares F-L'. The bottom left shows a 'Financial' window with various market indicators. The bottom right shows a 'Sport Index' window with '133 GOLF' and '134 HOCKEY' sections.



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SAWF filter	<input checked="" type="checkbox"/> 'Viewdata' mode
Four acquisition circuits	<input checked="" type="checkbox"/> 'Dumb Terminal' mode
Easy plug-in installation - Unique hardware feature - no 'com' ports or IRQ's required	<input checked="" type="checkbox"/> Added flexibility - Suitable for work and home PCs, notebooks, Macs, Unix boxes etc.

The image shows the 'Update TeleShares' software interface. It features a multi-paneled layout with several windows. On the left, there's a 'SHARES - LEADERS' table. The main area contains several line graphs showing stock price trends over time. At the bottom, there's a 'Financial' window with various market indicators and a 'PIZZA HUT PLAN TO CREATE 2,000 JOBS' news item.

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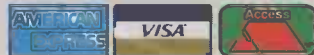
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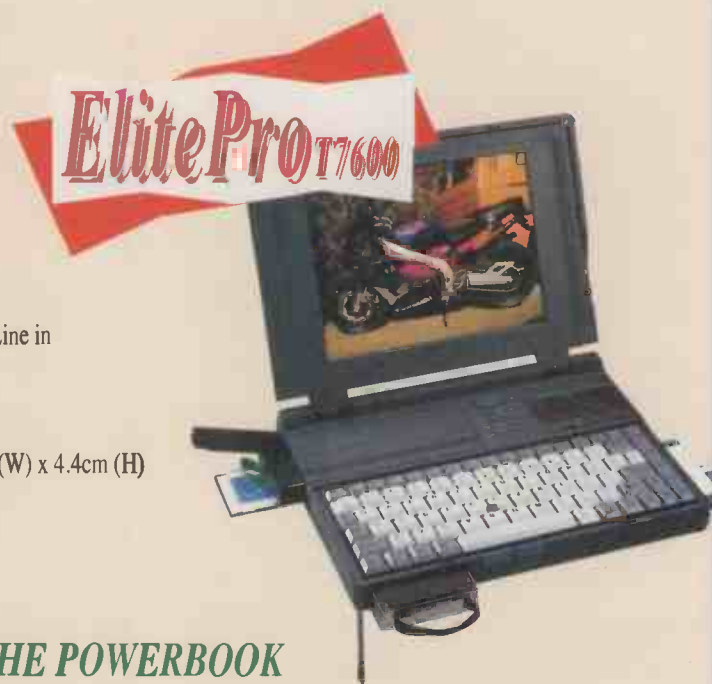
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Includes 340Mb Hard Disk & 4Mb Ram

Processor	Mono	Dual Scan	TFT
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Includes 340Mb Hard Disk & 4Mb Ram

Processor	Mono	Dual Scan	TFT
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Processor	Dual Scan	TFT
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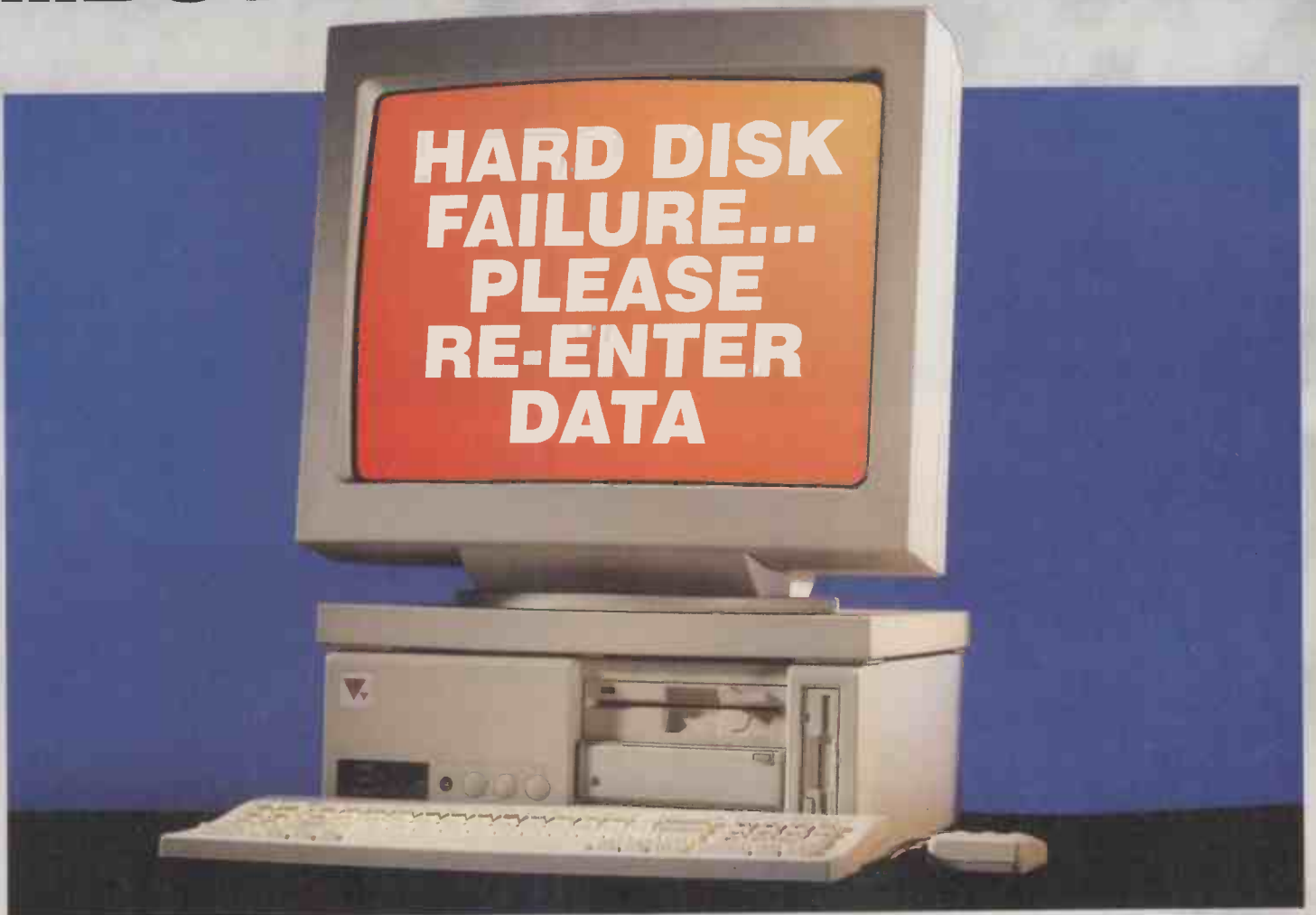
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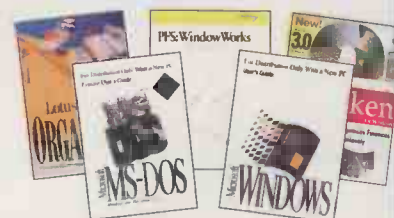
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Accura Modular Server



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Whoppers!

Accura Integrated Server

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- 3.5" 1.44mb floppy drive
- Fast PCI graphics card with 1mb RAM
- 14" Accuscan energy saving, MPR-II monitor, NI, max res 1024 x 768
- 2 serial (16550), 1 parallel port (EPP/ECP)
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- Accutouch 102 key UK keyboard
- Microsoft Ergonomic Mouse
- 3 year parts and labour warranty (first year on site)
- Operating systems: OS/2 Lan Server SMP, SCO Unix with SMP extrns, Windows NT 3.5 (not supplied).

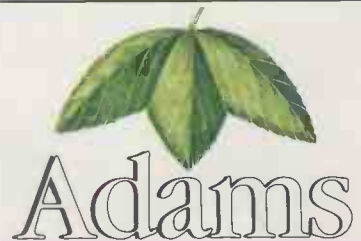
Adams service

Warranty: For your peace of mind Adams offer a 3 year parts and labour warranty on your Accura Server. The first year of this warranty is on-site with B55750 standard eight hour response provided by our partner ICL. All main system components are covered except monitors which are warranted by their own manufacturers. The on site service can be extended up to 3 years, and in certain areas, a four hour response time can be provided. Please call for specific quotations.

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Advanced Computer Technology

ADAMS TECHNOLOGY LTD, CITY POINT, CHESTER RD, OLD TRAFFORD, MANCHESTER M32 0RW UK. FAX: 0161 877 8664

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	Accura Integrated RAID Server with single Intel Pentium® 100 CPU with 8gb array	£8095
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	1gb → 4gb fast SCSI-II HDD (per drive)	£699
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	RAID cache upgrades per 1mb	£36
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	8gb total capacity	
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	18gb total capacity	
	Motherboard and RAID controller ECC memory upgrade (per 1mb)	£CALL
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Case accommodates 6 removable RAID drives and 5 secondary units. HDD's mounted in alloy glitch free carriers, hot swapped, spare unit fitted in lower case. 400w PSU's can be hot swapped, spare unit fitted in lower case.

Alain!

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Alain Menu on the way to victory in the Adams sponsored Williams Renault Laguna, in the British Touring Car Championship.

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DX2-66 £849	DX4-75 £899
DX4-100 £949	

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P75 £1149	P90 £1249
P100 £1349	

- Intel® Pentium® 75/90/100mhz CPU
- PCI local bus
- 256k external cache
- 8mb RAM (max 128mb)
- 540mb 11ms IDE hard drive with PCI 32-bit EIDE controller
- 3.5" 1.44mb floppy drive
- Ultra fast PCI graphics engine with 1mb RAM
- 15" Accuscan energy saving, MPR-II monitor, NI, max res 1280 x 1024
- 2 serial, 1 parallel port
- Desktop case with 200w PSU
- Accutouch 102 key UK keyboard
- Microsoft Ergonomic Mouse
- 3 year parts and labour warranty (first year on site)
- Win OS/2 Warp or DOS 6.22/Win FWG 3.11 preloaded
- Lotus Smartsuite for OS/2 included with Warp preloads

What's on

Portables We've plenty more things on the Adams' menu this month. Helped by high sales volumes we are now able to offer some amazing new prices on our Accura 5000 and 6000 notebooks. Together with a new price on the TFT Accura Portable our notebook range represents the *best* value for money available.

Premium With our Accura Premium range of desktops, we thought we better point out that unlike some manufacturers "low cost" products we don't skimp. We include the same high quality heavy duty keyboard, the same injection moulded, stainless steel lined cases, the same Microsoft mouse as our "big brother" Professional range.

Professional For those speed freaks among you, our Accura Professionals now feature a new 133mhz model which also incorporates the Matrox Millennium graphics card capable of 85hz refresh at 1600 x1200, also with new faster WRAM. This out paces VRAM and is upgradeable to 8mb

Adams offer a 3 year warranty with service support from ICL. We've many more delicacies to wet your appetite, so why not call sales now on 0161 877 8822 and find out what makes Adams different!

PS: Now 133mhz Pentium available for the Accura Premium too!

Accura Professional

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P90 £2049	P100 £2149
P120 £2349	P133 £2499

- Intel Pentium® 90/100/120/133 mhz CPU
- Intel Triton® chipset
- Plug and play compatible with auto configuration
- 256k pipeline burst synchronous SRAM
- 16mb EDO RAM (max 128mb)
- 1.2gb sub 10ms IDE hard drive with PCI 32 bit mode 4 enhanced IDE controller
- Quad speed multi session ATAPI CD-ROM drive
- 3.5" 1.44mb floppy drive
- Soundblaster Pro 16 with speakers
- Matrox Millennium graphics card with 2mb WRAM (u/g to 8mb)
- 15" Accuscan energy saving, MPR-II monitor, NI, max res 1280 x 1024, 75hz refresh
- 2 serial (16550), 1 parallel port (EPP/ECP)
- Desktop Case with 200w PSU
- Accutouch 102 key UK keyboard
- Microsoft Ergonomic Mouse
- 3 year parts and labour warranty (first year on site)
- Win OS/2 Warp or DOS 6.22/Win FWG 3.11 preloaded
- Lotus Smartsuite for OS/2 included with Warp preloads

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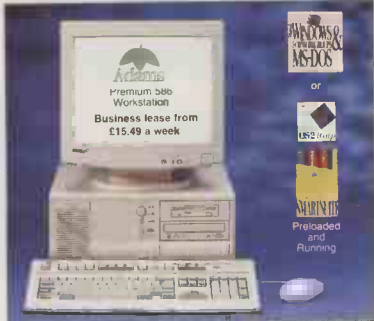


P90 £2549	P100 £2649
P120 £2849	P133 £2999

- Intel Pentium® 90/100/120/133 mhz CPU
- Intel Triton® chipset
- Plug and play compatible with auto configuration
- 256k pipeline burst synchronous SRAM
- 16mb EDO RAM (max 128mb)
- 1.2gb sub 10ms IDE hard drive with PCI 32 bit mode 4 enhanced IDE controller
- Quad speed multi session ATAPI CD-ROM drive
- Soundblaster® AWE32 sound card and pro-dlg spkrs
- 3.5" 1.44mb floppy drive
- Matrox Millennium 2mb WRAM graphics card (u/g to 8mb)
- 17" Idek MF8617 energy saving, MPR-II monitor, NI, max res 1600 x 1200, max refresh 100hz
- 2 serial (16550), 1 parallel port (EPP/ECP)
- Desktop Case with 200w PSU
- Accutouch 102 key UK keyboard
- Microsoft Ergonomic Mouse
- 3 year parts and labour warranty (first year on site)
- Win OS/2 Warp or DOS 6.22/Win FWG 3.11 preloaded
- Lotus Smartsuite for OS/2 included with Warp preloads

superb quality and value for money

Premium 586



Work Station

P90 £1749

P100 £1849

P120 £2049

P133 £2199

- Intel® Pentium® 90/100/120mhz CPU
- PCI local bus with 256k external cache
- 16mb EDO RAM (max 128mb)
- 1gb sub 10ms IDE hard drive with PCI 32-bit mode 4 enhanced EIDE controller
- Quad speed, multi session ATAPI CD-ROM drive
- 3.5" 1.44mb floppy drive
- #9 Fx Vision 330 64 bit PCI graphics card with 2mb DRAM
- 15" Accuscan energy saving, MPR-II monitor, NI, max res 1280 x 1024
- 2 serial, 1 parallel port
- Desktop case with 200w PSU
- Accutouch 102 key UK keyboard
- Microsoft Ergonomic Mouse
- 3 year parts and labour warranty (first year on site)
- Win OS/2 V3.0 or DOS 6.22/Win FWG 3.11 preloaded
- Lotus Smartsuite for OS/2 included with Warp preloads

Premium 586



Multi Media

P90 £2149

P100 £2249

P120 £2449

P133 £2599

- Intel® Pentium® 90/100/120mhz CPU
- PCI local bus with 256k external cache
- 16mb EDO RAM (max 128mb)
- 1.2gb sub 10ms IDE hard drive with PCI 32-bit IDE mode 4 controller
- Quad speed, multi session ATAPI CD-ROM drive
- Soundblaster® Pro 16 and speakers
- 3.5" 1.44mb floppy drive
- #9 FX Motion 771 64 bit PCI graphics card with 2mb VRAM (u/g to 4mb)
- 17" Accuscan MPR-II monitor, NI, max res 1280 x 1024
- 2 serial, 1 parallel port
- Desktop case with 200w PSU
- Accutouch 102 key UK keyboard
- Microsoft Ergonomic Mouse
- 3 year parts and labour warranty (first year on site)
- Win OS/2 V3.0 or DOS 6.22/Win FWG 3.11 preloaded
- Lotus Smartsuite for OS/2 included with Warp preloads



Accura

options

Premium

540mb IDE → 1gb 10ms IDE HDD	£135
1gb IDE → 1.2gb 10ms IDE HDD	£55
Std memory upgrades per 1mb	£31
EDO memory upgrades per 1mb	£37
Ultra fast PCI graphics 2mb → #9 Fx Vision 330 with 2mb DRAM	£59
#9 Fx Vision 330 with 2mb DRAM → #9 FX Motion 771 2mb VRAM	£99
VRAM upgrades 2mb → 4mb	£169
14" → 15" Accuscan Monitor	£80
1280 x 1024, MPR-II	
15" → 17" Accuscan Monitor	£269
1280 x 1024, MPR-II	
Sound Blaster Pro 16 (includes Speakers)	£109
NE2000 compatible ethernet card	£49

Professional

1gb IDE → 1gb 8.5ms fast SCSI-II including 32 bit DPT 2024 PCI fast SCSI-II controller (cache and RAID upgradeable)	£299
1gb fast SCSI-II → 2gb 9ms fast SCSI-II	£369
DPT CM4000 cache module (0 mb) for DPT 2024	£369
Memory for CM4000 (per 1mb)	£36
DPT DM4000 RAID module for DPT2024	£369
Matrox Millennium 2mb → Matrox Millennium with 4mb WRAM	£150
Matrox Millennium 4mb → 8mb WRAM u/g	£270
2mb → 4mb VRAM upgrade	£185
17" Idek → 21" Idek MF-9121 Diatron Pro 1600 x 1200, MPR-II	£899

PLEASE CALL FOR MANY MORE OPTIONS

the Menu?

no compromises for power users

Professional



586 Server

P90 £2599

P100 £2699

- Intel Pentium® 90/100mhz CPU
- Plug and play compatible with auto configuration (PCI and ISA bus)
- 512k external cache
- 16mb RAM (max 192mb)
- 2.0gb 8.0ms fast SCSI-II hard drive with DPT PCI 32-bit bus mastering SCSI controller (caching and RAID upgradeable)
- 4.4 speed multi session SCSI CD-ROM drive
- 3.5" 1.44mb floppy drive
- Fast PCI graphics card with 1mb RAM
- 14" Accuscan energy saving, MPR-II monitor, NI, max res 1024 x 768
- 2 serial (16550), 1 parallel port (EPP/ECP)
- 32 bit PCI bus mastering ethernet card
- Tower case with 250w PSU
- Accutouch 102 key UK keyboard
- Microsoft Ergonomic Mouse
- 3 year parts and labour warranty (first year on site)
- Operating systems: OS/2 Lan Server, Novell, SCO Unix, Windows NT (not supplied).

Professional



586 Dual Server

P90 £3199

P100 £3399

- Two Pentium® 90/100mhz CPU's
- Plug and play compatible with auto configuration (PCI and EISA bus)
- 512k external cache
- 16mb RAM (max 192mb)
- 2.0gb 8.0ms fast SCSI-II hard drive with DPT PCI 32-bit bus mastering SCSI controller (caching and RAID u/g)
- 4.4 speed multi session SCSI CD-ROM drive
- 3.5" 1.44mb floppy drive
- Fast PCI graphics card with 1mb RAM
- 14" Accuscan energy saving, MPR-II monitor, NI, max res 1024 x 768
- 2 serial (16550), 1 parallel port (EPP/ECP)
- 32 bit PCI bus mastering ethernet card
- Server case with 300 w PSU
- Accutouch 102 key UK keyboard
- Microsoft Ergonomic Mouse
- 3 year parts and labour warranty (first year on site)
- Operating systems: OS/2 Lan Server SMP, SCO Unix with SMP extns, Windows NT 3.5 (not supplied).



ordering

Adams Technology sales lines are open from 9am till 6pm from Monday to Friday. Technical sales staff are available to answer questions on any of our products to help you with any differing requirements that you might have. Please add VAT to all prices quoted. We welcome payment by Visa, Mastercard and American Express, or on a cheque with order basis. We charge £20 for carriage on all systems and servers and £12 for portables. A 14 day money back guarantee* is offered on all purchases.

All sales are subject to Adams Technology Ltd's terms and conditions of sale. These are available on request. Please call for any further information you may require.



Adams are the official computer supplier to Williams Renault for 1995

0161 877 8822

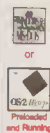
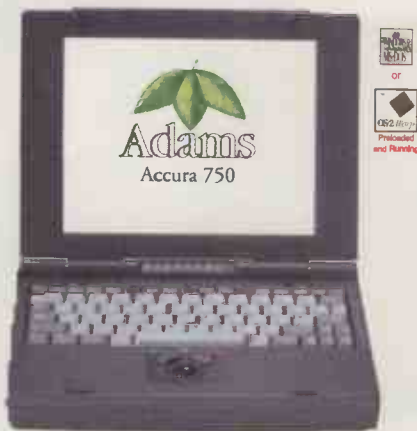


Advanced Computer Technology

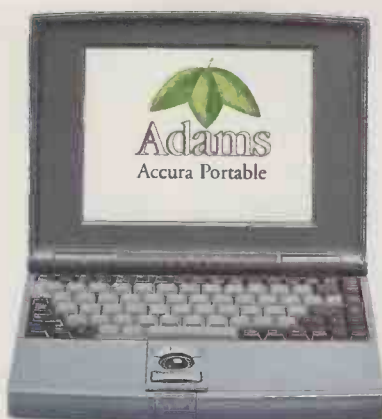
ADAMS TECHNOLOGY LTD, CITY POINT, CHESTER RD, OLD TRAFFORD, MANCHESTER M32 0RW UK. FAX: 0161 877 8884

*Warranty and money back guarantee subject to Adams Technology's terms and conditions.

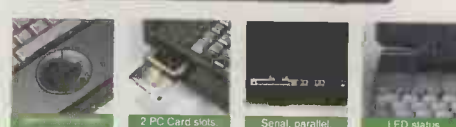
Accura 750



Accura Portable



Accura 7600



Accura 750 prices

Model	Price	Price with 8MB RAM
486DX2-66	£899	£1299
486DX4-75	£949	£1349
486DX4-100	£999	£1399

Accura Portable prices

Model	Mono	Dual Scan Colour	TFT active Colour
486DX2-66	£1049	£1399	£1899
486DX4-75	£1099	£1449	£1949
486DX4-100	£1149	£1499	£1999

Accura 7600 prices

Model	Price	Price with 8MB RAM
P75	£1699	£2199
P90	£1799	£2299

Divine Int

Accura 750 features

- 486DX2-66 CPU upgradeable to 486DX4-100
- 4mb standard memory upgradeable to 20mb
- 340mb 2.5" fast IDE hard drive upgradeable to 1.2gb.
- 9.5" Mono LCD with 64 grey levels, Dual Scan passive colour displaying 256 colours.
- Local bus graphics accelerator giving simultaneous LCD/CRT display and CRT resolutions up to 1024 x 768
- 1.44mb floppy disk drive built in
- BIOS controlled dual level power management facility
- Built in LED status Indicator
- 19mm trackball built in
- 1 PCMCIA type III slot (Takes type I and II also)
- Ni CD battery standard
- 1 serial port, 1 parallel port, external CRT port, external keyboard port
- Full function 84 key UK keyboard
- Multi voltage 90-240v charger power supply (2 hour charge time)
- Light weight 2.2kgs with hard drive and battery
- Compact size - near sub-notebook dimensions
- 1 year parts and labour warranty
- 14 day money back guarantee of satisfaction.

Accura Portable features

- 486DX2-66 CPU upgradeable to 486DX4-100
- 4mb standard memory upgradeable to 20mb
- Quick removable 340mb 2.5" fast IDE hard drive upgradeable to 1gb.
- Yamaha audio chip providing Sound Blaster® compatibility with built in speaker and microphone
- 9.5" Mono LCD with 64 grey levels, Dual Scan Passive Colour or TFT active colour displaying 256 colours, quickly interchangeable
- Local bus graphics accelerator (WD Rocket Chip) with 1mb RAM giving simultaneous LCD/CRT display and CRT resolutions up to 1024 x 768
- Removable 1.44mb floppy disk drive
- "PICO Power" chipset featuring BIOS controlled power management with SMM stop clock and suspend to disk function and built in battery meter
- 19mm Logitech trackball built in
- 2 PCMCIA type II and/or 1 type III slot
- Ni MH battery standard (quickly interchangeable)
- 1 serial port, 1 enhanced parallel port (EPP/EPS), external CRT port, external keyboard/mouse port, d/station port
- Full function 86 key UK keyboard
- Multi voltage 90-240v charger power supply (1.5 hour charge time)
- Weight 2.4kgs mono, 2.7kgs colour
- Carry slip and utility disk included
- 1 year parts and labour warranty
- 14 day money back guarantee of satisfaction

Accura 7600 features

- Intel Pentium P75 or P90 CPU
- 16k level 1 and 256k level 2 cache
- 8mb standard memory upgradeable to 40mb
- VESA local bus IDE HDD interface with 340mb 2.5" fast IDE hard drive upgradeable to 1.2gb
- Sound Blaster® 16 bit stereo compatibility with built in speakers and microphone
- 10.3" DSTN passive colour or 9.5" TFT active colour display
- VESA local bus graphics accelerator giving simultaneous LCD/CRT display and CRT resolutions up to 1024 x 768
- Built in 1.44mb floppy disk drive
- BIOS controlled power management
- 19mm trackball built in
- 2 PCMCIA type 2 and/or 1 type 3 slot
- Ni MH battery standard (quickly interchangeable)
- 1 serial port, 1 enhanced parallel port (EPP/EPS), external CRT port, external keyboard/mouse port, d/station port
- Full function 86 key UK keyboard
- Multi voltage 90-240v charger power supply (2.0 hour charge time)
- Dimensions(mm) 283w x 232d x 53h Weight 2.9kgs
- Utility disk set included
- 1 year parts and labour warranty
- 14 day money back guarantee of satisfaction

Accura 750 some options

Memory upgrade to 8mb	£169
Memory upgrade to 12mb	£325
Memory upgrade to 20mb	£699
Upgrade HDD from 340mb - 520mb	£99
Upgrade HDD from 340mb - 810mb	£279
Upgrade HDD from 340mb - 1gb	£439
Deluxe Carry Case	£39
14400 V32bis PC Card fax modem from	£199

Accura Portable some options

Memory and HDD upgrades as Accura 750	
Additional main battery	£89
Docking station	£375
Car Power Adaptor	£49
Deluxe Carry Case	£39
HDD upgrade from 340mb to 1.2gb	£CALL
PC Card ethernet adaptor from	£125
PC Card d/speed CD-ROM (no ext pwr required)	£249

Accura 7600 options

HDD upgrades as Accura 750	
Memory upgrade to 16mb	£309
Memory upgrade to 24mb	£679
Memory upgrade to 32mb	£988
Memory upgrade to 40mb	£1358
Additional main battery	£95
Docking station	£CALL
Car Power Adaptor	£CALL

Best Buys

Computer Warehouse

Lowest Mail Order Prices + Cash 'n' Carry From our Stores and Warehouses

12 Months On-Site Warranty

Standard with all PC's, Printers, Fax's and Word Processors unless otherwise specified.

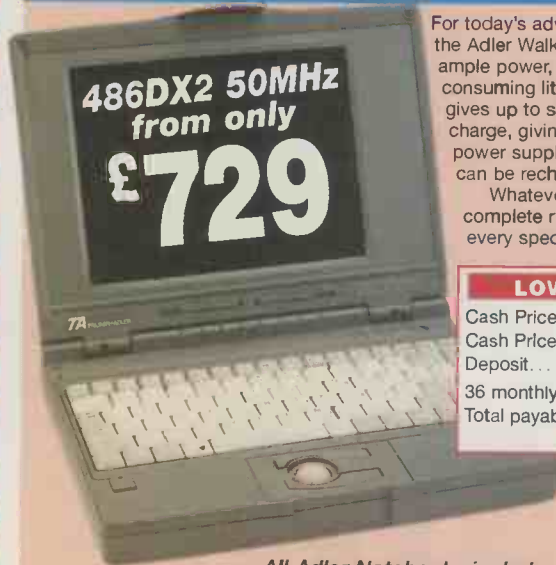
3 Year Warranty

Inexpensive Insurance is available to extend the on-site warranty for a further 2 years.

Just a small selection shown here

Many more products available-call us with your specific requirements.

Adler Walkstations



486DX2 50MHz
from only
£729

For today's advanced software applications the Adler Walkstation notebook provides ample power, but at a low voltage thus consuming little energy. The NiCd battery gives up to six hours usage on a single charge, giving instant use even when no power supply is available. The battery can be recharged in under two hours.

Whatever your needs Adler offer a complete range of notebooks to meet every specifications.

LOW COST CREDIT

Cash Price..... **£729.00**
Cash Price inc VAT..... **£856.57**
Deposit..... **£86.00**
36 monthly payments of..... **£28.⁰⁰**
Total payable inc VAT..... **£1094**
APR 19.9%

12 months return to base warranty

All Adler Notebooks include:

- 3.5" 1.44Mb floppy disk drive
- Integrated Trackball
- Ergonomic palm rest
- 2 x PCMCIA slots
- Parallel interface
- Serial interface
- Power management system
- Suspend/Resume feature
- Wide range of add-ons
- Simultaneous LCD/CRT display
- Fast battery recharge
- MS-DOS® 6.2 and Windows™ 3.11

UP TO 6 HOURS BATTERY LIFE

80% RECHARGE IN ONLY 2 HOURS

Adler 4/50DX2	486DX2	50MHz	200Mb	4Mb	£729
Adler 4/50DX2	486DX2	50MHz	340Mb	4Mb	£849
Adler 4/50DX2 D/Scan Colour	486DX2	50MHz	250Mb	4Mb	£1099
Adler 4/50DX2 D/Scan Colour	486DX2	50MHz	340Mb	4Mb	£1199
Adler 4/66DX2 TFT Colour	486DX2	66MHz	340Mb	4Mb	£1899

Brother Portables



Brother Trekker
Colour only **£979**

The Brother Trekker is the perfect business travelling partner. It is one of the world's smallest and lightweight portable computers yet packs the power of the 486SLC2 50MHz processor and is equipped with a formidable array of features you would expect to find on your desktop PC. The Trekker gives you the power to run your applications while visiting customers on-site, while on the move or to bring work home.

NOW WITH STANDARD 250Mb HARD DISK

- 486SLC2 50MHz CPU
- 4Mb RAM exp. to 8Mb
- 250Mb Hard Disk
- Built-in 3.5" 1.44Mb FDD
- Colour: 8.2" colour LCD
- Mono: 10" LCD 64 g/scales
- Micro Trackball module

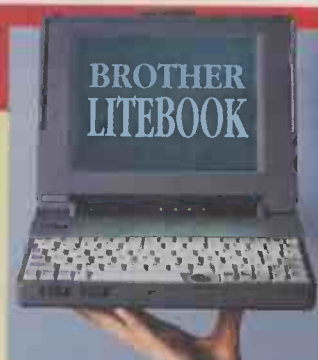
- 80 key keyboard
- Ports: 1 serial, 1 parallel, SVGA + External keyboard
- 2-4 hour fast charge battery
- Microsoft Works v3.0
- Windows 3.11, MS-DOS 6.2
- 279mm x 210mm x 40mm
- Weight 2.3kg

Trekker Mono
250Mb
£799

Brother 486 Litebook £699

For ultimate portability without sacrificing usability or performance

- 486SLC 25MHz CPU
- Built-in co-processor
- 4Mb RAM exp. to 8Mb
- 80Mb Hard Disk
- 2 x PCMCIA slots
- External 3.5" 1.44Mb FDD
- 8.5" VGA LCD 64 G/scales
- External col. (1024 x 768) port
- Built-in Micro Trackball
- Ports: 1 serial, 1 parallel, 1 SVGA + External keyboard, 1 FDD
- Microsoft Works v3.0 integrated suite
- Removable Long-Life battery
- Windows™ 3.11, MS-DOS® 6.2
- 252mm x 192mm x 39mm
- Weight 1.7kg with battery



Brother Litebook with GemFax
PCMCIA Fax/Modem and Comms Software **£799**

Notebook Carry Case



Solidex K919

A multi-purpose computer bag/briefcase to carry your valuable computer equipment and personal items. The durable leather-look material ensures a long-lasting life for your bag and your computer equipment. Genuine leather handle. Stain and water resistant.

LOW COST CREDIT

Available on most products

Example:
Cash Price..... **£699.00**
Cash Price inc VAT..... **£821.32**
Deposit..... **£92.00**
36 monthly payments of..... **£26.⁵⁰**
Total payable inc VAT..... **£1046**
APR 19.9% *Written quotation on request*

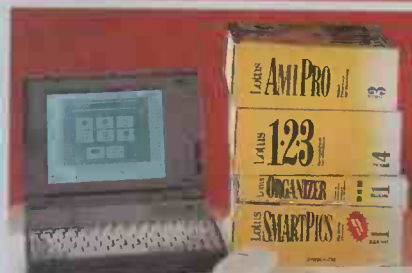
Brother & Lotus Offer only £899

Brother BCP431V

The powerful Brother BCP431V notebook with its 486DX 33MHz processor and 250Mb hard disk plus a complete suite of Lotus software pre-installed and ready to run at an amazing bundle price.

- 486DX 33MHz processor
- 250Mb Hard Disk
- Maths Co-processor
- 4Mb RAM exp. to 8Mb
- 3.5" 1.44Mb floppy drive
- Back-lit 10" VGA Mono LCD with 64 greyscales
- MS-Windows 3.11, MS-DOS 6.2 and Mouse.
- 292 x 217 x 46 (mm)

Manuals and disks available for extra charge. Boxes shown for illustration.



Lotus Software
pre-installed and ready to run with on-line documentation

- Lotus Ami Pro 3.1 Word processor
- Lotus 123 v.5 Spreadsheet
- Lotus Organiser 1.0 Personal Organiser
- Lotus Smart Pics 1.0 Clipart

- ▶ CENTRAL LONDON 63-65 New Oxford Street, London WC1. Tel: 0171-240 7773
- ▶ BRIGHTON 2 New Road. Tel: 01273 739007
- ▶ BRISTOL 8 Eldon Way, Brislington. Tel: 0117 9723890
- ▶ BURY ST EDMUNDS 10 Greyfriars Road, Moreton Hall Ind. Est. Tel: 01284 724213
- ▶ ILFORD 533 High Road. Tel: 0181-514 7887
- ▶ MILTON KEYNES Cromwell Bus. Centre, 8 Howard Way, Newport Pag. Tel: 01908 211871
- ▶ OXFORD 150 Cowley Road. Tel: 01865 200744
- ▶ ROMFORD 11 Victoria Road (Town Centre End). Tel: 01708 730430
- ▶ UXBRIDGE 199 High Street. Tel: 01895 812090
- ▶ WIMBLEDON 19 Windsor Park Ind. Est., Lyon Road. SW19. Tel: 0181-540 5926

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ORDERS: Freephone 0800 317 307

ENQUIRIES: 0181-514 7887

FAX ORDER LINE: 0181-553 3343

Amerigo MultiMedia System only £699

In today's world you demand a lot from your computer. Why not everything? Why not get all the capabilities you need, all the features you want, all in one system? Take your choice from the all new Amerigo systems and you'll get exactly that. With Amerigo you get a super fast system complete with preloaded business and entertainment software.

Amerigo systems offer high speed processor, disk and video performance, multitasking and improved system reliability. Amerigo systems are ideal for all your computer requirements, whether they be office, home, government or education.

For the fastest PCs around take a look at the new 586 range. Featuring NexGen CPU's from IBM they give equivalent Pentium® performance using RISC technology.



LOW COST CREDIT AVAILABLE

NEW IN THE UK
BEST BUYS • EXCLUSIVELY AT

LOW COST CREDIT APR 19.9%	
Example shown: Amerigo ASX2 50/210TM	
Cash Price.....	£699.00
Cash Price inc VAT.....	£821.32
Deposit.....	£92.00
36 monthly payments of.....	£26. ⁵⁰
Total payable inc VAT.....	£1046

All Amerigo models include 12 months return to base warranty. For 1st Year On-Site Warranty add £50

Software shown here for illustration only. Please check individual systems.

ASX2 50/210TM

- IBM486SX2 50MHz CPU
- 4Mb RAM
- 16K Internal Cache
- 210Mb IDE Hard Drive
- 1Mb SVGA Video
- Double Speed CD-ROM
- 14" SVGA 0.28dp Col. Monitor
- 1.44Mb 3.5" Floppy Disk Drive
- 16-bit Sound Card
- 2W Stereo Speakers
- 102 Key Quality Keyboard
- 2 Serial, 1 Parallel, 1 Game port
- MS Ergonomic Mouse 2.0
- MS DOS® 6.2
- Windows® for Workgroups 3.11
- Microsoft® Works 3.0 CD
- Microsoft® Encarta CD
- Free software titles on 2 CD's:
 - Cute 'n' Cuddly
 - Interplay's 10 Year Anthology - 10 Titles:
 - Battle Chess
 - Lord of the Rings
 - Star Trek
 - Out of this World
 - Mindshadow
 - The Bard's Tale
 - Tass Times
 - Wasteland
 - Dragon Wars

Titles subject to change

£699 **FANTASTIC VALUE**

ADX2 66/420TM

- 486DX2 66MHz CPU by HP
- 4Mb RAM
- 8K Internal, 128K External Cache
- 420Mb 13ms IDE Hard Disk Drive
- 1Mb Windows Accelerator Local Bus Video Card
- High Performance VL Bus IDE
- Double Speed CD-ROM
- 14" SVGA 0.28dp Colour Monitor
- 1.44Mb 3.5" Floppy Disk Drive
- 16-bit Sound Card / MIDI Hi-Fi
- 10W Stereo Speakers
- 102 Key Quality Keyboard
- 2 Serial, 1 Parallel, 1 Game port
- MS Ergonomic Mouse 2.0
- MS DOS® 6.2
- Windows® for Workgroups 3.11
- Microsoft® Works 3.0 CD
- Microsoft® Money
- Microsoft® Encarta '95 CD

£799 **FANTASTIC VALUE**

ADX4 100/420TM

- IBM486DX4 Blue Lightning 100MHz CPU
- 8Mb RAM
- 16K Internal, 256K External Cache
- 420Mb 13ms IDE Hard Disk Drive
- 1Mb Windows Accelerator Local Bus Video Card
- High Performance VL Bus IDE
- Double Speed CD-ROM
- 14" SVGA 0.28dp Digital Colour Monitor
- 1.44Mb 3.5" Floppy Disk Drive
- 16-bit Sound Card / MIDI Hi-Fi
- 10W Stereo Speakers
- 102 Key Quality Keyboard
- 2 Serial, 1 Parallel, 1 Game port
- MS Ergonomic Mouse 2.0
- MS DOS® 6.2
- Windows® for Workgroups 3.11
- Microsoft® Works 3.0 CD
- Microsoft® Money
- Microsoft® Encarta '95 CD

£999 **FANTASTIC VALUE**

NEW 586 SYSTEMS

- NexGen CPU with equivalent Pentium® performance manufactured by IBM and motherboard by Alaris
- 8Mb RAM expandable to 192Mb
- 32K Level One Cache (internal), 256K external Cache
- 540Mb fast IDE Hard Disk Drive (1Gb option available)
- Local Bus IDE, floppy & I/O card
- 1Mb (max 2Mb) High Performance Windows Accelerator Local Bus Video
- 14" SVGA 0.28dp NI Digital Colour Monitor
- 1.44Mb 3.5" Floppy Disk Drive
- Quad Speed CD-ROM Drive
- 16-bit Sound Card / MIDI Hi-Fi
- 10W Active Stereo Speakers
- 102 Key Quality Keyboard
- 2 Serial, 1 Parallel, 1 Game port
- MS Ergonomic Mouse 2.0
- Microsoft® Encarta '95 CD
- MS DOS® 6.2 and Windows™ for Workgroups 3.11

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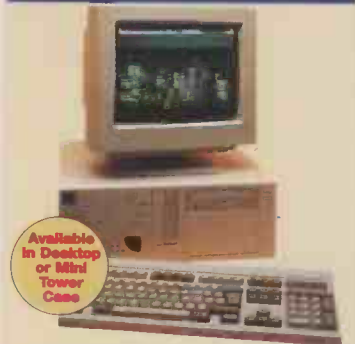
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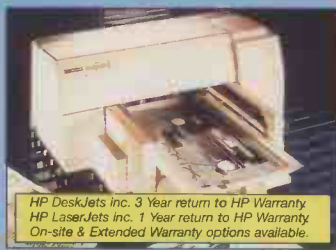
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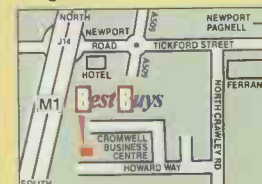
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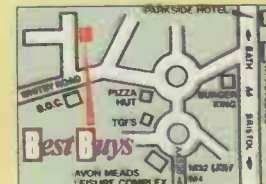
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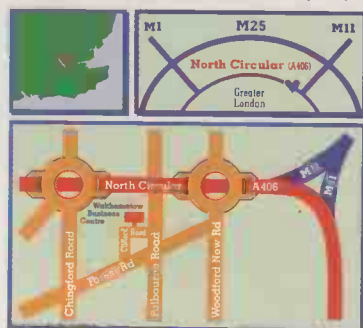
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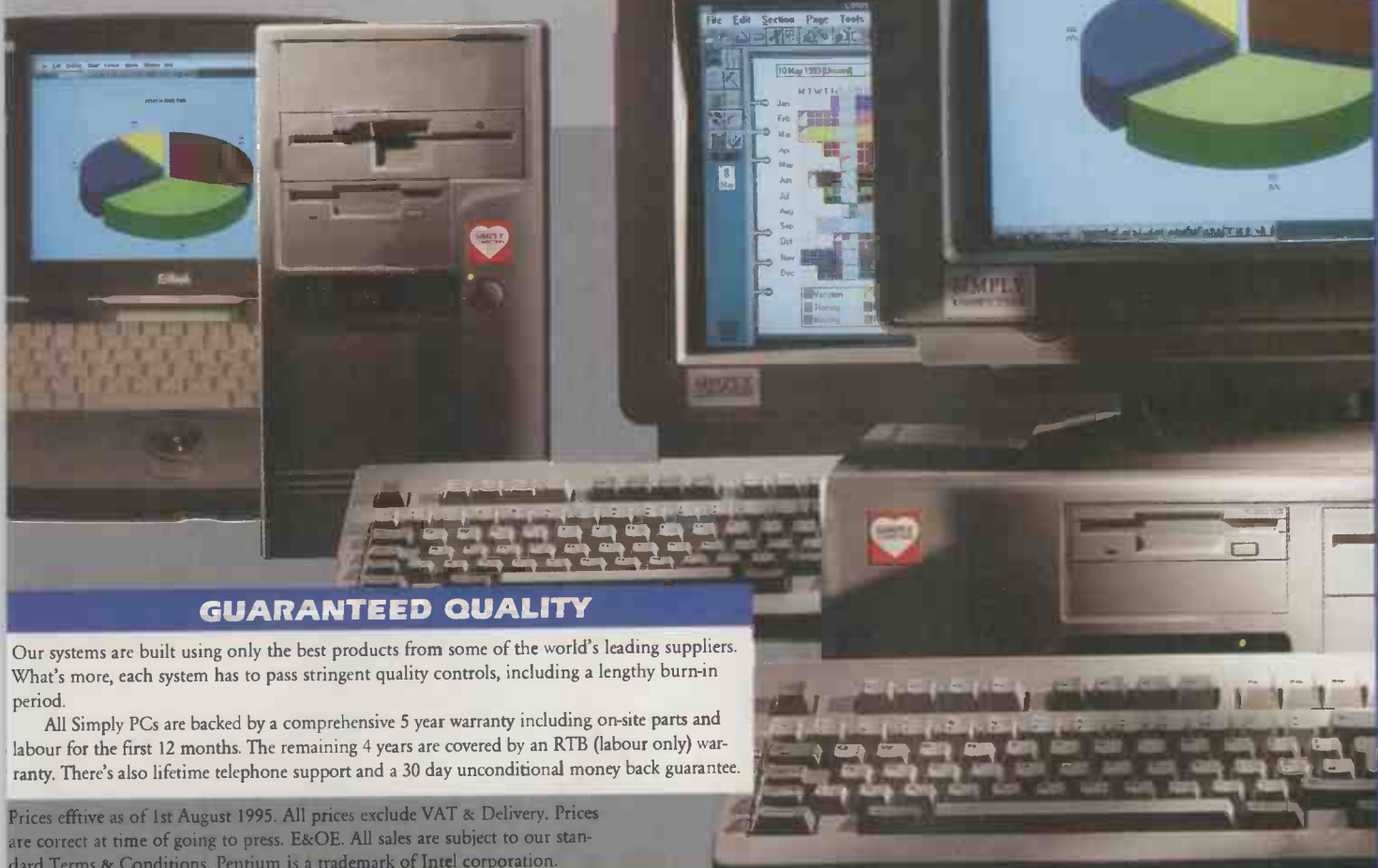
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Wangtek 1Gb External SCSI Tape Streamer.....	£639
WangDat 3100 External 2Gb SCSI DAT.....	£795
WangDat 3200 External 4-8Gb SCSI DAT.....	£940
WangDat 3400DX External 8-16Gb SCSI-2 DAT.....	£1025

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HP Surestore 2000i 2Gb.....	£599
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MiroSOUND PCM20 Radio.....	£190

Microsoft

Microsoft Windows Software & Microphone.....	£39
Microsoft Windows Sound Card.....	£105

Aztech

Sound Galaxy Nova 16 Extra.....	£75
Sound Galaxy Pro 16.....	£59
Sound Waverider 32+.....	£95
Sound Waverider 32+ Kit.....	£299

Others

Portable Sound Plus.....	£129
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(Sound Blaster compatible connects to Parallel Port)

SPEAKERS

Small Speakers.....	£5
Screen Beat 4 Speakers.....	£9
Screen Beat 5 Speakers.....	£10
Screen Beat 3 Speakers.....	£12
Screen Beat Pro 50.....	£29
Creative 20W Speakers.....	£69
Labtec CS-600 Speakers.....	£19
Small Mains Powered Amp Speakers.....	£19
Large Mains Powered Amp Speakers.....	£49
Pro Digital Speakers.....	£29
Soundisk SD-100 Speakers for 5.25".....	£15
Sony Multimedia PC Speakers SRS-PC30.....	£48
Sony Multimedia PC Speakers SRS-PC50.....	£65
Yamaha Sub Woofer.....	£75
Yamaha Multimedia Speakers YST-M5.....	£39
Yamaha Multimedia Speakers YST-M10.....	£55
ZIFI 2 Speakers.....	£25
ZIFI Pro 2 Speakers.....	£39

ACCESSORIES

Headphones.....	£5
Microphone.....	£9



LEISURE

JOYSTICKS

Warrior 5 Joystick.....	£9
Warrior 5 Plus Joystick.....	£12
Mach 1 Joystick.....	£12
Mach 1 Plus Joystick.....	£16
Mach 2 Joystick.....	£21
CH Flightstick.....	£27
CH Flightstick Pro.....	£48
CH Jetstick Joystick.....	£23
CH Virtual Pilot Flight Yoke.....	£59
CH Virtual Pilot Pro Flight Yoke.....	£75
CH Pro Pedal for Flight Sims.....	£85
Gravis Analog.....	£24
Gravis Professional Analog.....	£32
Gravis Phoenix Flight & Weapon Control System.....	£95
Gravis Firebird Flight & Weapon Control System.....	£59
Gravis PC Game Pad & FIFA International Soccer (CD).....	£35
Logitech Wingman.....	£23



Dual Joystick Splitter Cable.....	£9
GAME CARDS	
Gravis Game Card (50Mhz Max).....	£25
CH Gamecard III Auto up to 80Mhz.....	£28
CH Gamecard III MCA 50Mhz.....	£32
IBM Game Card & Joystick 50Mhz.....	£19
JCD Gamecard 11 PCMA Dual Joystick Interface.....	£45

MULTI-MEDIA CARDS

Canon
 Canon Ion PC RC2601 Camera.....£395
 (Includes ION PC 11 Digitiser, ION PC Turbo Remocon Cable, Windows Software, TWAIN Driver Software plus all regular features of the Kit.)

CREATIVE

Creative MP400 (MPEG Player).....£174
 Creative TV-Coder External.....£119
 Creative Video Blaster RT300.....£255
 Creative Video Spigot.....£75

Diamond
 Diamond Videostar.....£279

Aztech
 Video Galaxy Gamma.....£155
 Video Galaxy Gamma MPEG Upgrade.....£119
 Video Galaxy Teletext Upgrade Module.....£38
 Video Galaxy Oscar (MPEG Playback board).....£189

Fast Electronic
 Fast Aviator MN502010.....£185
 Fast Movie Machine Pro.....£189
 Fast Movie Machine Pro.....£289
 Screen Machine II.....£659



HAUPPAUGE WIN/TV CELEBRITY

£259

- Frame Grabbing on the fly
- Teletext
- NTSC/PAL Compatible
- Scaleable viewing window from icon to full screen

Hauppauge Win/TV Cinema.....£189
 Hauppauge Win/TV Prisma.....£149

Orchid
 Orchid 1Mb Kelvin MPEG.....£249
 Orchid 2Mb Kelvin MPEG.....£295
 Orchid Vidia.....£249
 Orchid Vidia Premium.....£569
 Orchid Vidia Pro.....£439

Sigma Design
 Reelmagic Full Version.....£325
 Reelmagic Lite.....£199

Rombo
 Rombo Media Pro HI-RES.....£209
 Rombo Media Pro Plus.....£189
 Rombo PC Tuner.....£65
 Rombo TV Buster External.....£45
 Rombo TV Buster Internal.....£45
 Rombo TV Tuner with Teletext.....£99

Videologic
 Videologic 1Mb 928 Movie ISA.....£189
 Videologic 1Mb 928 Movie ISA Sound.....£259
 Videologic 1Mb 928 Movie VLB.....£189
 Videologic 1Mb 928 Movie VLB Sound.....£259
 Videologic 1Mb 928 Movie with MPEG Player ISA.....£425
 Videologic 1Mb 928 Movie with MPEG Player VLB.....£425
 Videologic 1Mb 928 VRAM Upgrade Kit.....£85
 Videologic 2Mb PCI Movie.....£329
 Videologic Captivator & Video for Windows.....£165
 Videologic Captivator & Video for Win /Action.....£185
 Videologic Captivator Pro.....£189
 Videologic Captivator Pro & TV.....£219
 Videologic MPEG Player for VMC.....£239

MIROVIDEO

Mirovideo 2Mb 20TD Live PCI or VLB.....£319
 Mirovideo Mouse.....£285
 Mirovideo D1 (With Video Studio).....£239
 Mirovideo D1 (With Adobe Premiere).....£359
 Mirovideo DC1 (With Video Studio).....£339
 Mirovideo DC1 (With Adobe Premiere).....£439
 1Mb MiroVIDEO 12PD.....£89
 2Mb MiroVIDEO 12PD.....£129
 MiroMPEG Maker.....£185

FLEXCAM™

DESK TOP TV CAMERA.....£499

Flexcam is a high resolution, integrated colour camera and microphone.


Videolabs
 Compro LaserWave Movie Studio - MPEG Video Board.....£239
 Intel Smart Recorder Pro.....£295
 Spea Showtime (MPEG Player).....£299

VIDEO CONFERENCING
 Intel ProShare Video System 200.....£1,849
 Intel ProShare Premiere Edition SPW.....£199

CREATIVE LABS

SHAREVISION PC 3000 £995

MODEMS



US Robotics SPORTSTER

PRICE CUT

US Robotics Courier V34 Int.....£238
 US Robotics Courier V34 Ext.....£238
 US Robotics Sportster 28.8 V34 Fax EXT.....£158
 US Robotics Sportster 28.8 V34 Fax INT.....£158
 US Robotics Sportster 14.4 Fax EXT.....£105
 US Robotics Sportster 14.4 INT.....£105

US Robotics Worldport Dual Standard Cellular.....£119
 US Robotics Worldport 2496 + Fax Pocket.....£95
 US Robotics Worldport -
 Dual Standard Cellular V34 PCMCIA.....£159
 US Robotics Worldport 2496 + Fax PCMCIA.....£129

SIMPLY Modems

Simply 14400 PCMCIA Fax Modem.....£219
 Simply V34 External Fax Modem.....£179
 Simply V34 Internal Fax Modem.....£179
 Simply 14400 Internal Fax Modem.....£69
 Simply 14400 External Fax Modem.....£99

Simply Modems are BABT approved and come with Windows software.

RoadRunner Rocket Bundles
 Silver Pack.....£119
 (Includes V32bis Modem, Serial Cable, BT Lead, PSU, no Software)
 Gold Pack.....£135
 (As above plus BT 'T' Piece, 9-25 way adaptor and TRAns-Send WinDOS Lite Software)
 Gold RocketBoard Bundle.....£149
 (As Gold Pack plus Rocketboard dual 16C550 High Speed Serial Card)
 Platinum Pack.....£169
 (As Gold Pack but with 19,200bps V32Terbo RoadRunner Rocket)

Andest VPA V22 BIS.....£349
 Andest VPA V32 BIS + RocketBoard.....£449
 Andest RocketBoard - High Speed 16C550 Serial Card.....£59

Pision Dacom
 Gold Card V34 + Fax PCMCIA Modem.....£315
 Gold Card V32 bis + Fax PCMCIA Modem.....£215

PACT

Pace Netlink V32.....£129
 Complete internet Access Pack containing Pace
 MobiFax1 44, FREE 21 Days direct connection time
 Plus all Software needed.

Pace Netlink Gold V34.....£215
 Complete internet Access Pack containing Pace
 MobiFax1-44. Free 21 Days direct connection time Plus
 all Software needed.

Pace Microlin fx34 PC Internal V34 Fax Modem.....£299
 Pace Linnet 34 Plus fx Desktop V34 Fax Modem.....£239
 Pace Microlin fx34 V34 Pocket Fax Modem.....£289
 Pace Microlin NB34 PCMCIA V34 Fax Modem.....£329
 Pace Microlin fx32 Plus V32 Internal Fax Modem.....£134
 Pace Linnet 32 Plus fx V32 Desktop Fax Modem.....£175
 Pace Microlin fx32 Plus V32 Pocket Fax Modem.....£169
 Pace Microlin fx NB 32 Plus PCMCIA Fax Modem.....£189
 Pace MobiFAX 14.400.....£119
 Pace Linnet Message Desk V32 Fax Modem.....£259
 (Voice functionality integrated with Data and Fax. Fax Back & Fax forward with enhanced audio standard. Internal Microphone)

Hayes
 Hayes Optima 28.8 VFC & Fax.....£449
 Hayes Optima 288 VFC + Fax Value Pack.....£689
 2 Hayes Optima 288 - 2 Enhanced Serial Ports (Free upgrade to V34)
 Hayes Optima 14.4 + Fax 144.....£275
 Hayes Optima 144 - Fax 144 PCMCIA.....£215
 Hayes Accura 28.8 + Fax VFC V32bis.....£189
 Hayes Accura 14.4 + Fax V32bis.....£139

(The above Modems APPROVED for connection to telecommunications systems specified in the instructions subject to the conditions set out in them.)
 External V34 28.8 Fax/Modem.....£149
 Internal V34 28.8 Fax/Modem.....£149
 External V32 14400 Fax/Modem.....£110
 Internal V32 14400 Fax/Modem.....£69
 Internal 9624 Fax/Modem.....£35

(The above modems are prohibited from direct or indirect connection to public telecommunications systems. Action may be taken against anyone so connecting this apparatus.)

Cables
 9 to 25 Pin Modem Cable.....£9
 25 to 25 Pin Modem Cable.....£9

Automatic Fax Switches
 Andest MSL Manager 1100 Fax/Phone.....£89
 Andest MSL Manager 3300.....£105
 Andest MSL Manager 3300M.....£125
 Andest MSL Manager 7700.....£145

SCANNERS

Andest
 Andest FaxScanner (Win).....£59
 (Converts Fax Machine into A4 Scanner)
Epson
 Epson GTX6500 SCSI.....£465
 (Photoshop LE, OmniPage Direct, Pagekeeper)
 Epson GTX8500 Parallel.....£495
 (Photoshop LE, OmniPage Direct, Pagekeeper)
 Epson GTX8500 SCSI.....£575
 (Photoshop LE, OmniPage Direct, Pagekeeper)
 Epson GT18500 SCSI (Adobe Photoshop V3).....£759
 Epson GTX9000 SCSI.....£675
 (Photoshop LE, OmniPage Direct, Pagekeeper)
 Epson GT18500 SCSI (Adobe Photoshop V3).....£769
 Epson GT19000 SCSI (Adobe Photoshop V3).....£869
 Epson Bi-Directional Parallel Port.....£35



LOGITECH

SCANMAN 32 WIN & PAGEPLUS V3.0

£78

Logitech 256 Scanner.....£78
 Logitech Easy Touch Scanner.....£98
 Logitech Scanman Colour.....£165
 Logitech Scanman Power Page.....£298

Nikon
 Nikon Scantouch LE.....£915
 Nikon Coolscan.....£1,099

Sicos
 Sicos Colour Page Scanner.....£229

Trust
 Trust 1200dpi Flatbed Scanner.....£295
 Trust 2400dpi Flatbed Scanner.....£395



UMAX

£1960

600 X 1200 dpi
COLOUR SCANNER

Page Office.....£285
 Vista T630 300 x 600dpi Colour Scanner.....£385
 Vista S8 400 x 800dpi Colour Scanner.....£539
 UC 1260 Colour Scanner.....£759

Other
 ScanFX - Scanner, Fax, Copier.....£399
 (Colour/BW 1200 x 1200dpi Scanner with Fax & Copying Comes with Wordscan OCR & Picture Publisher LE)

SOFTWARE AND BOOKS

MS-DOS 6.22 Upgrade.....£38
 MS Win for Workgroups 3.11 Upgrade.....£44
 MS Windows for Workgroups 3.11.....£89
 D.I.Y. Book.....£5
 All the information you need to build or update a PC

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VGA CARDS

ISA	
<i>Generic</i>	
256K VGA 800 x 600 16C.....	£19
512K VGA 1024 x 768 16C.....	£25
1Mb Trident 8900D 1024 x 768 256C.....	£39
1Mb Cirrus Logic 16.7 Win Accelerator.....	£44
1Mb Tseng ET4000 16.7m Colours.....	£65
<i>Hercules</i>	
1Mb Hercules Dynamite Pro.....	£139
<i>Matrox</i>	
2Mb MGA Impression Plus ISA.....	£259
2Mb MGA Impression Plus 200/220.....	£309
<i>Orchid</i>	
1Mb Kelvin 64.....	£95
2Mb Kelvin 64.....	£129
<i>Taxan</i>	
1Mb Taxan GTS WinBoost.....	£114
2Mb Taxan GTS WinBoost.....	£145
2Mb Taxan WinTurbo 64.....	£245
4Mb Taxan WinTurbo 64.....	£395
VESA LOCAL BUS	
<i>Generic</i>	
1Mb Cirrus Logic 5429 Win ACC VLB.....	£55
<i>(35% Faster than 5428 Chipset)</i>	
1Mb Tseng ET4000/W32 VLB.....	£79
1Mb Cardex 90C33.....	£79
2Mb Tseng ET4000/W32 VLB.....	£109
<i>Diamond</i>	



DIAMOND

	VLB	PCI
1Mb Diamond Stealth SE	£79	£78
2Mb Diamond Stealth SE	£119	£119
1Mb Diamond Stealth 64 Dram	£89	£95
2Mb Diamond Stealth 64 Dram	£139	£135
2Mb Diamond Stealth 64 Video Vram	£215	£230
4Mb Diamond Stealth 64 Video Vram	£329	£319

<i>Hercules</i>		
1Mb Hercules Dynamite Pro	VLB	PCI
	£139	-
2Mb Hercules Dynamite Power	£195	£195
2Mb Hercules Graphite Terminator 64	£265	£265
4Mb Hercules Graphite Terminator 64	£379	£379
1Mb Hercules Stingray	-	£100
1Mb Hercules Stingray Pro Video	-	£109
1Mb Hercules Stingray 64 Video	-	£129
2Mb Hercules Stingray 64 Video	-	£149
<i>Number 9</i>		
1Mb 9FX Vision 330	VLB	PCI
	£99	£99
2Mb 9FX Vision 330	£145	£145
1Mb 9FX Motion 531	£139	£139
2Mb 9FX Motion 531	£189	£189
2Mb 9FX Motion 771	£279	£279
4Mb 9FX Motion 771	£399	£399
4Mb Imagine 128 1280	£759	£759
4Mb Imagine 128 1600	£949	£949
8Mb Imagine 128	£1,399	£1,399
<i>Matrox</i>		
2Mb MGA Impression Lite	VLB	PCI
	£195	£259
4Mb MGA Impression Plus	£949	-
<i>Orchid</i>		
1Mb Orchid Kelvin EZ	VLB	PCI
	£89	£89
1Mb Orchid Kelvin 64	£99	£99
1Mb Orchid Fahrenheit 64	£115	£119
2Mb Orchid Kelvin 64	£135	£135
2Mb Orchid Fahrenheit 64	£155	£159
2Mb Orchid Fahrenheit Pro 64	£245	£245
4Mb Orchid Fahrenheit Pro 64	£349	£349
<i>Spea</i>		
1Mb Spea Videoseven Mirage	VLB	PCI
	£85	-
	VLB	PCI
1Mb Spea Videoseven Mirage P64	£125	-
2Mb Spea V7 Mercury P64 VLB	£239	-
<i>STB</i>		
2Mb Lightspeed	VLB	PCI
	£139	-
2Mb STB Powergraph 64	-	£149
2Mb STB Nitro 64	-	£145
1Mb Powergraph 24	£139	-



VGA CARDS Cont.

2Mb STB Velocity 64V MPEG	£219	£245
4Mb STB Velocity 64V MPEG	£319	£395
<i>Taxan</i>		
1Mb Taxan GTS WinBoost	VLB	PCI
	£119	£119
2Mb Taxan GTS WinBoost	£145	£145
2Mb Taxan WinTurbo 64	£245	£245
4Mb Taxan WinTurbo 64	£395	£395



	VLB	PCI
1Mb GfatrixStar 300	£99	£99
2Mb GfatrixStar 300	£139	£139
1Mb GfatrixStar 500 inc AVI scaling	£135	£135
2Mb GfatrixStar 500 inc AVI scaling	£189	£189
2Mb GfatrixStar 700 inc AVI scaling	£269	£269
4Mb GfatrixStar 700 inc AVI scaling	£389	£389

PCI		
<i>Generic</i>		
1Mb Tseng ET4000/W32P PCI.....	£79	
1Mb Cirrus Logic 5434 PCI.....	£69	
1Mb Advanced Logic AL2301 PCI.....	£79	
2Mb Tseng ET4000/W32P PCI.....	£109	
2Mb Cirrus Logic 5434 PCI.....	£109	



MONITORS

14" Mono VGA Monitor.....	£69
14" Crystal Colour SVGA Interlaced.....	£159
15" Crystal Colour Monitor N-I MPRIL.....	£245
17" Crystal 17HQ 1280 x 1024 N-I.....	£509
<i>CTX</i>	
14" CTX 1451CD N-I MPRIL.....	£169
15" CTX CPS-1565GN N-I SVGA MPRIL.....	£235
17" CTX 1765GM SVGA MPRIL .28 1024 x 768.....	£449
17" CTX 1785GM SVGA MPRIL .26 1280 x 1024.....	£495
LMT 1000 16 Grey Scale LCD VGA Screen 9.4".....	£499
LMT 5020 4096 Colour LCD VGA Screen 9.4".....	£1,999
<i>All the above monitors come with one year on-site Warranty</i>	
<i>Hitachi</i>	
Hitachi 15" 15MVX Value.....	£245
Hitachi 17" 17MVX Value.....	£475
Hitachi 17" 17MVX ValuePlus.....	£769
Hitachi 20" CM2096M 1280 x 1024 NI 84Hz.....	£989
Hitachi 20" CM2098M 1280 x 1024 NI 86Hz.....	£1,139
Hitachi 21" CM2198M 1280 x 1024 NI.....	£1,429
Hitachi 21" CM2199M 1600 x 1280 NI 80Hz.....	£1,979
<i>Iiyama (IDEK)</i>	
15" Iiyama Vision Master FST MF-8115.....	£259



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17" IYAMA
VISION MASTER
FST MF-8617

£536

21" Iiyama Vision Master FST MF8221.....	£1,247
21" Iiyama Vision Master FST MF9121.....	£1,293
21" Iiyama Vision Master FST MF8621.....	£1,645
<i>(Now bundled with Colourific Kodak SFW)</i>	

<i>Mitsubishi</i>		
(MITS) 15" SD5520 Diamond Scan 15FS.....	£339	
(MITS) 17" FFY7705 Diamond Scan 17FS.....	£595	
(MITS) 17" TFG8705 Diamond Pro 17TX.....	£920	
(MITS) 21" THN9105 Diamond Pro21TX.....	£1,299	
<i>Nokia</i>		
Valuegraph 449E090P 15" SVGA FST.....	£349	
Multigraph 449M092P 15" FST TCO Trinitro.....	£355	
Valuegraph 447V090 17" SVGA FST.....	£469	
Multigraph 447M090 17" FST Trinitron.....	£629	
Multigraph 447X092P 17" FST Trinitron.....	£769	
Multigraph 447M092PX 17" FST Trinitron.....	£685	
Multigraph 447X090 17" FST Trinitron.....	£829	



MONITORS Cont.

Multigraph 445M090 21" FST.....	£1,299
Multigraph 445M092P 21" FST TC.....	£1,449
Multigraph 445X092P 21" FST.....	£1,799



NEC *New NEC Multisync X Series - FullScan Flat Square Technology, Plug & Play & AccuColor Colour Control System.*

NEC Multisync XV14 14" 1024 x 768 N-I.....	£219
NEC Multisync XV15 15" 1024 x 768 80Hz.....	£285
NEC Multisync XV17 17" 1024 x 768 80Hz.....	£569
NEC Multisync XE15 15" 1024 x 768 80Hz.....	£405
NEC Multisync XE17 17" 1024 x 768 80Hz.....	£719
NEC Multisync XE21 21" 1152 x 1070 75Hz.....	£1,335
NEC Multisync XP17 17" 1280 x 1024 76Hz.....	£935
NEC Multisync XP21 21" 1600 x 1200 70Hz.....	£1,759

<i>Panasonic</i>	
15" Panasync (TX-T1562) 1024 x 768 NI.....	£279
17" Panasync (TX-D1732)	
1024 x 768 NI 1280 x 1024 Max.....	£449
17" Panasync (TX-D1751) 1280 x 1024 NI.....	£775
20" Panasync (TX-D2032) 1280 x 1024 NI.....	£1,119
21" Panasync (TX-D2131) 1280 x 1024 NI	
1600 x 1280.....	£1,349
<i>2 year On-Site Warranty on Panasonic Monitors</i>	

<i>Philips</i>	
14" Philips Mono Monitor 14M.....	£89
14" Philips Enhanced VGA Color Monitor 14C.....	£168
15" Philips Brilliance Autoscan Colour Monitor 15B.....	£254
15" Philips Brilliance Autoscan NI Colour Monitor 15A.....	£275
<i>(Built in Stereo for Multimedia Applications)</i>	
17" Philips Autoscan Colour Monitor 17C.....	£429
<i>(Built in Stereo for Multimedia Applications)</i>	
17" Philips Autoscan Colour Monitor 17B.....	£560
20" Philips Autoscan Colour Monitor 20C.....	£775
20" Philips Autoscan Colour Monitor 20T.....	£1,299
21" Philips Autoscan Colour Monitor 21B.....	£1,439
21" Philips Brilliance Autoscan - Colour Monitor with Cyberscreen Technology 21A.....	£1,749

<i>Sony</i>	
Sony 15" CPDSF1 1024 x 768 NI .25.....	£305
Sony 17" GDM-17SEI SVGA N-I.....	£809
Sony 20" GDM20 SEV 1280 x 1024 N-I.....	£1,315
Sony 20" GDM20 SE1 1280 x 1024 N-I.....	£1,395
Sony CSS-B100 Computer Speaker System.....	£75

<i>Taxan</i>	
14" Taxan Ergovision 400LR Interlaced.....	£185
14" Taxan Ergovision 410LR N-I.....	£195
14" Taxan Ergovision 420LR N-I.....	£235
15" Taxan Ergovision 580 LR 1024x768 N-I.....	£285
17" Taxan Ergovision 880 LR 1024x768 N-I.....	£505
17" Taxan Ergovision 885 LR 1280x1024 N-I.....	£625
17" Taxan Ergovision 895 LR 1280x1024 N-I.....	£819
20" Taxan Ergovision 1080 1280 x 1024 N-I.....	£910
21" Taxan Ergovision 2100 LR 1600 x 1200 N-I.....	£1,530

<i>Viewsonic</i>	
14" Viewsonic 6E 1024 x 768 N-I.....	£169
15" Viewsonic 15E5 1280 x 1024 NI.....	£239
17" Viewsonic 17-2 1280 x 1024 NI.....	£669
20" Viewsonic 20G 1600 x 1200 N-I.....	£989
21" Viewsonic 21 1600 x 1200 N-I.....	£1,339

<i>Accessories</i>	
Unversal Monitor Drawstring Dust Cover.....	£11
14" Anti Glare Screen Filter.....	£29



PRINTERS

<i>Hewlett Packard Deskjets</i>	
HP Deskjet 540 (upgradable to colour).....	£209
HP Deskjet 660C.....	£292
HP Deskjet 850C.....	£390
HP Deskjet 1200C.....	£629
HP Deskjet 1200C Postscript.....	£985
HP Deskjet 1600C.....	£833
HP Deskjet 1600CM.....	£1,219
HP Deskjet 320.....	£165
HP Deskjet 320 & Sheetfeeder.....	£180
HP Deskjet 320/540 Colour Kit.....	£28
<i>Laser Printer</i>	
HP Laserjet 5P.....	£578



PRINTERS Cont.

HP Laserjet 5MP.....	£275
HP Laserjet 4 Plus.....	£985
HP Laserjet 4M Plus.....	£1,298
HP Laserjet 4Si.....	£2,099
HP Laserjet 4Si MX.....	£2,965
HP Laserjet 4V A3 Laser Printer.....	£1,365
HP Laserjet 4MV A3 Postscript Laser Printer.....	£1,989
HP Colour Laserjet.....	£4,199

Paintjets

HP Paintjets XL300.....	£1,595
HP Paintjets XL300 Postscript.....	£2,575

Epson

Epson LX300 9 Pin Dot Matrix.....	£95
Epson LX1050 9 Pin Dot Matrix.....	£183
Epson FX870 9 Pin Dot Matrix.....	£245
Epson FX1170 9 Pin Dot Matrix.....	£305
Epson LQ150 Mono 24Pin Dot Matrix.....	£114
Epson LQ300 24 Pin Dot Matrix.....	£149
Epson LQ570+ 24 Pin Dot Matrix.....	£215
Epson LQ1070+ 24 Pin Dot Matrix.....	£299
Epson LQ870 24 Pin Dot Matrix.....	£376
Epson LQ1170 24 Pin Dot Matrix.....	£435
Epson Stylus Colour.....	£339
Epson Stylus 1000.....	£329
Epson Stylus Pro XL Colour A3 Oversize.....	£1,589
Epson SQ870 Ink Jet Printer.....	£449
Epson SQ1170 Ink Jet.....	£598
Epson EPL-3000 4PPM Laser Printer.....	£369
Epson EPL-5200+ 6PPM Laser Printer 600dpi.....	£479
Epson EPL-9000 8PPM A3 Laser Printer 600dpi.....	£1,195
Epson EPL-9000PS 8PPM A3 Postscript Laser 600dpi.....	£1,375

Canon

Canon BJ30 Mono Portable Printer.....	£152
Canon BJ200e Bubblejet Printer.....	£170
Canon BJC70 Colour Portable Printer.....	£221
Canon BJC230 Printer.....	£239
Canon BJ300 80 Column Bubblejet.....	£355
Canon BJC30 136 Column Bubblejet.....	£389
Canon BJC4000 Colour.....	£231
Canon BJC600e Colour Inkjet.....	£334
Canon BJC800 Colour Bubblejet.....	£1,065

Brother

Brother HL-630 6PPM Windows Printer.....	£319
Brother HL-631 6PPM (1Mb) Windows Printer.....	£359
Brother HL-660 600dpi Windows 6PPM Laser.....	£460
Brother HL1260 1200dpi 12PPM B&W Laser.....	£899

Mitsubishi

Personal Mitsubishi Colour Printer (PCP)	
£459	
Mitsubishi CP-J10 Inkjet Printer.....	£225
Mitsubishi DiamondScript 210 Colour Printer.....	£1,890
Mitsubishi Colour Sublimation Printer S3410-30.....	£3,699
Mitsubishi Colour Thermal Transfer Printer G6710-10.....	£4,099
Mitsubishi Colour Sublimation Printer S3600-30.....	£4,699
Mitsubishi DiamondScript 230 Colour Printer.....	£5,350
Mitsubishi A3 Colour Sublimation Printer S6600-30.....	£9,299

NEC

NEC Superscript 610 Plus 6PPM Laser.....	£294
NEC Superscript 660 6PPM Laser.....	£405
NEC Superscript 660i 6PPM Laser.....	£555
NEC Superscript Colour 3000 1PPM Laser.....	£668

OKI

OKI OL400ex 4PPM Laser Printer.....	£279
OKI OL410ex 4PPM 600dpi Laser Printer.....	£382
OKI OL810ex 600dpi Laser Printer.....	£669
OKI OKIJET300C 300dpi Inkjet Printer.....	£239

Olivetti

Olivetti JP360C Inkjet (Upgradeable to Colour).....	£199
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Star

Star Wintype 4000 Laser Printer.....	£295
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Panasonic Dot Matrix

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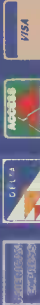
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GTX6500 parallel	£385
GTX6500 SCSI	£463
GTX8500 parallel <i>NEW!</i>	£496
GTX8500 SCSI <i>NEW!</i>	£572
GTX9000 parallel	£602
GTX9000 SCSI	£672
GTi8500 SCSI <i>NEW!</i>	£748
GTi9000 SCSI	£855



All the above bundles include the necessary interface and cables. GTX models include Omnipage Direct, Adobe Photoshop LE and PK Portfolio software. GTi models include full version of Adobe Photoshop software.

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Desktop sheetfed A4 colour scanning at **ONLY - £179**



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Available now this is the recently upgraded version of the popular HP Ilicx delivering the performance you need from the name you can trust. The major improvement is an optical scan resolution increased to 600 dpi producing up to 2400 dpi enhanced resolution. Call now!



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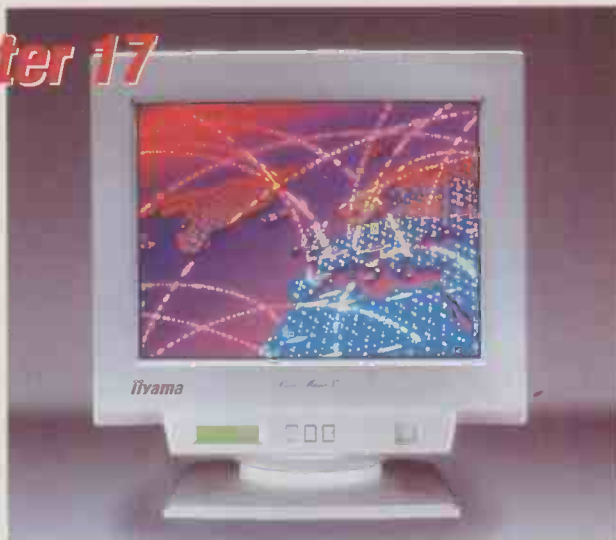
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CM2096		£873
CM2098M		£1,077
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CM2199MET		£1,815

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CPD-17SF1		£585
GDM-17SE1		£819
GDM-20SE1VT		£1,277
GDM-20SE1T		£1,426

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MF-8617A		£536
MF-8221		£1,247
MF-8621		£1,645
MT-9121 Diatron		£1,293

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DiamondPro 17TX		£728
DiamondPro 20X		£947
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hard disk drive:	420Mb
disk controller:	motherboard IDE Mode 3 & 4
printer port:	advanced parallel
graphics card:	2Mb S3
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expansion slots:	2 dedicated PCI, 4 dedicated ISA, 1 for ISA or PCI
case:	mini tower or desktop
keyboard:	102 AT style
mouse:	3 button Microsoft compatible
software:	MS-DOS 6.2, Windows 3.11
monitor:	Sony CPD 15SF1

Pentium 75 £1,928
Pentium 90 £2,018

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The first notebook PC with a 100MHz Pentium processor!

Specification

- Intel Pentium 100MHz CPU
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Windows '95

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HP Surestore JS2000 2Gb Internal	£629
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HP Surestore JS6000 8-16 Gb Internal	£885
HP Surestore External Kit	£95

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4mm - EXB-4200C 2-4Gb Internal	£549
4mm - EXB-4200E 2-4Gb External	£649
8mm - EXB-8205 2.5Gb Internal	£879
8mm - EXB-8505 5Gb Internal	£1,499
8mm - External Kit	£95

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Kingston

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ST9385AG 341Mb	16ms	64k	£220
ST9550AG 455Mb	16ms	64k	£299

Quantum

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COREL SOFTWARE

Corel SCSI Version 2	£67
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AC6350 630Mb	12ms	128k	£155
AC2850 850Mb	10ms	128k	£163
AC31200 1.0Gb	10ms	128k	£229
AC31000 1.2Gb	10ms	128k	£239
AC31600 1.6Gb	10ms	128k	£399

Seagate IDE

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ST5850A 850Mb	12ms	256k	£155
ST31220A 1Gb	12ms	256k	£209

Quantum IDE

Trailblazer 420Mb	14ms	128k	£103
Fireball 540Mb	12ms	256k	£129
Maverick 540Mb	12ms	256k	£115
Lightning 540Mb	11ms	256k	£145
Lightning 730Mb	11ms	256k	£154
Trailblazer 850Mb	14ms	256k	£164
Fireball 1.0Gb	12ms	256k	£229

Conner IDE

CFS420A 420Mb	13ms	33k	£104
CFS450A 540Mb	15ms	256k	£112
CFA850A 850Mb	12ms	256k	£175
CF A1275S 1.2Gb	14ms	64k	£229
CF A1275A 1.2Gb	12ms	256k	£289

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7540A 540Mb	12ms	256k	£117
7850A 850Mb	11ms	64k	£159
71050A 1.0Mb	12ms	256k	£189
71260A 1.2Mb	12ms	256k	£243

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ST31250N 1.0Gb Barracuda	8ms	1Mb	£545
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UK Flex Special Offer

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ST15150N 4.0Gb Barracuda	8ms	1Mb	£1,149
ST410800N 9.0Gb Elite	9ms	1Mb	£1,799

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What is Fast Wide SCSI ?

FastWide SCSI enables you to connect up to ten devices to your SCSI chain as opposed to seven. It also offers data throughput rates of up to 20Mb/sec.



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ST32430W 2.0Gb Hawk	9ms	512k	£749
ST32550W 2.1Gb Barracuda	9ms	512k	£799
ST15320W 4.0Gb Hawk	9ms	512k	£999
ST15150W 4.0Gb Barracuda	8ms	512k	£1,249
ST410800W 9.0Gb Elite	11ms	1024k	£2,199

Quantum SCSI

Trailblazer 420Mb	14ms	128k	£133
Fireball 540Mb	12ms	256k	£155
Maverick 540Mb	10ms	128k	£147
Lightning 540Mb	12ms	128k	£159
Lightning 730Mb	12ms	128k	£173
Trailblazer 850Mb	13ms	256k	£183
Fireball 1.0 Gb Mb	12ms	256k	£369
Atlas 2.1Gb	8ms	1Mb	£649
Atlas 4.3Gb	8ms	1Mb	£929
Grand Prix 4.3Gb	8ms	512k	£899

Micropolis Fast SCSI 2

M3221 2.0Gb Fast SCSI 2	9ms	512k	£599
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M3243 4.2Gb Fast SCSI 2	9ms	512k	£889
M3243 4.2Gb AVFast SCSI 2	8.5ms	512k	£989
M1991 9.0Gb Fast SCSI 2	9ms	512k	£1,529
M1991 9.0Gb AVFast SCSI 2	8.5ms	512k	£1,549

Fujitsu SCSI

M16065 1.0Gb	9ms	256k	£320
M29035 2.0Gb	9ms	512k	£669
M29095 3.0Gb	9ms	512k	£865
M29155 2.0Gb AV	9ms	512k	£865

Conner Fast SCSI 2

CFA540S 540Mb	12ms	256k	£209
CFP1060S 1.0Gb	11ms	256k	£385
CFP2105S 2.0Gb	8ms	512k	£680
CFP4207S 4.0Gb	9ms	512k	£1,265

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500A Seagate 540Mb IDE in ext. enclosure & in-built Parallel Port device	£259
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- Totally portable
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CD-ROM & Optic Storage

CD 200A Dual speed CD-ROM in ext. enclosure with Parallel Port device	£209
CD 400A Quad speed CD-ROM in ext. enclosure with Parallel Port device	£589

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IDE 2FDD/2HDD	£9
IDE 2FDD/2HDD 2S, 1P, 1G	£12

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IDE 2HDD/2FDD 2S, 1P, 1G	£17
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KT946 PCI SCSI 2 Full Kit	£224
BT640A MCA 32Bit SCSI	£239
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1544 ISA Full Kit	£169
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TM 3260 PCI SCSI Kit	£129

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PM 202195 ISA with floppy	£169
PM 202295 EISA with floppy	£259
PM 212295 EISA Wide SCSI without floppy	£389
PM 202490 PCI without floppy	£219
PM 212490 PCI High performance without floppy	£329
PM 212490 PCI Wide without floppy	£383
CM 4000 Caching module with 0 RAM	£309
CM 4004 Caching module with 4Mb RAM	£549
SM 4000A 4Mb Slimm for CM4000	£299
SM 400016 16Mb Slimm for CM4000	£1,359
DM 4000 Disk Array Module	£319

DPT SmartRaid SCSI Controllers

PM 322290 EISA SCSI Controller	£989
PM 322490W EISA Wide SCSI Controller	£1,099
PM 322490 PCI SCSI Controller	£989
PM 322490W EISA SCSI Controller	£1,099

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- 128K cache memory
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- 540Mb hard disk
- VESA-LB IDE controller
- 2 serial ports, 1 parallel port
- 3 VESA-LB, 4 16-bit ISA slots
- C&T VESA-LB SVGA graphics card (1Mb RAM)
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- 102-key keyboard, mouse
- MS-DOS 6.22, Windows 3.11
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 102-key keyboard, mouse
 MS-DOS 6.22, Windows 3.11 for Workgroups
 USR Sportster V32b internal modem
 Full-tower case



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Interest-free credit (incl. VAT): 368.95 down, 12 months x £276.71
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 PCMCIA USR V32b modem
 AC/DC mains adaptor, car adaptor
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 Toshiba quad speed IDE CD-ROM drive
 S3 864 PCI local bus graphics card (1Mb RAM, upgradable to 2Mb)
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 102-key keyboard, mouse
 MS-DOS 6.22, Windows 3.11 for Workgroups
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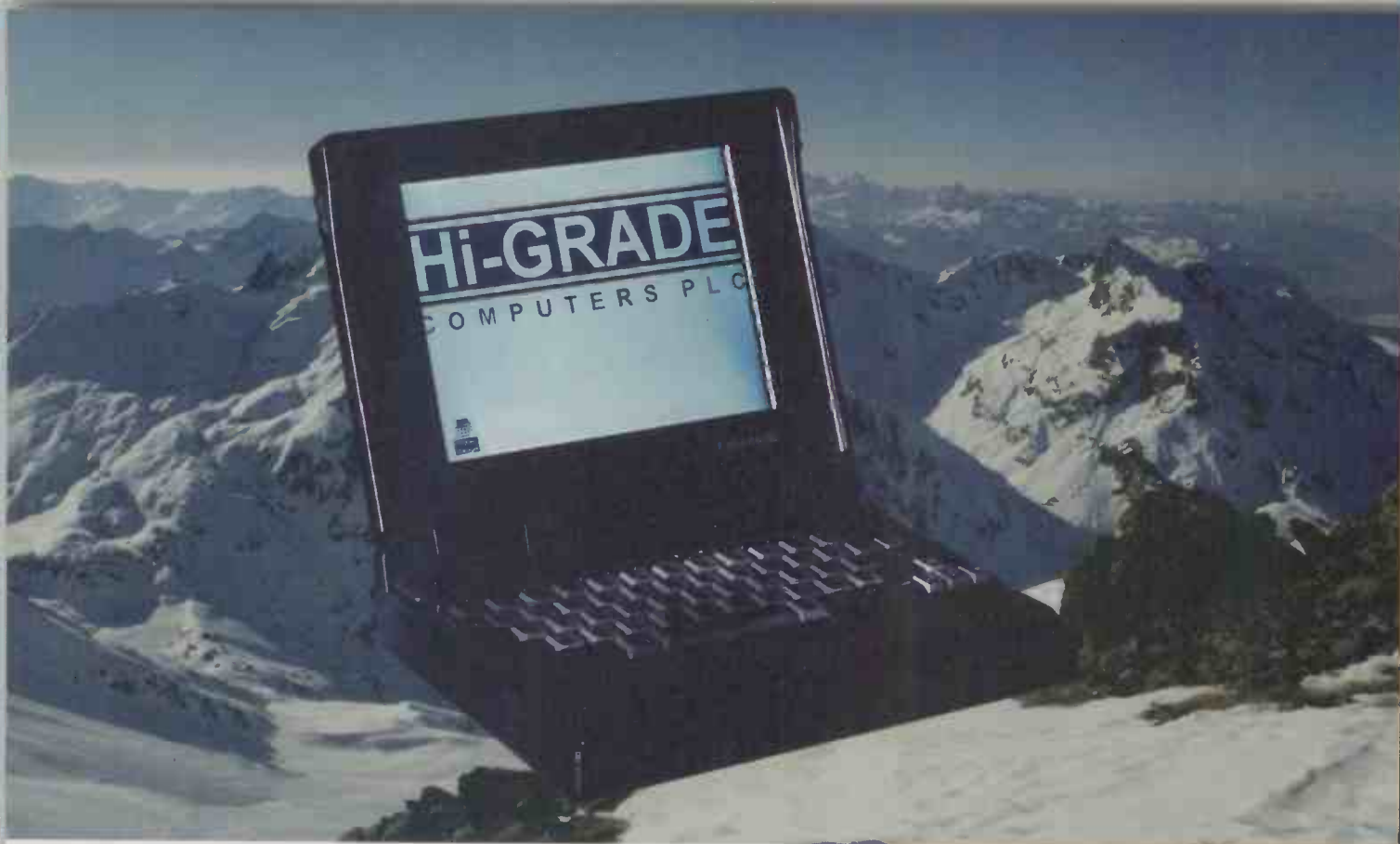
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VESA-LB SVGA card (1Mb RAM)
2 Ni-MH batteries
3.5" 1.44Mb floppy disk drive
340Mb removable hard disk, expandable to 800Mb
1 serial port, 1 parallel port
MS-DOS 6.22, Windows 3.11
Trackball (centre front position)
PCMCIA type IV slot
Sound card
Built-in speaker and microphone
£1,750 (plus VAT)

Finance is available subject to status. Written quotations will be sent on request. Hi-Grade is a licensed credit broker.

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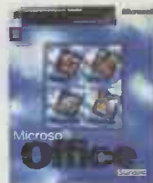


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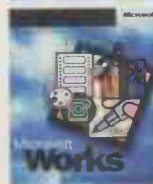
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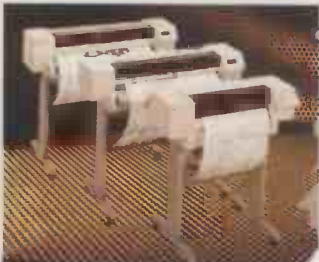
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KX-P3626	£252

Plotters

HEWLETT PACKARD



DesignJet 230 A4-A1 *	£1387
DesignJet 230 A4-A0 *	£1909
DesignJet 250C A4-A1 *	£1738
DesignJet 250C A4-A0 *	£2387
DesignJet 230/250 legs only A1	£195
DesignJet 230/250 legs & bin A0	£219
DesignJet 600 A4-A1 *	£2765
DesignJet 600 A4-A0 *	£3295
DesignJet 650C A4-A1 *	£3765
DesignJet 650C A4-A0 *	£4456
3 Years On-site Maintenance	£295

Cables

PARALLEL TO PRINTER

1.8 M Printer Cable	£4
3 M Printer Cable	£6
5 M Printer Cable	£10
10 M Printer Cable	£15

M - M CENTRONICS

2 Metre M-M	£5
3 Metre M-M	£8
5 Metre M-M	£10
10 Metre M-M	£15
2 Way Manual switch Box	£17

Inkjet Printers

CANON	
BJ30	£149
BJ70 Colour	£221
BJ200ex	£171
BJ230	£236



BJC4000 Colour	
BJC600e	£334
BJ300	£358
BJ330	£395
BJC800	£1079
BJC820	£1225

EPSON	
Stylus 800+	£177
Stylus 1000	£328
Stylus Colour 720dpi	£337
Stylus Colour 720 dpi Paper	£Call
Stylus Colour XL <i>New!</i>	£1389

HEWLETT PACKARD	
DeskJet 320	£163
DeskJet 320+SheetFeed	£176
DeskJet 320/540 Colour Kit	£28
DeskJet 320 Battery Pack	£27



DeskJet 540	£219
DeskJet 660C	£289
DeskJet 850C	£385
DeskJet 1600C	£822
DeskJet 1600PS	£1225

HP for APPLE MAC	
DeskWriter 320	£169
DeskWriter 320+SheetFeed	£182
DeskWriter 540	£212
DeskWriter 660C	£297
DeskJet 850C	£385

No of * = No of years On-Site Maint.

Laser Printers

BROTHER	
HL630	£317
HL631	£349
HL660	£459
HL1260	£919

CANON	
LBP430W <i>New!</i>	£359
LBP1260	£893

EPSON	
EPL5200+ <i>New!</i>	£462
EPL9000 12ppm A3	£1179

HEWLETT PACKARD

LaserJet 4L	£349
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LaserJet 5P	£584
LaserJet 5MP	£725
LaserJet 4+	£977
LaserJet 4M+ Pscript	£1294
LaserJet 4V A3	£1364
LaserJet 4MV Pscript A3	£1967
LaserJet 4Si	£2054
LaserJet 4Si MX	£2927
LaserJet Colour	£4197

NEC	
SuperScript 610 Plus	£289
SuperScript 660	£416
SuperScript 660i	£569
SuperScript Color 3000	£669

PANASONIC	
KX-P6100	£266
KX-P4430	£389
KX-P4440	£699

QMS Fast Postscript	
PS1060 A4 600x600 12Mb	£1576
PS1660 A3 1200x600 12Mb	£2891

STAR	
Wintype 4000	£288

No of * = No of years On-Site Maint.

Printer Ribbons

AMSTRAD	
DMP2000/3000/3160	2+ 12+ RN 1.80 1.70
PCW9512	MS 2.30 1.99

EPSON	
LQ100,LQ150 Original	DN 5.25 4.95
LQ300/570/850/870	DN 3.05 2.75
LQ1070/1170	DN 3.50 3.10
LX300/400/850	FN 2.85 2.55
LX1050,FX1170	FN 3.10 2.75

PANASONIC	
KXP1123/1124	RD 2.30 2.20
2123/2124 BLACK	RD 3.95 3.70
2123/2124 COL	RD 7.95 7.50

STAR	
LC10/100	FN 1.60 1.40
LC24-1/2/300,XB24	DN 2.30 2.10

Ink Cartridges

CANON	
BJ10E,BJ20	1+ 6+ 14.75 13.95
BJ200/BJ230	16.95 15.45
BJ300/BJ330	13.00 12.00
BJC600 Black Long Life	9.00 8.00
BJC600 Colours	8.00 7.00
BJC4000 BC21 Black	8.00 7.00
BJC4000 BC21 Colour	14.00 13.00
BJC4000 BC20 Black	23.00 21.00

EPSON	
Stylus 400,800,1000	10.00 9.00
Stylus 800,1000 Long Life	19.00 17.00
Stylus Colour Black	12.00 11.00
Stylus Colour	29.00 27.00

HEWLETT PACKARD	
DeskJet 310,320	16.75 15.95
DeskJet 500,520,540,560	19.75 18.95
DeskJet Colour	21.00 19.00
DeskJet 1200 Black	19.00 18.00

Laser Toner

HEWLETT PACKARD	
LaserJet IIP,IIIP	1+ 3+ 48.00 46.00
LaserJet II,III,IIID	49.00 47.00
LaserJet 4L,4ML,4P	46.00 44.00
LaserJet 4,4M,4+	71.00 69.00
LaserJet 4V,4MV	91.00 89.00

NEC	
SuperScript 610,660	78.00 76.00

STAR	
Laser 5 All Models	67.00 65.00
WinType 4000	68.00 62.00

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GS1455D 14" 800x600	£137
GS1466DM 14" 1024x768 NI LR	£168
GS1505DM 15" 1024x768 NI LR	£195
GS1520DM 15" 1024x768 NI LR	£229
GS1727DM 17" 1024x768 NI LR	£455

NEC

Value Series

XV15 15" 1024x768 NI LR	£279
XV17 17" 1024x768 NI LR	£559

Efficiency Series

XE15 15" 1024x768 NI LR	£389
XE17 17" 1024x768 NI LR	£697
XE21 21" 1152x870 NI LR	£1329

Professional Series

XP17 17" 1152x870 NI LR	£909
XP21 21" 1360x1024 NI LR	£1749

PHILIPS

14M 14" VGA Mono LR	£89
14C 14" 1024x768 I LR	£163
14B 14" 1024x768 NI LR	£179
15B 15" 1024x768 NI LR Stereo	£254
17C 17" 1024x768 NI LR Stereo	£423
17T 17" 1280x1024 Trinitron	£546
20C 20" 1280x1024 NI LR	£779

SONY



CPD-15SF1 1024x768 NI LR	£305
CPD-17SF1 1024x768 NI LR	£636
GDM 17SE1 1280x1024 NI LR	£811
GDM 20SE1 1280x1024 NI LR	£1403

Keyboards

Silitek 102 Key Tactile	£17
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MS Natural Keyboard £59

Scanners

AGFA

StudioScan	£538
Arcus II	£2128

EPSON Colour Scanners

GT300 LapCAT for PC New!	£292
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Price includes interface cables & Xerox Desktop Document Management Suite



Scanner Packages

Includes all interfaces, cables & software required +

GTX includes:

● Adobe Photoshop LE	
● Omni Page Direct OCR	
GTX8500 Parallel	£495
GTX8500 SCSI	£572
GTX9000 Parallel	£602
GTX9000 SCSI	£672

GTI package includes:

● Adobe Photoshop full version	
GTI8500 SCSI	£748
GTI9000 SCSI	£855

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ScanJet 3P	£229
ScanJet 3C	£609

Please specify interface - PC, MCA, or MAC

LOGITECH

ScanMan 32 for Dos + OCR	£56
ScanMan 32 for Wind OCR	£56
ScanMan 256 PC	£78
ScanMan EasyTouch	£106



ScanMan COLOUR £169
PowerPage £299

PLUSTEK

ScanPlus 6000 Colour	£179
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A4 Sheet fed Includes Pict Pub LE + WordScan OCR

Modems

MOTOROLA **New!**

New 28.8 Modem on its own or complete with Internet pack	
3400 Pro PC	£154
3400 Pro Online Internet Pack	£168

PACE

	Internal	External
Microlin FX32+	£136	£149
Microlin FX34	£229	£229
Microlin FX32+ PCMCIA		£189
Microlin FX34 PCMCIA		£259
Mobifax 32+ 14.4 + Fax		£92
Linnet Message Centre		£228

US ROBOTICS



Sportster 28.8+fax	£156
Sportster 14.4+fax	£105
Sportster 14.4+fax Internal	£107
Sportster 28.8+fax Internal	£159
Worldport 14.4 +CellPhone	£121
Worldport PCMCIA V34	£159
Courier v34 External	£239
Courier v34 Internal	£239

ZOOM

14.4 Internal	£85
14.4 External	£92
28.8 Internal	£139
28.8 External	£158

Modem Cable 9 or 25 pin £9

APPROVED connection to telecommunication services specified in the instructions is subject to the conditions of use in them.

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SAMSUNG

SF40	*	£159
SF500	*	£182
SF800	*	£246
SF1505	*	£229
SF2800 New!	*	£292

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CFS420A	420Mb	13ms	£92
CFS540A	540Mb	15ms	£109
CFA850A	850Mb	12ms	£165
CFA1275A	1.2Gb	12ms	£279

QUANTUM IDE

MV540AT	540Mb	14ms	£132
LT730AT	730Mb	11ms	£172

SEAGATE IDE



ST3491A	428Mb	15ms	£99
ST3660A	545Mb	14ms	£109
ST5850A	850Mb	11ms	£159
ST31220A	1Gb	12ms	£194

WESTERN DIGITAL IDE

AC-2540	540Mb	11ms	£129
AC-2850	850Mb	12ms	£147
AC-31200	1.2Gb	10ms	£219

Other Drives

5.25" 1.2Mb	£33
3.5" 1.44Mb	£18

Interface Cards

CONTROLLER CARDS

IDE 2Hdd 2Fdd 1Parr 2 Ser 1Game	£14
IDE 4Hdd 2Fdd 1P/1G/2 16550 Serial	Mode 3+4 VL Bus £22
Promise	
DC2300 VL IDE 1P/1G/2 16550 Ser	£39
DC200 ISA IDE Cache	£69
DC4030 VL IDE Cache	£79
DC5030 PCI IDE Cache	£105

ADAPTEC SCSI Controllers

1522 Hdd/Fdd	£95
1542C kit ISA Hdd/Fdd	£159
1640kit PS/2 MCA Hdd/Fdd	£189
2742kit EISA Hdd/Fdd	£259
2842kit VL Bus Hdd/Fdd	£165
2940kit PCI Hdd	£189
T460kit PCMCIA fast SCSI2	£179

Soundcards

CREATIVE LABS



Sound Blaster 16 Value	£64
Sound Blaster 16 Value IDE	£64
Sound Blaster 16 Pro IDE	£85
Sound Blaster AWE32 Value	£122
Sound Blaster AWE32 MCD	£163
Sound Blaster AWE32 IDE	£175

ORCHID

Soundrive 16	£59
GameWave 32 +	£93
SoundWave 32 Pro	£131
SoundWave 32 Pro SCSI 2	£143

ZIFI SPEAKERS

Zi-Fi Speakers	£25
Zi-Fi Pro Speakers	£39

Graphics Cards

CLICK

Cirrus 5422 16.7m Col 1Mb ISA	£49
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DIAMOND

Stealth 64 1Mb Dram	£87
Stealth 64 2Mb Dram	£125
Stealth 64 2Mb Vram	£217
Stealth 64 4Mb Vram	£309

Please specify VLB or PCI

ORCHID

Fahrenheit VA ISA	£69
Fahrenheit 64 1Mb	£114
Fahrenheit 64 2Mb	£155
Fahrenheit Pro 64 2Mb VLB	£219
Fahrenheit Pro 64 4Mb VLB	£345



Kelvin 64 1Mb	£92
Kelvin 64 2Mb	£122

Please specify ISA, VLB, or PCI

CD Kits

CREATIVE LABS

Sound Blaster16 Cracker Pack	£139
16 Bit Stereo Sound Card	
Panasonic CR563 Dual Speed CD Rom	
Aldus Photostyler SE	
Grolier Encyclopaedia	
Battery Powered Speakers	

MultiMedia Home CD4x

£282	
16 Bit SoundBlaster Card with AdSP	
Nec Quad Speed IDE CD Rom	
StereoSpeakers	
Microsoft Publisher 2 with Design Pack	
Microsoft Works, Encarta 95,	
MS Cinemania 95, Bookshelf 94	
Ancient Lands, Golf, Dangerous Creats	
MS Musical Instruments, Undersea	
Pagan Ultima 8, Wing Commander 2	
Syndicate Plus, Strike Commander	

CD Drives

CREATIVE LABS

563 MultiMedia Upgrade	£92
Includes Grolier Ency + PhotoStyler	

GOLDSTAR

GCDR520D Dual Speed IDE	£69
GCDR540D Quad Speed IDE	£103

Price Includes Interface, Cable & Driver

PANASONIC Multi-SessionCD

CR562 Bare Drive	£68
Interface Kit inc Cables	£8
CR584 Quad Speed IDE	£119
CR504 Quad Speed SCSI	£129

PLEXTOR

Quad Speed	£245
Six Speed	£365

TOSHIBA

XM3601B int Quad speed	£229
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Joysticks

CH

Flight Stick	£27
Flight Stick Pro	£49
Virtual Pilot Yoke	£63
Multi I/O with Game Port	£14

Network cards

3COM Etherlink III3C509B

Connection	Bus	1 Pack	5 Pack
BNC	ISA	£66	£293
RJ45	ISA	£65	£276
BNC & RJ45	ISA	£75	£325

Memory

30 Pin

1Mb 70ns 3 Chip	£27
4Mb 70ns	£99

72 Pin Non Parity

1x32 4Mb 70ns	£95
2x32 8Mb 70ns	£199
4x32 16Mb 70ns	£319
8x32 32Mb 70ns	£625

72 Pin Parity

1x36 4Mb 70ns	£109
2x36 8Mb 70ns	£217
4x36 16Mb 70ns	£359
8x36 32Mb 70ns	£689

OverDrives

DX4 OverDrive

25Mhz to 75Mhz	£109
33Mhz to 100Mhz	£159

Pentium OverDrive

to fit 486 25Mhz	£239
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Tape Streamers

COLORADO

DJ-35 350Mb Internal	£86
DJ-25 700Mb Internal	£128
DJ-50 1.4Gb Internal	£189
FC-20 Tape Controller	£48
Trakker 350Mb External	£159
Trakker 700Mb External	£238
250 Mb Tapes	£12
350 Mb Tapes	£18
700 Mb Tapes	£22

Please Call for Quantity Tape Prices

Mice

LOGITECH

Pilot Serial Mouse	£17
Mouseman Combo	£33
Mouseman Cordless	£49
Trackman II	£43
Trackman Portable	£35

MICROSOFT

Mouse 2 Serial & PS/2 Intellipoint	£35
Home Mouse	£29

Keyboards

Silitek 102 Key Tactile	£17
MS Natural Keyboard	£59



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Aldus Page Maker 5	£389
Aldus Photostyler v1.1	£386

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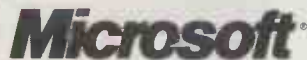
dBase 5 Windows	£228
dBase 5 Windows Version Upg	£89
dBase 5 Dos	£327
dBase 5 Dos Ver Upg	£89
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Turbo C++ v3 Dos	£55
Turbo C++ v3 Windows	£81
Paradox v5 for Win Upgrade	£117
Pascal v7 Dos	£78
Pascal for Windows	£94



Corel Draw 3 CD Only	£45
Corel Draw 4 CD Only	£86
Corel Draw 5 CD Only	£287
Corel Draw 3 - 5 Upg CD Only	£208
Corel Draw 4 - 5 Upg CD Only	£116
Corel Ventura 5 CD Only New!	£195
Corel Ventura 5 Upgrade CD Only	£66
Corel Gallery 2	£51
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Quicken Deluxe Home Pack 4	£46
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Quicken for Windows 4.0 New!	£29
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Access v2.0 CCP Upgrade	£84
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Fine Artist	£34
Creative Writer	£34
Excel 5	£228
Excel 5 CCP Upgrade	£86
Foxpro v2.6 Std. Dos or Win	£72
Foxpro v2.6 Prof. Dos or Win	£288
Money 3	£32
Project 4	£293
Publisher 2	£63
Office 4.2	£334
Office 4.2 CCP Upgrade	£162
Office v4.2 Trade In	£205
Office Professional v 4.3	£429
Office Prof v4.3 CCP Upgrade	£253
Office Prof v4.3 Tradeln	£277
Word for Windows 6	£228
Word for Windows 6 CCP Upg	£86
Works for Windows v3	£82

Languages

Visual C++ Standard	£53
Visual Basic Standard	£84
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Windows 3.x to Windows 95 3.5"	£65
Windows 3.x to Windows 95 CD	£65
MS-DOS to Windows 95	£109
MS Plus! for Windows 95	£39

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Office 95 std version upg	£139
Office 95 std comp upgrade	£164
Office 95 Pro 3.5" or CD	£432
Office 95 Pro version upg	£205
Office 95 Pro comp upgrade	£246
Word 95	£229
Word 95 version upgrade	£82
Word 95 comp upgrade	£106
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Excel 95 version upgrade	£82
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Ami Pro v3.1	£82
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Netware v3.12 25 User	£1351
Netware v4.1 5 User CD	£424
Netware v4.1 10 User CD	£973
Netware v4.1 25 User CD	£1436
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WordPerfect for Windows 6.1	£165
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Accountant	£160
Accountant Plus	£242
Financial Controller	£319
Financial Controller LAN	£506
Payroll II	£129

STERLING + 2 for Windows



Accountant +2	£190
Accountant Plus +2	£272
Financial Controller + 2	£354
Financial Controller + 2 LAN	£549
Payroll for Windows	£129
Instant Accounting for Windows	£79
Instant Payroll for Windows	£69



Utilities

Central Point PC Tools Win v2	£47
Dr Solomons Anti Virus Dos	£58
Dr Solomons Anti Virus Windows	£70
Laplink Pro v 5 Dos	£59
Laplink Pro v 5 Windows	£84
Norton Utilities v8	£87
PC Anywhere v5 DOS (host+Rem)	£92
PC Anywhere Windows	£92
QuarterDeck CleanSweep	£27
QuarterDeck Qemm v7.5	£45

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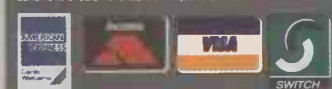
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- 1Mb PCI Video Card
- Cherry Keyboard
- 12 Month on site warranty



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Double speed CD ROM, Soundblaster 16bit comptable Soundcard, 25 watt speakers and software bundle on 10 CD's

OTHER CONFIGURATIONS AVAILABLE PLEASE CALL!!!



Modems

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9600 Fax 2400 modem	£69
14.4 Modem 9600 Fax Int	£99
28.8 Fax Modem	£139
Datalfax:	
Gem/fax Int. V22.bis	£54
Gem/fax Pocket V22.bis	£58
Gem/fax PCMCIA	£149
Hypergem:	
New desktop V34	£POA
New Portable V34	£POA
New Internal V34	£POA
Hayes:	
Optima 14.4 + fax	£249
Optima 28.8 VFC + Fax	£399
Ultra 96	£395
Ultra 14.4	£467
Pace	
Microlin FX 32+ (Int)	£136
Microlin FX 32+ (Ext)	£149
Microlin FX 34 (Int)	£229
Microlin FX 34 (Ext)	£229
Mobi Fax 32+ 14.4	£92
Linnet Message Centre	£218
PCMCIA Version	
Microlin FX +NB32+	£189
NEW Microlin FX NB 34	£POA
US Robotics:	
Courier DS V.34 (Ext)	£255
Courier DS V.34 (Int)	£255
W/Port DS Cell PCMCIA	£194
W/Port DS Cell Portable	£169
W/Port 2496 PCMCIA	£129
Sportster Int. 14.4 Fax	£109
Sportster Ext. 14.4 Fax	£109
Sportster Ext. 14.4 Mac	£139
Sportster 28.8 V34 Ext	£169
Sportster 28.8 V34 Int	£169
Ethernet Faxserver single port	£999
Ethernet Faxserver Dual port	£1099
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Andest MSL 1100	£85
Andest MSL 3300	£99
Andest MSL 3300M	£119
Andest MSL 7700	£139
PCMCIA	
IBM Fax Modem Quad speed	£129
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Dacom Goldcard V32bis+FX	£189
Dacom Goldcard V34bis+FX	£269
Modem Accessories	
9 to 25 Pin Cable	£9
25 to 25 Pin Cable	£9
Multi I/O High speed 16550	£29

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Cases with PSU

Mini Tower with LED	£30
Desk Top with LED	£32
Full Tower	£65
Deluxe Desktop Case TUV	£49
Desktop Multi-Media	£99
Slimline Case	£49
Deluxe Mini-Tower Case TUV	£49
Replacement PSU's	
Desktop/Minitower 200w PSU	£29
Full Tower 230w PSU	£44
300 watt PSU	£49
Diamond Series	
Desktop	£59
Mini Tower	£59
Power Cable	£5



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Keyboard

102 key standard	£10
Cherry Membrane (OEM)	£19
Cherry G80-3000 Click	£33
Cherry G80-3000 soft	£31
P52 Keyboard adapter	£5
Keyboard Extension cable	£9
Notebook keyboard	£64
Cherry G84-4100	
Trackball Notebook keyboard	£199



Speakers

25 Watt Active speakers	£19
80 Watt Active speakers	£39
Trust Dynamic	
Soundwave 40 (15 watt)	£25
Trust Dynamic	
Soundwave 30 (25 watt)	£35
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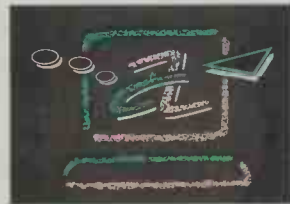
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PCMCIA - Your Questions Answered

What are PCMCIA Cards?

Also called PC Cards, they are the size of a credit card. PC Cards enhance your computers capabilities. All PC Cards conform to the PCMCIA standard making it possible in theory to swap from one machine to another. In practice, as with any other evolving standard, there are some compatibility issues.

What is Type I, II and III?

There are three types of PC Card with varying thicknesses, which determines its peripheral function.

Type I Cards - (3.5mm thick) are used for memory expansion (DRAM) to give your notebook extra memory to run programs. SRAM or Flash Cards give you additional data storage. These work in the same way as floppy disks.

Type II Cards - (5mm thick) are the most versatile. Generally used for products such as modems, network connections, sound cards and SCSI connections for CD ROM and Multimedia.

Type III Cards - (10mm thick) are the newest introduction to the PC Card technology. The extra thickness of this card allows it to have rotating parts, and are thus used for mini hard disks.

What are Card and Socket Services?

In the same way that attaching a network card or another peripheral to your PC requires software to operate the device, Card and Socket Services are the software drivers which control the PC Cards. There are three main vendors of this software: Phoenix, Systemssoft and Award. This software allows you to configure your card to suit your machine and system setup.

My PCMCIA Modem can be installed without Card and Socket services, I thought I always needed Card and Socket Services?

Some PC cards have software direct enablers which mean they do not need Card and Socket Services. This makes installation even easier and also saves on system memory.

Can I use my PC Card on my PC?

Simply add a PCMCIA slot to your PC with a card reader, either internally through an Interface adaptor or externally through the parallel port. The slots act as additional drives, so you can copy and fax to your PC Card. To run Type II products through your PC you need an Internal PCMCIA reader.

How do I link my mobile system to a CD ROM using my PCMCIA slot?

Use a PCMCIA SCSI card link to a CD ROM drive or other SCSI devices such as scanners, cameras and multimedia products.

What is the difference between SRAM and Silicon disk?

SRAM cards are battery backed storage cards with a battery life of over 2 years. Silicon disks have no battery and operate like mini hard disks.

I have heard people mention 32 bit bus cards & Berlin. What's it all about?

The PCMCIA committee will soon issue the next release of specifications (Version 3, code-named BERLIN and now called the PC Card standard) and this will bring with it several new and exciting features. The most important of these are 32 bit card bus capabilities and dual function cards. Basically 32 bit will give faster throughput than the current cards which are 16 bit. As is implied, dual function cards will be able to perform more than one task.

I'm very confused about the whole issue of PCMCIA cards, Socket Services, enablers, SRAM, Flash. What happens if I need help? Simply ring and speak with our Technical support department, who will be able to give both Pre & Post sales advice and support. And don't forget we guarantee that all the PC Cards listed and sold by Pico Direct will work with the appropriate card slot.



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170	i486 DX4/75	170MB	8MB	8.5 DSTN	£1769
260	i486 DX4/75	260MB	8MB	8.5 DSTN	£1879



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- No external power required for operation
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- Hot swap card insertion and removal
- Software configurable
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- Automatic polarity detection and correction for UTP cable
- 1 Year warranty

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IBM/PICO TOKEN- RING I/O CARD

Provides attachment to Token-Ring LANs operating at either 16Mbps or 4Mbps.

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- Operates with DOS 5.0, PC LAN Program (PCLP) v.1.34 and Novell Netware v.3.11.
- Driver support includes NDIS and ODI.
- Complies with IEEE 802.5 and 802.2.

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IBM/PICO RS-232 SERIAL CARD

Complete RS-232 connectivity in the hands of mobile business professionals. The card allows quick and easy expansion to add peripherals like modems, serial printers, scanners and mouse devices at rates of up to 115.2Kbaud.

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- Data Integrity 1 error in 10¹⁶ bits

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For medium speed, low power SCSI bus peripherals such as optical and tape drives.

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- Multimedia PC (MPC) compatible.
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- >500KB/s average sustained transfer rate.
- Low power - 180mA active & 40mA standby

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- What software required?
- PCMCIA, ExCA or Quicksnap?

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1MB PLUS (2MB Data Storage)	£195.95
2MB PLUS (4MB Data Storage)	£295.95
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20MB Silicon Disk	£659.95
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DRAM Memory

DRAM expansion cards allow you to increase the resident RAM storage in your mobile computer without physically modifying the computer. Increasing RAM greatly improves program operation and efficiency.

PRODUCT/MODEL	PRICE
IBM	
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4MB	£169
8MB	£329
16MB	£589
32MB	£1090
TOSHIBA	
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8MB	£279
16MB	£499
32MB	£1049
COMPAQ	
LTE LITE	
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Microsoft
Windows 95

Note: Windows 95 is NOT available from SMC Computers

Windows 95 is due for release on August 24th.....

Are you ready?

Microsoft claim that it will run in 4 Megabytes of RAM, but the majority of users will need at least 12Mb or even 20Mb to achieve peak performance, especially when multi-tasking.

The minimum CPU requirement will be for a 486 DX-33, although serious users will need a minimum 486 DX2-66 to start gaining advantages of the 32-bit operating system.

NOW is the time to upgrade your system. We have SIMMs and memory modules for all popular PCs and the full range of CPUs and Overdrive chips, so call our Component Sales line TODAY.

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1Mb x 3	30 pin	£30	£28
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4Mb x 3	30 pin	£116	£112
4Mb x 9	30 pin	£120	£114
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2Mb x 36	72 pin	£278	£254
16Mb			
16Mb x 9	30 pin	£598	£578
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PROCESSORS

CPUS

486DX-50	Intel	5v	£188	486DX4-100	Intel	3.3v	£155
486DX2-66	Cyrix	5v	£66	Pentium 75	Intel	3.3v	£199
486DX2-66	Intel	5v	£89	Pentium 90	Intel	3.3v	£269
486DX2-80	AMD	3.3v	£89	Pentium 120	Intel	3.3v	£575
486DX4-100	AMD	3.3v	£109				

* Note: All require heat sink with fan

Intel Over-drive Chips

SX-25 to DX2-50	£79
DX-25 to DX2-50 *	£79
DX-33 to DX2-66 *	£108
DX-33 to DX4-100 *	£181

CPU Fan Heat sinks

486	£12
Pentium 60/66	£20
Pentium 90	£22

* Note: Available for single socket and dual socket motherboards.

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Processor fitted

- Intel 'Plato'** £475
- 90Mhz CPU fitted
 - 256K cache
 - Maximum 128Mb RAM
 - 2 fast serial ports
 - 1 enhanced parallel port
 - 2 PCI slots
 - 4 ISA slots
 - 1 PCI/ISA option slot
 - EIDE controller

Processor ready

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- Maximum 128Mb RAM
- Built-in EPP and high-speed serial ports
- Built-in EIDE & floppy controller

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ALI chipset	4 PCI, 3 ISA	£155
Opti chipset	3 PCI, 4 ISA	£175

Note: All 486 and Pentium processor ready motherboard prices exclude CPU.
See above for processors.

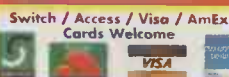
486

Processor ready

- 256k cache
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- Maximum 128Mb RAM
- 3.3v
- DX4 compatible
- Supports CPUs from most major manufacturers

VESA	3 VESA, 4 ISA	£75
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Warning.

Memory modules and processor chips are sensitive to static electricity and can easily be damaged. When fitting memory ensure you have discharged any static by wearing an anti-static wrist strap (preferred) or by touching your PC case (providing it is connected to mains electricity but not switched on).

Anti-Static Wrist Strap

To prevent damaging your memory modules during installation, these straps will ground your body by attaching to a metal object such as your PC case.

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Ambra series, Hurdla 486, Sprint 486, Enterprise 486	PS/2 50Z	Xstation 120
4Mb £163	2-16Mb exp brd £234	1Mb £53
16Mb £544	4-16Mb exp brd £294	2Mb £84
Hurdla 386SX, Sprinta 386, Enterprise 386 slim	1Mb £53	Xstation 130
2Mb £104	2Mb £84	1Mb £53
8Mb £164	4Mb £167	2Mb £84
16Mb £544	PS/2 55SX, 55LS, 65SX	4Mb £167
Trekka 386SL	2-16Mb exp brd £234	Thinkpad 750, 755
2Mb £116	4-16Mb exp brd £294	4Mb £178
Sprinta II	1Mb £53	8Mb £348
4Mb £167	2Mb £84	PS2 CL57SX, Thinkpad 700, 720
8Mb £259	4MB £158	4Mb £138
16Mb £548	Model 70-	8Mb £268
Aptiva 486, Valuepoint 300	061, 121, 081, 161.E61, F61	Thinkpad 750 range
8Mb £285	4-64Mb exp brd £234	4Mb £244
16Mb £545	8-64Mb exp brd £428	8Mb £484
32Mb £950	1Mb £53	Thinkpad 350
PS/1 286	2Mb £84	4Mb £144
2Mb £94	Model 80-041, A series	8Mb £392
PS1 386SX	2-16Mb exp brd £188	Model L40SX, PS Note 182
2Mb £94	4-16Mb exp brd £234	2Mb £129
4Mb £167	4Mb £138	4Mb £144
PS1 Consultant 2133-G11/13/2155-	Model 80-321	8Mb £288
G14, Essential, Expert M series	2-16Mb exp brd £188	Thinkpad 750 range
1Mb £53	4-16Mb exp brd £234	4Mb £144
2Mb £94	4Mb £138	8Mb £392
4Mb £167	Server Model 95XP	Model L40SX, PS Note 182
8Mb £258	4Mb £128	2Mb £129
PS1 Advisor, Consultant, Investor, Willow, Expert S series, Valuepoint series (check models)	8Mb £258	4Mb £144
2Mb £94	Server Model 95, 95 Array	8Mb £288
4Mb £167	4Mb £128	Model L40SX, PS Note 182
8Mb £258	8Mb £259	2Mb £129
PS1 Pro386SX, Model 50/57 series, Model 56/57, multimedia, Model 76/77, multimedia, Model E9533 range, Server Model 85, 90XP	PS/2 L40SX	4Mb £129
2Mb £94	4MB £148	4Mb £144
4Mb £167	8MB £288	8Mb £288
8Mb £258	Hurdla 386SX, Sprinta 386, Enterprise 386 slim	PS Note 2141
PS/2 35LS, 35SX, 40SX	8Mb £285	2Mb £129
1Mb £53	16Mb £475	4Mb £144
4Mb £148	Pentium Valuepoint	Portable PS2 P75
8Mb £288	8Mb £288	2Mb £95
1Mb £327	16Mb £548	4Mb £167
PS1 Valuepoint P60/D	RS6000 Powerserver, 220 series, Model 53	Portable PS2 P70
4Mb £167	2Mb £167	2-16Mb exp brd £188
8Mb £258	8Mb £258	4-16Mb exp brd £234
16Mb £54	RS600 Powerserver, 250 series,	2Mb £84
32Mb £1080		

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4Mb £164	16Mb £659
P320SX	32Mb £1095
2Mb £82	486P range low profile desktop
4Mb £148	1Mb £53
8Mb £311	4Mb £208
PC325D/P series, PC333D/P series	16Mb £548
1Mb £59	Powerline Workstation range, System 425TE, 433TE
4Mb £148	2Mb £95
8Mb £329	4Mb £155
16Mb £548	8Mb £310
PC486D/P series	16Mb £659
1Mb £59	Dimension series, Omniplex series
4Mb £148	4Mb £148
16Mb £548	8Mb £288
32Mb £1112	16Mb £558
Performance 425S/L/ M.433S/ME, 450L/M/ T, 466M/T	32Mb £1095
4Mb £113	System 212N, 320N
16Mb £594	2Mb £94
Performance 425S/ ME, 444S/ME, 450/ME, 466/ME	System 320N+
4Mb £118	2Mb £94
8Mb £309	System 325N, 325NC
16Mb £659	2Mb £98
32Mb £1095	NL20, 25
	2Mb £113

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More memory over the page



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2Mb	£128	Zstation 500	
		4Mb	£208
ZDS-600NL series		8Mb	£311
2Mb	£108	16Mb	£659
		32Mb	£744
Slimsport 286		Zstation 325SH, 325SN	
1Mb	£75	1Mb	£53
2Mb	£126	4Mb	£164
Supersport 286		Z station 420S-EH/N, 420S-SH/	
1Mb	£75	N, 425SH, 433DEH, 450XEN, 400+	
		1Mb	£53
Supersport 286E		4Mb	£164
1Mb	£75	16Mb	£548
2Mb	£126	Zselect 100 series	
z386-SX, SX20		4Mb	£143
2Mb	£82	8Mb	£295
8Mb	£254	16Mb	£485
		32Mb	£999

TOSHIBA

T1000LE		T2000		T3200SX	
2Mb	£88	2Mb	£88	2Mb	£84
4Mb	£168	4Mb	£158	4Mb	£161
8Mb	£298	8Mb	£288	T4400, T6400, T6600	
T1200XE		T2100, T2150/CD		4Mb	£164
2Mb	£74	4Mb	£182	8Mb	£328
T1600		8Mb	£325	16Mb	£619
2Mb	£74	16Mb	£757	T4600, T4700, T4800	
T1800, T1850, T2000, T2200		24Mb	£1128	4Mb	£168
2Mb	£88	T2400, T3400, T3600		8Mb	£329
4Mb	£168	4Mb	£168	16Mb	£792
8Mb	£298	8Mb	£298	32Mb	£1648
16Mb	£298	16Mb	£648	T5100	
T1900, T4500, Dynapad T200		T3100SX		2Mb	£74
4Mb	£168	2Mb	£88	T5200, T8500	
8Mb	£328	4Mb	£168	2Mb	£114
16Mb	£792	T3100E		8Mb	£344
T1910, T1950, T1960		2Mb	£94	T3200	
4Mb	£168	T3200		3Mb	£168
8Mb	£299				
16Mb	£628				
32Mb	£1648				

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2Mb	£88
4Mb	£158
LaserJet III, IIIP, IIID, IIP	
2Mb	£81
4Mb	£148
LaserJet IIISi	
4Mb	£146
LaserJet 4L	
1Mb	£75
DeskJet 500, 500C	
256Kb	£48
DesignJet 600, 650, LaserJet 4M, Si, SIMX	
2Mb	£85
4Mb	£135

Canon

LBP-4, LBP-4 lite, LBP-4 plus	
1-2Mb	£133
2Mb	£179
LBP-4SX	
2Mb	£132
LBP-8 III	
1-3Mb exp board	£91
2-3Mb exp board	£115
3Mb exp board	£198
LBP-8III Plus	
1-3Mb exp brd	£131
2-3Mb exp brd	£181
3Mb exp brd	£301

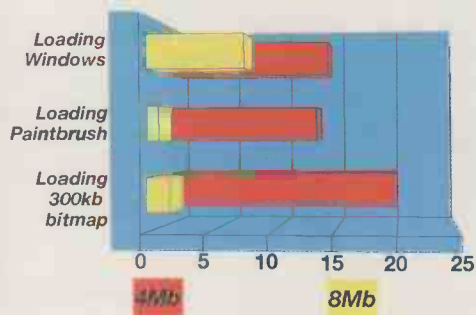
IBM/Lexmark

PS4019, 4019E	
1-3.5Mb exp brd	£88
2-3.5Mb exp brd	£146
4028, 4037	
1Mb	£58
2Mb	£109
4Mb	£192
Lexmark 5E 6, 6A, 10, 10A, 10L, Winwriter 600	
1Mb	£62
2Mb	£112
4Mb	£206
Panasonic Laser Printers	
KX-P4110, KX-P4430	
1Mb	£93
2Mb	£142
8Mb	£206
KX-P4450	
1Mb exp brd	£101
KX-P4420, KX-P4450i, KX-P4451	
1Mb	£90
2-4Mb exp brd	£131
4Mb exp brd	£219
KX-P4440	
KX-P5410	
1Mb	£58
2Mb	£112
4Mb	£207

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In tests, conducted on one of our own 486DX2-66-based systems, the difference between 4Mb and 8Mb of RAM was startling. The graph above indicates the amazing speed increase that just another 4Mb can make to your system. With today's top software packages demanding more and more processing power a small increase in your systems RAM can make a real difference.

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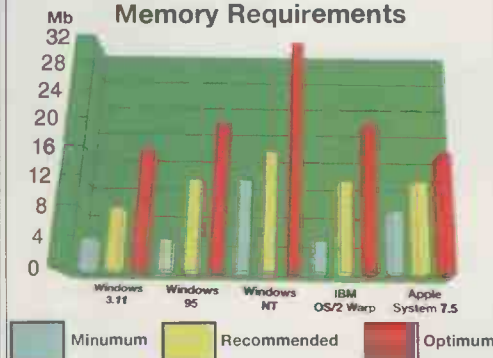
COMPAQ

Concerto 325,433	Deskpro 5/60M,5/66M,EX560	Prosignia PC server 486-33,DX2-66
4Mb £208	8Mb £576	1Mb £51
8Mb £256	16Mb £620	2Mb £94
16Mb £590	32Mb £1305	4Mb £167
		8Mb £325
Deskpro 286N, 386N	Deskpro XE 433S	16Mb £548
0-12Mb exp brd £76	Presario 800S/F	32Mb £1080
1Mb £51	2Mb £188	
2Mb £95	4Mb £167	Proliant 1000 486DX2-66
4Mb £167	8Mb £335	8Mb £326
Deskpro 386-25/33,468-33/66	Deskpro M (non-Pentium)	16Mb £547
1Mb £51	Expansion board £95	32Mb £1080
2Mb £94	4Mb £144	
4Mb £167	8Mb £285	Proliant 1000 5/60,Server,2000,4000
8Mb £324		16Mb £620
Deskpro 386/20,25,20E,25E	Deskpro XL 466	32Mb £1305
1Mb exp brd £98	4Mb £166	64Mb £2189
4Mb exp brd £223	8Mb £324	128Mb £4320
1Mb £129	16Mb £653	
4Mb £208	32Mb £1095	LTE Lite 20,25,25C,25E
		2Mb £128
		4Mb £188
		8Mb £348
		LTE Lite 4-25
		4Mb £188
		8Mb £348
		16Mb £772
		LTE Elite
		4Mb £188
		8Mb £348
		16Mb £944
		LTE 386S/20
		1Mb £99
		4Mb £188
		Contura 320,325
		2Mb £84
		4Mb £159
		8Mb £298
		Contura 425
		4Mb £118
		8Mb £298
		16Mb £599
		Contura Aero 433,425
		4Mb £158
		8Mb £298
		Contura 400
		4Mb £154
		8Mb £278
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		2Mb £128
		4Mb £188

Quality matched for performance

What will it take?

Operating System Memory Requirements



AST

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4Mb £206	4Mb £206
Advantage Pro 486DX/33, 486SX/25	Power Premium 3/33,4/33,4/33S,4/50D,4/66D
2Mb £106	0-32Mb exp brd £150
4Mb £143	Exp brd + 1Mb £208
8Mb £238	Exp brd + 4Mb £352
16Mb £489	Exp brd + 8Mb £554
32Mb £969	
Advantage 386SX/20,25	Premium 486/33,486/33E
2Mb £82	Premium II range
8Mb £310	8Mb £404
Advantage Plus	Premmia 4/33,433/s
4Mb £164	MTE 4/33,4/50D,4/66D
8Mb £310	4Mb £208
Ascentia 800Nseries	8Mb £310
4Mb £186	16Mb £659
8Mb £664	32Mb £1095
Ascentia 900N series	64Mb £2160
4Mb £190	Premmia GX/P90,GX/P100,MX/P100,MX4/66D,MX4/100T
16Mb £675	8Mb £285
Bravo NB Explora	16Mb £589
4Mb £195	32Mb £969
16Mb £672	Power Exec 3/25 range
Power Exec 3/25 range	Premmia LX/P60
4Mb £206	8Mb £154
8Mb £328	16Mb £557
16Mb £752	32Mb £1443
Premmia MX/IP100, MX4/66d, MX4/100t	8Mb £304
8Mb £304	16Mb £557
16Mb £557	32Mb £1443
32Mb £1443	64Mb £2637
Premium 386C	1Mb £55
1Mb £55	4Mb £164
4Mb £164	

Original manufacturers specification

Warning.



Memory modules and processor chips are sensitive to static electricity and can easily be damaged. When fitting memory ensure you have discharged any static by wearing an anti-static wrist strap (preferred) or by touching your PC case (providing it is connected to mains electricity but not switched on).

Anti-Static Wrist Strap

To prevent damaging your memory modules during installation, these straps will ground your body by attaching to earth via your PC case.

Elasticated wrist strap £6

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Slough Berkshire SL2 1HA

Prices exclude VAT and delivery

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Drives Plus...

SCSI

Floppy Disk Drives

3.5"	1.44Mb	£29
5.25"	1.2Mb	£39
3.5" / 5.25"	Dual	£89
Single drive cable	5.25"	£8
Dual drive cable	3.5"/5.25"	£10
Bracket and fascia - fits 3.5" drive into 5.25" bay		£8



Controller cards

TMC1610MCD	16bit	£49
Adaptec 1515	Kit 16bit	£62
Adaptec 1542	Kit 16bit	£165
Adaptec 2842VL	Kit VESA	£163
Adaptec 1640	Kit MCA	£197
Adaptec 2742	Kit EISA	£242
Adaptec 2940	Kit PCI	£192

Cables

Single drive internal	£8
Dual drive internal	£10
Triple drive internal	£15
Centronic 50 - Centronic 50	£18
Centronic 50 - 25 pin	£18
Centronic 50 - Micro D 50	£35
Micro D 50 - Micro D 50	£38



Needs up to 85Mb of hard disk space. Have you got enough?

Terminators

External	£25
Active	£10
Passive	

Corel software

Version 2 Network manager	£67
	£285



External Drive Boxes

- For 1 to 4 SCSI devices
- Choice of open or closed front panels
- Suitable for:
 - Hard drives
 - Tape drives
 - Optical drives
 - CD ROM
 - DAT drives
 - Floptical drives
 - Syquest drives
- Available with Centronics 50 way, Wide SCSI and Micro D interfaces
- 3 year warranty
- UL / TUV / CSA approved
- Free fitting of any SCSI device when purchased at the same time

EB310	1 x 3.5"	LP/HH	£99
EB320	2 x 3.5"	LP/HH	£112
EB451	1 x 5.25"	FH	£155

SMC INFO GUIDE



The SCSI interface is necessary for very large drives or certain multi-user operating systems. SCSI is ideal for controlling multiple devices such as hard drives, CD-ROMS, tape drives and optical drives from one controller card as you can mix up to seven different drives from various manufacturers. Please note: Active terminators are recommended for SCSI-2 and Wide SCSI devices and essential for external Fast SCSI devices.

SCSI hard disk drives

Size	Manufacturer	Model	Access time	Cache / buffer	Warranty AV	Price
270Mb	Quantum	MV270S	14ms	128k	2yr	£124
425Mb	Quantum	TBZ420S	14ms	128k	2yr	£139
528Mb	Seagate	ST5660N	12ms	256k	3yr	£209
532Mb	Fujitsu	M2684S	14ms	256k	2yr	£133
540Mb	IBM	66G9743	10.5ms	512k	3yr	£149
540Mb	Quantum	MV540S	14ms	128k	2yr	£137
544Mb	Quantum	FBL540S	12ms	128k	3yr	£169
730Mb	Quantum	LT730S	11ms	128k	2yr	£172
852Mb	Quantum	TBZ850S	14ms	128k	3yr	£229
1.0Gb	Connor	CFP1060S	9ms	512k	3yr	£379
1.0Gb	Connor	CFP1080S	9ms	256k	3yr	£349
1.0Gb	Connor	CFP2105S	11ms	256k	3yr	£559
1.0Gb	Fujitsu	M1606SA	10ms	512k	2yr	£305
1.0Gb	HP	C3323S	11ms	512k	5yr	£353
1.0Gb	IBM	Pegasus	10ms	512k	5yr	£312
1.0Gb	Seagate	ST31230N	10ms	512k	5yr	£329
1.0Gb	Quantum	FBL1080S	12ms	128k	3yr	£299
1.0Gb	Quantum	XP31070S	8.5ms	1Mb	5yr	£519
2.0Gb	Fujitsu	M2903S	11ms	512k	5yr	£589
2.0Gb	Micropolis	MIC4221	9ms	512k	5yr	£633
2.0Gb	IBM	74G7044	9ms	512k	5yr	£799
2.1Gb	Micropolis	MIC4221AV	8.5ms	512k	5yr	£679
2.1Gb	Connor	CFP2107S	9ms	512k	5yr	£599
2.1Gb	HP	C2490S	9ms	256k	5yr	£665
2.1Gb	Quantum	XP32150S	9ms	1Mb	5yr	£655
2.1Gb	Quantum	XP32151S	8.5ms	512k	5yr	£695
2.1Gb	Seagate	ST32430N	9ms	512k	5yr	£647
2.1Gb	Seagate	ST32550N	8ms	512k	5yr	£733
2.2Gb	Quantum	VP32210S	8.5ms	1Mb	5yr	£645
4.0Gb	Seagate	ST15230N	10ms	512k	5yr	£839
4.0Gb	Seagate	ST15150N	8ms	1Mb	5yr	£1139
4.0Gb	IBM	74G7045	9ms	512k	5yr	£1388
4.2Gb	Connor	CFP4207S	9ms	512k	5yr	£869
4.3Gb	Quantum	XP34301S	8.6ms	512k	5yr	£829
4.35Gb	Micropolis	MIC3243	9ms	512k	5yr	£833
4.3Gb	Micropolis	MIC3243AV	8.5ms	512k	5yr	£888
5.2Gb	IBM	74G7037	8ms	512k	3yr	£1549
9.0Gb	Micropolis	MIC1991	12ms	12ms	3yr	£1549
9.0Gb	Seagate	ST410800N	11ms	1Mb	5yr	£1699
9.1Gb	Micropolis	MIC1991AV	12ms	512k	5yr	£1616

SMC INFO GUIDE



Audio / Video drives

These high-performance drives are designed to give faster and smoother data transfer rates for multimedia applications. Ideal for animations, audio and MIDI recordings, digital video editing etc.

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Your **1st** choice for hard drives



IDE



3.5" IDE hard disk drives

Size	Manufacturer	Model	Access time	Cache / buffer	Mode	Warranty	Price	
420Mb	Quantum	TBZ420AT	14ms	128k	4	2yr	£129	NEW!
425Mb	Conner	CFS425A	13ms	64k	3	2yr	£102	NEW!
425Mb	Western Digital	AC2420A	12ms	64k	3	3yr	£117	
428Mb	Seagate	ST3491A	14ms	120k	4	3yr	£99	
532Mb	Fujitsu	M2684T	12ms	256k	3	2yr	£119	
540Mb	Conner	CFS540A	14ms	32k	3	2yr	£112	
540Mb	Western Digital	AC2540A	12ms	64k	3	3yr	£135	
540Mb	Quantum	FBL540AT	12ms	128k	4	2yr	£139	NEW!
540Mb	Maxtor	7540AV	12ms	32k	3	1yr	£117	
540Mb	IBM	84G6173	12ms	128k	3	3yr	£119	NEW!
545Mb	Seagate	ST3660A	14ms	120k	4	3yr	£113	
730Mb	Quantum	LT730AT	11ms	128k	3	2yr	£156	
730Mb	Western Digital	AC2700A	10ms	64k	3	3yr	£149	
850Mb	Western Digital	AC2850A	10ms	64k	3	3yr	£151	
850Mb	Seagate	ST5850A	11ms	256k	4	3yr	£157	
850Mb	Maxtor	7850AV	12ms	64k	3	2yr	£165	
850Mb	Quantum	TBZ850AT	14ms	128k	4	2yr	£179	NEW!
850Mb	Conner	CFS850A	12ms	256k	3	1yr	£157	
1.0Gb	IBM	84G8998	11ms	512k	3	3yr	£219	
1.0Gb	Seagate	ST31220A	12ms	256k	4	3yr	£199	
1.0Gb	Western Digital	AC31000A	10ms	64k	3	3yr	£225	
1.0Gb	Quantum	FBL1080AT	12ms	128k	4	2yr	£259	NEW!
1.2Gb	Western Digital	AC31200A	10ms	64k	4	3yr	£228	
1.2Gb	Conner	CFS1275A	15ms	64k	3	3yr	£225	
1.2Gb	Conner	CFA1275A	12ms	256k	4	3yr	£257	
1.2Gb	Maxtor	71260AV	12ms	256k	3	2yr	£245	
1.6Gb	Western Digital	AC31600A	10ms	128k	4	3yr	£439	NEW!

2.5" IDE hard disk drives

209Mb	Seagate	ST9240AG	16ms	64k	3	3yr	£172
341Mb	Seagate	ST9385AG	16ms	120k	3	3yr	£219
455Mb	Seagate	ST9550AG	16ms	120k	3	3yr	£272
520Mb	Seagate	ST9655AG	10ms	120k	3	3yr	£322
543Mb	Toshiba	MK1924FC	13ms	128k	2yr	£313	

Cables

Single drive £8
Dual drive £10
Note: Dual drive cables are 14" long with a space of 3.5" between connectors. Please check for compatibility with your system before ordering. We can custom make cables to order - please call with measurements.

EIDE

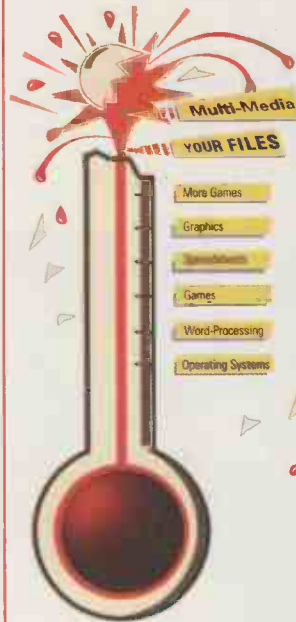
DC2300+	VESA	4 devices	2 fdd	enhanced i/o	£59
QD6580	VESA	4 devices	2 fdd	multi i/o	£29
T9003C	VESA	4 devices	2 fdd	enhanced i/o	£45
FD16002 CD	ISA	2 devices	CD optimised		£19
FD16030 CD+	ISA	4 devices	CD optimised		£35

IDE

C&C ISA	ISA	2 devices	2 fdd	multi i/o	£15
DC-200 cache	ISA	2 devices	2 fdd	lba support	£89
DC-4030 cache	VESA	4 devices	2 fdd	lba support	£95

Controller Cards

MORE MORE



You're probably running out of space already!

Every new software release takes more and more hard drive space and Windows 95 may take up to 85 megabytes to install.

Data files grow, multimedia gets more complex and games demand more system resources. Don't wait for an 'Out of disk space' error - call our Technical Sales line today.

Break your BIOS limitations

ADP60

The remarkable ADP60 card contains its own intelligent BIOS which allows IDE drives up to 2Gb to run on almost any PC - no more configuration worries!

If your PC does not have a 'user definable' option for hard disk drives then you need the ADP60. Available with or without floppy control, the card will fit into any AT ISA bus on 286, 386 or 486-based systems.

ADP60 HDD £35
ADP60F HDD/FDD £39

Disk Manager



Ideal for 'branded' PC systems - such as those by Compaq, IBM, Amstrad etc - and other manufacturers whose BIOS does not allow for large hard disk drives.

This easy to install software will initialise, partition and prepare virtually any hard disk drive. Disk Manager eliminates restrictions set by DOS and CMOS, giving you extended partitions complete storage access without the need for additional drivers. Supports DOS, all versions of MS Windows and OS/2.

PC version
£19

When purchased with a hard drive

Also available individually:
PC version £39
Macintosh £29

Speed up data transfer rates by up to 80%

£12

When purchased with a hard drive Available separately £17



D09R

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REMOVABLE DRIVES

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Unlimited hard disc drive space!

With one of our Syquest or Iomega ZIP systems installed, you have an ever-expanding hard disc drive. Fast-access, low-cost cartridges mean you can build a library of applications that can be used and changed in seconds without turning your system off.

Suitable for PC and Macintosh systems.



- 14.5ms access time
- 32k intelligent look-ahead buffer
- Up to 4Mb/s transfer rate
- Air filtration system provides Winchester Class environment
- 88Mb drive unit can read and write to 44Mb cartridges
- 20ms access time
- Less than 1 non-recoverable error in 10¹² bits read
- Over 4 million cartridges sold worldwide
- 32k intelligent look-ahead buffer

Syquest 3.5"

105Mb Media	£40
270Mb IDE drive	£259
SCSI drive	£264
Parallel port	£439
Media	£45

Syquest 5.25"

88Mb SCSI drive	£177
200Mb SCSI drive	£262
Media 44Mb	£35
88Mb	£50
200Mb	£60

For SCSI external drives - any size - add: £100

SPECIAL OFFER

Buy 5 or more media cartridges and get **£2 off** each



- Ideal for separating data files to save on hard drive space
- Great for Work, Home, School & Play
- Quick and simple to install
- Lifetime warranty on disks - estimated shelf life of 10 years
- 29ms access time
- Up to 50Mb/min sustained transfer rate with SCSI interface - 20Mb/min with parallel
- Lightweight design - 450g including disk
- Includes ZipTools software to organise, track and find data quickly - works for CD ROMs too!
- Available with SCSI or parallel interface

Zip Drives

SCSI interface	£149
Parallel interface	£149

ZIP Disks

100Mb	£17
100Mb 5 pack	£57
100Mb 10 pack	£98

PARALLEL PORT DRIVES

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These compact, portable units connect to any standard parallel port making them ideal for notebooks and laptops with no or little expansion capabilities. The easy to install software can be loaded on to several systems allowing units to be transferred between systems.

All these devices have a pass-through port to connect parallel printers.



Colorado Tracker

250Mb tape drive	£157
350Mb tape drive	£165
700Mb tape drive	£215
Trakker carry case	£39

- Conforms to QIC standards
- Supplied with DOS and Windows backup software
- Up to 8Mb/min backup speed



Backpack CD ROM drive

Quad speed £255

- Up to 700kb/s transfer rate
- 250ms access time
- Dust proof mechanism
- Built-in audio circuit with headphone and line out sockets
- Motorised tray loading
- Photo CD compatible
- Weighs only 4lb
- Supports enhanced parallel port
- Drivers for DOS, Windows, OS/2



Backpack tape drive

340Mb	£212
900Mb	£342

- Conforms to QIC standards
- Weighs only 5lb
- Macro recording for unattended backup
- Novell Netware compatible



Backpack floppy drives

3.5" 1.44Mb	£119
3.5" 2.88Mb	£175
5.25" 1.2Mb	£125

- 1.44Mb model also accepts 720k disks
- 2.88Mb model also accepts 720k and 1.44Mb disks
- 1.2Mb model can accept 360kb disks
- Background formatting software included
- 32k data buffer

Notes:

- 360Kb disks that have been written by a 1.2Mb drive may not be readable on a 360Kb drive.
- 2.88Mb format requires special extra density diskettes.



Backpack hard disk drives

420Mb	£318
850Mb	£399
1.2Gb	£509

- 14ms access time
- Security password option
- Automatic support for enhanced parallel ports (EPP)
- Up to 600kb/s transfer rate
- Switching power supply reduces heat and power consumption
- Weighs less than 3lbs
- Chains to any other Backpack product

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DAT DRIVES



Hewlett Packard

SMC INFO GUIDE

Digital Audio Tape (DAT) offers fast, high quality, secure backups to those with large data archiving needs. DAT drives are very compact making them ideal for sharing between several computers and their capacity will suit almost any network.

C1553A Autoloader £1549

- Holds up to 6 tapes
- Up to 48Gb data storage
- Cartridge swap in under 15 seconds
- File access in average 90 seconds including tape swaps
- 10 character status display on front panel

Note: Termination not supplied with internal version. See SCSI hard disk drive page.

For external versions of any HP DAT drive add £100

HP external kits

These kits are direct JetStor equivalents and are supplied complete with Adaptec controller, backup software and all necessary cables and manuals.

HP2000-1	2.0Gb	1 user	£999
HP2000-25	2.0Gb	25 user	£1199
HP5000-25	4.0Gb	25 user	£1339
HP5000-UL	4.0Gb	Unlimited	£1679
HP6000-25	8.0Gb	25 user	£1559
HP6000-UL	8.0Gb	Unlimited	£1899

35470A £527

- 2Gb data storage capacity
- 183 Kb/s (max) transfer rate (11Mb per minute)
- Fastsearch feature finds any file in an average 30 seconds
- Supports 60m and 90m cartridges

35480A £605

- 4Gb data storage capacity
- Up to 732Kb/s (max) transfer rate (44Mb per minute)
- Can store 1Gb in under 30 mins
- Fastsearch feature finds any file in an average 30 seconds
- Supports 60m and 90m cartridges

C1533A £725

- Up to 8Gb data storage capacity
- 1.5Mb/s (max) sustained transfer rate (90Mb per minute)
- 200,000 MTBF rating
- Files accessed in an average 40 seconds
- Fully compatible with all DDS, DDS-2 and DDS-DC format drives
- Can use 120m, 90m and 60m cartridges

Note: Termination not supplied with internal version. See page 4.

SureStore drives

SS2000	2.0Gb	£619
SS5000	4.0Gb	£697
SS6000	8.0Gb	£799

External options for above add: £100

SureStore external kits		
Includes drive and 250 user ARCserve for Windows		
SS5000XK		£1745
SS6000XK		£2097

WangDAT

3100 £559

- 2Gb capacity
- Built-in self-activated head cleaner
- 30 second file search time

3200 £599

- 4Gb capacity with DDS compression
- Up to 732Kb/s data transfer rate
- Built-in self-activated head cleaner

3400DX £715

- Up to 8Gb capacity with DDS2 compression
- Up to 732Kb/s data transfer rate
- 1Mb buffer



External versions add £100

TAPE DRIVES

Colorado Jumbo



DJ20	120/240Mb	£77
DJ35	170/340Mb	£85
DJ25	350/700Mb	£139
DJ50	680/1.36Gb	£237
External versions		add £75

- All drives offer up to 6:1 compression with an average of 2:1
- Uses QIC format compatible tapes
- Internal versions can be attached to floppy controller - even with two floppy drives installed
- Dedicated controllers are available for top performance

New DJ50 includes FC-20 controller card plus one free tape

Jumbo accessories

AB 11	External port	£25
FC-20	8bit controller	£49
SK7	Windows software	£45
SU53J	Unix / Xenix software	£79
SK1	Sytos Plus for OS/2	£85

Wangtek



5150PK kit*	£315
5525ES	£335
51000ES	£465
External versions	add £100

Wangtek's 5000 Series tape drives offer you leading price/performance in advanced quarter-inch tape drives. With capacities from 150 megabytes to 1 gigabyte, 5000 Series drives are an ideal match to a wide range of system data backup requirements.

* Note: 5150PK uses proprietary interface

- Uses QIC format compatible tapes
- Quick-File-Access (QFA) feature for fast data retrieval
- Compatible with most popular data backup software packages
- PK kits are supplied with proprietary controller card, software, data cartridge and cable

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Drives Plus...

*See below

SOUND CARDS



SoundBlaster AWE-32

Full pack MCD	£165
Full Pack IDE	£165

- Built-in AdSP and EMU 8000 sound processors
- 1Mb ROM for MIDI samples and 512kb RAM for downloadable samples - upgradeable to 28Mb
- 32-voice wave table built-in
- MCD has interfaces for Panasonic, Mitsumi and Sony drives

Value pack MCD	£125
Value pack IDE	£125

- Upgrade port for AdSP chip
- 1Mb ROM for MIDI samples and 512kb RAM for downloadable samples
- 32-voice wave table built-in



Gravis

Ultrasound	£95
------------	-----

- Stereo recording and playback
- 256k RAM upgradeable to 1Mb
- Real recorded sounds for wave table synthesis
- CD ROM interfaces for Sony, Mitsumi and LMSI drives

Ultrasound Max	£142
----------------	------

- True wavetable synthesis
- 32 voice sound
- CD ROM interface for Panasonic, Sony and Mitsumi drives
- SoundBlaster compatible

SPEAKERS

Creative Labs

Pro Digital	£29
-------------	-----

- 4 watt
- Mains powered
- Magnetically shielded to protect monitors
- Suitable for all popular audio cards

Yamaha

M10	£49
-----	-----

- 10 watt per channel
- Magnetically shielded
- Active Servotechnology for bass response

SS510 Sub-woofer	£125
------------------	------

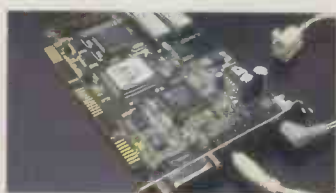
- 25 watts power
- 35Hz-250Khz frequency response ±3Db
- Auto On/Off



SoundBlaster 16

Value pack	£58
Value IDE	£64
Multi CD	£84
Multi CD AdSP	£105
SCSI-2	£104
SCSI-2 AdSP	£127
Pro IDE	£88
Pro IDE AdSP	£112

- 16-bit stereo recording and playback on all cards
- AdSP upgrade sockets on all cards except Value versions
- WaveBlaster connector for enhanced wave table synthesis on all cards except Value versions



Orchid

GameWave 32 Plus	£99
SoundWave 32 Pro	£129
SoundWave 32 SCSI	£143

- Compatible with: SoundBlaster, Adlib, Windows SoundSystem, General MIDI, Roland MT 32
- Built-in Digital Signal Processor
- SoundWave cards are supplied with software for DOS and Windows
- SoundWave cards utilise analogue wave table synthesis for improved playback

MIDI

MIDI Blaster

- MTC32 MIDI compatible
- Can be used as a stand-alone device on PC or MIDI
- Plays up to 20 notes simultaneously
- Includes 9v adaptor, cable and software

Cables

Connect your sound card to any MIDI keyboard or device. Our kit contains cables and software for recording and playback.

SoundBlaster MIDI cable set	£16
SoundBlaster MIDI kit	£49
MIDI Box for multiple devices	£37

MULTIMEDIA KITS



SoundBlaster Multimedia Home CD £288

This new kit has been specifically designed for your home and office to let you work, learn and play.

- 16 bit sound card with Advanced Signal Processor
- Quad speed CD ROM drive
- 'Work' software: MS Works, MS Publisher, MS Design Pack
- 'Learn' software: MS Encarta, MS Bookshelf, Ancient Lands, Dangerous Creatures, Musical Instruments, MS Cinemania, MS Scenes
- 'Play' software: MS Golf, Syndicate, Wing Commander II, Pagan, Strike Commander

SoundBlaster Discovery 4x £275

Superb low-cost upgrade which will turn your home PC into a fully feature multimedia system. The software included is ideal for all the family.

- Quad-speed CD ROM drive
- Sound Blaster 16 sound card
- CD ROM titles include: Grolier encyclopaedia, Wing Commander academy, Ultima Underworld, How To Computers

SoundBlaster GameBlaster 4x £295

If you're looking for the ultimate game playing kit, this is it! With the hottest games driving an AWE-32 sound card and a quad-speed drive this is an essential addition for the serious game player.

- Quad-speed drive
- AWE 32 sound card
- CD ROM titles include: Theme Park, Rebel Assault, Wing Commander 2, Alone in the dark 2, Strike Commander, Sim City 2000

GRAPHIC CARDS



Orchid Fahrenheit Pro64

	VLB	PCI
2Mb	£233	£235
4Mb	£336	£337

- VESA & PCI versions
- 16.7 million colours at 1024x768 resolution (4Mb required)
- Refresh rates up to 120Hz
- Virtual Desktop and Switch-on-the-fly software



Orchid Kelvin 64

1Mb	£97
2Mb	£129

- VESA & PCI versions
- Up to 1280x1024 resolution
- Upgradeable from 1Mb to 2Mb DRAM
- 16.7 million colours at 800x600 (2Mb DRAM required)
- Green PC (energy saving) compliant



Diamond Stealth 64

DRAM	1Mb	£85
	2Mb	£115
VRAM	2Mb	£195
	2Mb MM	£229
	4Mb	£299
	4Mb MM	£345

- VESA & PCI versions
- 65k colours at 1280x1024 (4Mb only)
- Refresh rates up to 120Hz
- Windows Virtual Desktop

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C091

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CD ROM DRIVES



Toshiba (4.4x)
XM3601B Internal £215
XM3601S External £279

- SCSI-2 Interface
- Up to 660Kb/s sustained data transfer rate
- 140ms access time
- 256Kb data buffer
- Sealed enclosure
- Front panel headphone socket and audio volume control
- Fully compatible with MPC2, Photo CD, CD ROM XA, CD-I etc
- Tray loading mechanism



Mitsumi (4x)
FX400 £109

- IDE / EIDE standard interface
- Sub 250ms access time
- 600Kb/s transfer rate
- 256Kb cache
- Drivers for most popular operating systems
- Compatible with most CD ROM standards including CDI-Movie
- Headphone socket with volume control
- Tray loading mechanism



NEW!
 THE FASTEST
 CD ROM
 drive available

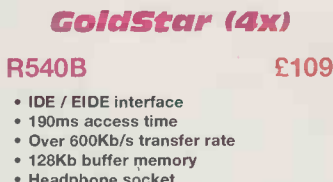
Plexor (6x)
6Plex Internal drive £365
6Plex Internal kit £396
6Plex External £479

- SCSI-2 interface
- 900Kb/s sustained data transfer rate
- Up to 5Mb/s burst transfer rate
- 115ms seek time
- 256kb data buffer
- Front panel includes headphone socket, volume control, auto and manual emergency eject
- Caddy loading



Pioneer (4.4x)
DR-U124X SCSI £189
DR-UA127X EIDE £128

- 676Kb/s sustained transfer rate
- 4.63Mb/s burst transfer rate
- 150ms access time
- 128k cache
- Fully MPC2 compatible
- Caddy loading



GoldStar (4x)
R540B £109

- IDE / EIDE interface
- 190ms access time
- Over 600Kb/s transfer rate
- 128Kb buffer memory
- Headphone socket
- Drivers supplied
- Tray loading mechanism



Panasonic (4x)
PD Dual Media
LF1004 Internal drive £499
LF1004 Internal kit £549
LF1004 External kit £625

- SCSI-2 interface
- Reads CD ROM and 650Mb rewriteable optical discs from single tray
- 4x CD ROM spin speed
- Data transfer rates up to 600Kb/s for CD and 5Mb/s for optical disc
- Access time 195ms for CD and 165ms for optical disc
- Kit includes Adaptec SCSI card and cables



NEC (4x)
CDR-272 £115

- IDE / EIDE interface
- 250ms access time
- 600Kb/s transfer rate
- 256Kb cache
- Fully MPC-2 compatible
- Tray loading mechanism



Backpack (4x)
CD ROM
Parallel port drive £255

- 250ms access time
- Connects to any standard parallel port
- Up to 700kb/s transfer rate
- Photo CD compatible
- Weighs only 4lbs
- Tray loading mechanism



Panasonic (2x)
CR 562 £69
AT interface card £10

- Panasonic interface
- 320ms access time
- 300Kb/s transfer rate
- Supports Photo CD, CD ROM XA, MPC2
- Embedded lens cleaning mechanism
- 64k buffer memory
- Tray loading mechanism
- Interface card includes all necessary cables

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4/66 270HD, 8MB (4/4)	£975	5/90 720HD, 8MB (5/5)	£1515	COMPAQ 17"	£669
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SDTR

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WANGDAT 3400DX	4GB	16GB	21MB	30MB	£675
CONNER 4326	4GB	16GB	24MB	36MB	£675
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HP C1553A	24GB	96GB	30MB	45MB	£1500
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CONNER 4586	48GB	192GB	24MB	36MB	£2500
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SEAGATE 31220A	1.2GB	IDE	2MB	12MS	£250
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FUJITSU M1606SA	1.0GB	F-SCSI	3MB	9MS	£325
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QUANTUM FIREBALL	1.0GB	F-SCSI	3MB	9ms	£350
SEAGATE 31230N	1.0GB	F-SCSI	3MB	9ms	£350
SEAGATE 31250N	1.0GB	F-SCSI	3MB	8ms	£475
QUANTUM CAPELLA	2.1GB	F-SCSI	4MB	9ms	£550
CONNER 2105	2.1GB	F-SCSI	4MB	9MS	£560
HP C2490S	2.0GB	F-SCSI	3MB	9MS	£650
QUANTUM ATLAS	2.1GB	F-SCSI	4MB	8ms	£675
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CONNER 2107W	2.0GB	WIDE	6MB	9ms	£850
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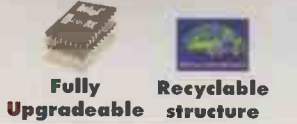


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- Colours - 1024 x 768 256 colours for external CRT.
- Built in Audio - 16BIT sound card & microphone.
- PCMCIA - 2 x PCMCIA type 2 or 1 X PCMCIA 3
- Graphics - 1Mb PCI graphics.
- 3.5 FDD fitted.
- Expansion slots - 1 serial, 1 parallel port. External mouse, keyboard, VGA ports
- Battery - 1 NI-MH battery.



	10.3 DI scan	10.3 TFT
pentium 75	£2149	£3050
pentium 90	£2299	£3230
pentium 100	CALL	CALL



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1Mb VESA 32 BIT graphics, Dual scan system, Soundcard built in 340Mb HDD, 4Mb RAM, 3.5 FDD, 2 type 2 PCMCIA slots or 1 type 3, Trackball, Carry bag, 2 year Opti warranty.

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486DX2/66	£1049	£1425	£2025
486DX4/75	£1099	£1475	£2075
486DX4/100	£1149	£1525	£2125

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New Cyrix DX2/66 processor, 4Mb RAM, 340Mb HDD, Dual scan mono screen, two PCMCIA type 2 or type one type 3, Trackball.



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- 32 Bit Lotus SmartSuite

Add £75

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Upgrade 8Mb (add) Platinum.....£155	Battery charger (add).....£79
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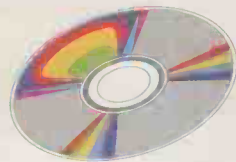
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Local Bus Graphics,
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keyboard & mouse)

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36DX2-80 4Mb£349
86DX4-100 4Mb£379
entium 75 8Mb£629
entium 90 8Mb£709
entium 100 8Mb£789
entium 120 8Mb£989
entium 133 8Mb£1039

Select the IDE Hard
Drive
40Mb\$70
40Mb\$120
50Mb\$170
08Gb\$220
6Gb\$320

Select the Screen.
4" SVGA colour£120
4" SVGA digital NI£160
5" SVGA digital NI£230
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Select the CD /
Multimedia Options
Double speed CD-ROM
drive alone£50
Double speed CD-ROM
plus 16-bit sound card &
speakers£100
Quad speed CD-ROM
drive alone£100
Quad speed CD-ROM
drive plus 16-bit sound
card & speakers£150

Additional Options
OS 7 & OS/2 Warp\$Call
OS 7 & Windows 3.11\$Call
Windows '95\$Call
MS DOS 6.22 & Windows
11 for Workgroups\$Call
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Cache£40
RAM Upgrade per 4Mb
.....£110
36 Video RAM upgrade to
Vb£35
entium* Video RAM
Upgrade to 2Mb£40
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30Mb Tape streamer£150
7Gb omega tape
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Tape cartridge\$Call
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Options 2-5 can only be
purchased with a PC System

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telecommunication systems specified in
the instructions for use, subject to the
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- 32-bit VESA graphics
- 14" SVGA colour screen
- Parallel & 2 serial ports
- 102 Keyboard & mouse
- 12 Month warranty extendable to 3 years

£569
+ VAT

With 8Mb RAM£679

486DX4-100

CD Business System

- 486DX4-100 Processor
- 8Mb RAM expandable to 64Mb
- 540Mb hard drive
- Double speed CD-ROM drive
- 3.5" 1.44Mb floppy drive
- 32-bit VESA graphics
- 14" SVGA colour screen
- Parallel & 2 serial ports
- 102 Keyboard & mouse
- 12 Month warranty extendable to 3 years

£779
+ VAT

With quad speed CD & 850Mb
drive£879

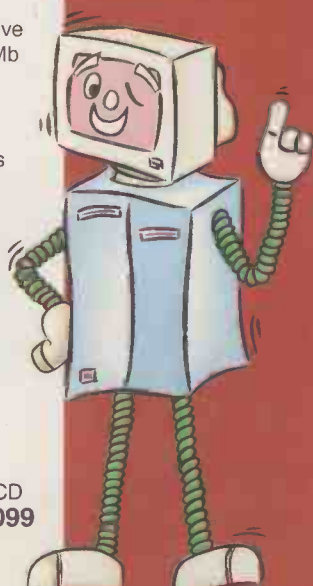
Pentium 75

CD Business System

- Intel® 75MHz Pentium® Processor Upgradeable to Pentium® 90, 100, 120 or 133
- 8Mb RAM; 256K Cache
- 850Mb Enhanced IDE hard drive with 256K hard drive Cache
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- PCI 64-bit graphics with 1Mb Video RAM
- 14" SVGA colour screen
- 3.5" 1.44Mb floppy drive
- Parallel & 2 fast serial ports
- 102 Keyboard & mouse
- 12 Month warranty extendable to 3 years

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+ VAT

P90 model with quad speed CD
drive£1099



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Our VESA 486 systems use the highest performance components and are future-proof with chip-change upgradeability. All systems come with 32-bit local bus graphics and high quality keyboard and mouse.

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- IDE hard and floppy controller
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- Expandable desktop case
- 4 drive bays and 7 expansion slots (2 VESA)
- 102 Enhanced keyboard
- Microsoft compatible mouse

MrPC 486DX2-80

- 486DX2-80 processor
- 4Mb RAM expandable by SIMMS
- Pentium® technology upgradeable
- 3.5" 1.44Mb floppy drive
- VESA bus graphics with Windows accelerator
- IDE hard and floppy controller
- Parallel, 2 serial & keyboard ports
- Expandable desktop case
- 4 drive bays and 7 expansion slots (2 VESA)
- 102 Enhanced keyboard
- Microsoft compatible mouse

MrPC 486DX4-100

- 486DX4-100 processor
- 4Mb RAM expandable by SIMMS
- Pentium® technology upgradeable
- 3.5" 1.44Mb floppy drive
- VESA bus graphics with Windows accelerator
- IDE hard and floppy controller
- Parallel, 2 serial & keyboard ports
- Expandable desktop case
- 4 drive bays and 7 expansion slots (2 VESA)
- 102 Enhanced keyboard
- Microsoft compatible mouse

4Mb System (as specified)	£329	£349	£379
4Mb 14" Screen, 125Mb	£479	£499	£529
8Mb 14" Screen, 540Mb	£679	£699	£729

586 SYSTEMS

MrPC P75

- Intel 75 Pentium® processor
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- 256K external SRAM cache
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- PCI Bus with 4 PCI slots
- 1Mb PCI bus graphics with Windows accelerator
- PCI IDE hard and floppy controller
- Parallel, 2 serial & keyboard ports
- Expandable desktop case
- 4 drive bays and 7 expansion slots (4 PCI)
- 102 Enhanced keyboard
- Microsoft compatible mouse

MrPC P90

- Intel 90 Pentium® processor
- 8Mb RAM expandable by SIMMS
- 256K external SRAM cache
- 3.5" 1.44Mb floppy drive
- PCI Bus with 4 PCI slots
- 1Mb PCI bus graphics with 64-bit Windows accelerator
- PCI enhanced IDE hard and floppy controller
- Parallel, 2 fast serial & keyboard ports
- Expandable desktop case
- 4 drive bays and 7 expansion slots (4 PCI)
- 102 Enhanced keyboard
- Microsoft compatible mouse

MrPC P100

- Intel 100 Pentium® (or Pentium 133 Processor £250 extra)
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- 256K external SRAM cache
- 3.5" 1.44Mb floppy drive
- PCI Bus with 4 PCI slots
- 1Mb PCI bus graphics with 64-bit Windows accelerator
- PCI enhanced IDE hard and floppy controller
- Parallel, 2 fast serial & keyboard ports
- Expandable desktop case
- 4 drive bays and 7 expansion slots (4 PCI)
- 102 Enhanced keyboard
- Microsoft compatible mouse

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8Mb System (as specified)	£629	£709	£789
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8Mb 14" Screen, 850Mb	£919	£999	£1079

MrPC Multimedia Systems

Any of our systems can be fitted with our high performance multimedia options to produce powerful multimedia systems.

Each option includes:-

- Quad speed or double speed IDE CD-ROM drive
- 16-bit high quality stereo sound card with sound software
- Twin high quality stereo speakers

Double Speed Multimedia option	£100
Quad Speed Multimedia option	£150



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"LET ME BUILD YOUR SYSTEM"

Simply follow the 5 stage process to specify the system most suited to your requirements.

1. Select the processor base system

(see specifications opposite)

- 486DX2-66 4Mb **£329**
- 486DX2-80 4Mb **£349**
- 486DX4-100 4Mb **£379**
- 486DX2-66 4Mb, 256K **£359**
- 486DX2-80 4Mb, 256K **£379**
- 486DX4-100 4Mb, 256K **£409**
- Pentium® 75 8Mb, 256K **£629**
- Pentium® 90 8Mb, 256K **£709**
- Pentium® 100 8Mb, 256K **£789**
- Pentium® 120 8Mb, 256K **£989**
- Pentium® 133 8Mb, 256K **£1039**

2. Select the IDE hard drive

- 120Mb **£30**
- 340Mb **£70**
- 540Mb **£120**
- 850Mb **£170**
- 1.08 Gb **£220**
- 1.6 Gb **£320**

3. Select the screen

- 14" SVGA **£120**
- 14" SVGA Digital NI **£160**
- 15" SVGA Digital NI **£230**
- 17" SVGA Digital NI **£440**

4. Select A CD/Multimedia option

- Double speed CD-ROM drive alone **£50**
- Double speed CD-ROM plus 16-bit sound card and speakers **£100**
- Quad speed CD-ROM drive alone **£100**
- Quad speed CD-ROM plus 16-bit sound card and speakers **£150**

5. Additional options

- RAM upgrade per.4Mb **£110**
- 486 Video RAM upgrade to 2Mb **£35**
- Pentium video RAM upgrade to 2Mb **£40**
- 250Mb Tape streamer **£90**
- 850Mb Iomega Tape streamer **£150**
- 1.7Gb Iomega Tape streamer **£200**
- 9624 approved data/fax modem **£35**
- 14.4 approved data/fax modem **£100**
- PC joystick **£10**
- 16-bit sound card **£40**
- Twin stereo speakers **£10**

Pre-loaded Software Options

- DOS 7 & OS/2 Warp **£Call**
- DOS 7 & Windows 3.11 **£Call**
- Windows '95 **£Call**
- MS DOS 6.22 and Windows 3.11 for Workgroups **£Call**

The above options in stages 2 - 5 can only be purchased with a PC system

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- 540Mb hard drive
- Double speed CD-ROM drive
- 16-bit sound card
- PC joystick
- Twin stereo speakers
- 3.5" 1.44Mb floppy drive
- 32 bit VESA graphics
- 14" SVGA screen
- Standard ports
- 102 keyboard and mouse
- 12mth warranty extendable to 3 years

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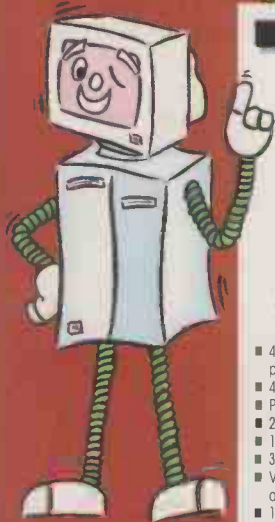
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MR PC SYSTEMS



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 - Pentium technology upgradeable
 - 256K external SRAM Cache
 - 125Mb hard drive
 - 3.5" 1.44Mb floppy drive
 - VESA bus graphics with Windows accelerator
 - 14" SVGA Colour screen
 - IDE Hard and floppy controller
 - Parallel, 2 serial, joystick & keyboard ports
 - Expandable desktop case
 - 4 drive bays and 7 expansion slots (2 VESA)
 - 102 Enhanced keyboard
 - Microsoft compatible mouse

486DX2-66	£479
486DX2-80	£499
486DX4-100	£529

OPTIONS

These options are only available with Mr. PC Systems

540Mb HD instead of 125Mb	£90
850Mb HD instead of 540Mb	£50
1Gb HD instead of 540Mb	£100
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17" NI SVGA instead of 14"	£320
RAM Upgrade per 4Mb	£110
486 Video RAM Up to 2Mb	£35
Pentium video RAM Up to 2Mb	£40
250Mb Tape streamer	£100
700Mb Tape streamer	£150

- Mr. PC 586 Systems**
- Intel Pentium 75, 90, 100 processor
 - 8Mb RAM expandable by SIMMS
 - 256K external SRAM cache
 - 850Mb Enhanced IDE hard drive
 - 3.5" 1.44Mb floppy drive
 - PCI Bus with 4 PCI slots
 - 1Mb PCI bus graphics with windows accelerator
 - 14" SVGA Colour screen
 - PCI IDE Hard and floppy controller
 - Parallel, 2 serial & keyboard ports
 - Expandable desktop case
 - 4 drive bays and 7 expansion slots
 - 102 Enhanced keyboard
 - Microsoft compatible mouse

Pentium 75	£999
Pentium 90	£1079
Pentium 100	£1129

9624 Data/fax modem	£35
14.4 Data/fax modem	£100
Double speed CD-ROM drive	£70
Quad speed CD-ROM drive	£100
PC Joystick	£10
16-bit Sound card	£40
Twin stereo speakers	£10
Pre-loaded Software Options	
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MS DOS 6.22 & Windows 3.11 for work-groups	£Cali

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 - 4Mb Ram, max 64Mb/128Mb
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 - VESA Local bus technology
 - 3.5" 1.44Mb floppy drive
 - Integrated VESA local bus graphics
 - 4 Drive bays & 4 slots
 - Parallel, serial and mouse ports
 - 14" SVGA colour screen
 - MS Compatible mouse & 102 keyboard
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 - PC Dos 6.3, MS Windows 3.1 Microsoft
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Includes 720Mb hard disk, 256K cache, mini-tower case, PCI bus graphics but no modem. Rest of specification as above.

486SX2-66, 340/4 mono	£799
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486DX4-100, 340/4 colour	£1209

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 - 486DX2-50 260MiB STN mono£845
 - 486DX2-50 350MiB STN col£1599
 - 486DX2-50 350MiB TFT col£1945
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 - High contrast 9.5" LCD VGA mono or colour screen
 - 3.5" removable 1.44Mb floppy disk drive
 - VESA Local Bus graphics
 - PCMCIA Type II/III slot
 - Built-in trackball
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 - Batter & AC Pack included
 - 12 month warranty

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HP LASERJET

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CANON

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BJC70	£225
BJ200EX	£168
BJ230	£236
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BJ330	£389
BJC400	£231
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LQ300	£92
LQ300	£145
LX1050+	£179
LQ - 1070+	£209
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PANASONIC

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KXP 3696	£259
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KXP 4440	£690
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£198

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STAR

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LC-15	£176
LC24-20 Mk2	£112
LC24-200 C	£198
LC24-15 Mk2	£231
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Wintype 4000	£287
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HP DeskJet 540C	£243
HP DeskJet 660C	£294
HP DeskJet 850C	£387
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HP DeskJet 1200 PS colour	£945
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HP DeskJet 1600CPS	£1226

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Citizen ABC Mono (Col Kit £23)

ABC 24 pin	£102
ABC Colour kit	£23
Swift 90	£113
Swift 90C	£120
Swift 200	£137
Swift200C	£145

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£282

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P2Q	£97
P3Q	£178
P72	£372
P90	£448
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S660i Laser	£565
S3000 Colour	£638

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Okilaser 400EX	£269
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Lexmark Winwriter 200

- 4ppm print speed
- Laser quality 300 dpi resolution
- 12 months on-site maintenance
- GDI & PCL4 language compatible
- Windows & TrueType scalable fonts
- 512Kb RAM standard, upgradeable to 4.5Mb
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230 A1	£1415
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600 A1 600dpi	£2716
600 A0 600dpi	£3246
650C A1 Colour	£3711
650C A0 Colour	£4386

HP PaintJet

XL300 A4	£1599
XL300 A3 Value-Pack	£1768
XL300 Postscript A4	£2568
XL300 Postscript A3 Value Pack	£2752

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£495

Epson GTX 6500

Agfa Scanners	
StudioScan	£485
StudioScan IIsi	£585
Arcus II	£2285
HP Scanners	
HP ScanJet 3P PC	£245
HP ScanJet 3C PC	£299
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GTX6500 SCSI	£495
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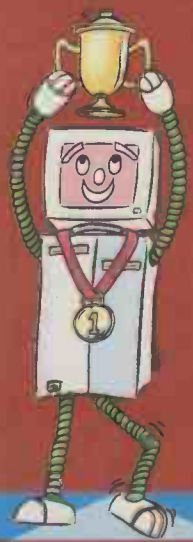
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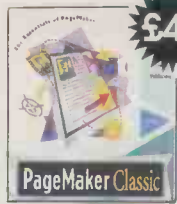
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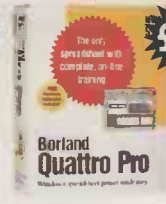


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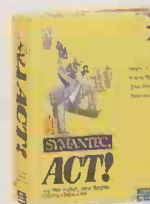


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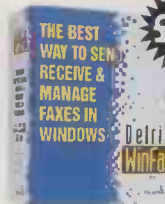


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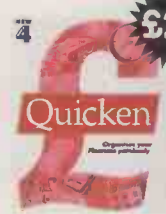
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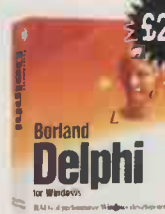
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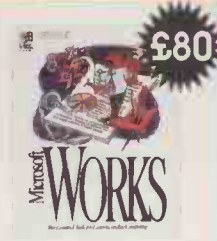
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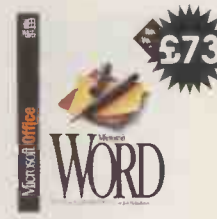
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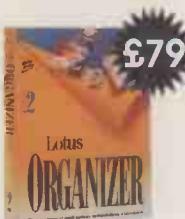
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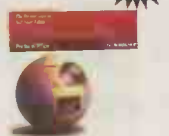
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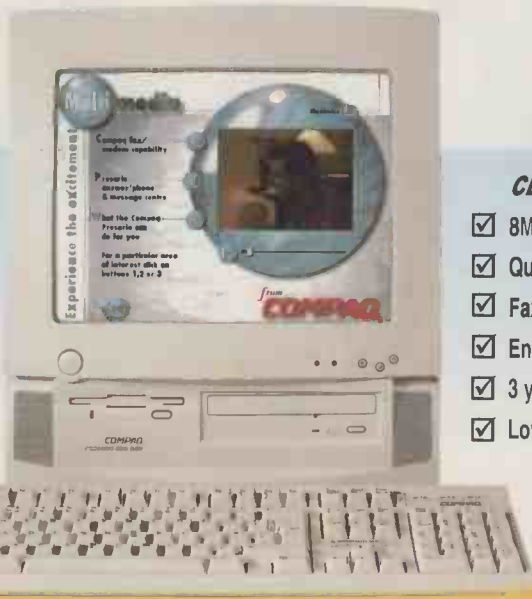
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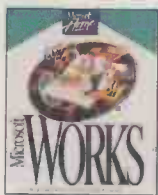
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- 3.5" 1.44Mb floppy drive
- Local bus SVGA graphics
- Compact 3 bay case with 2 expansion slots
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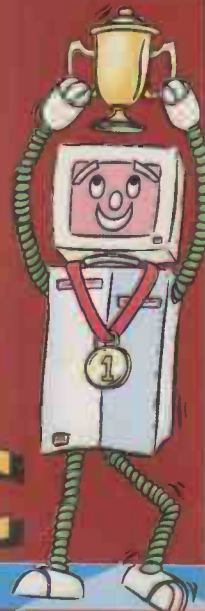
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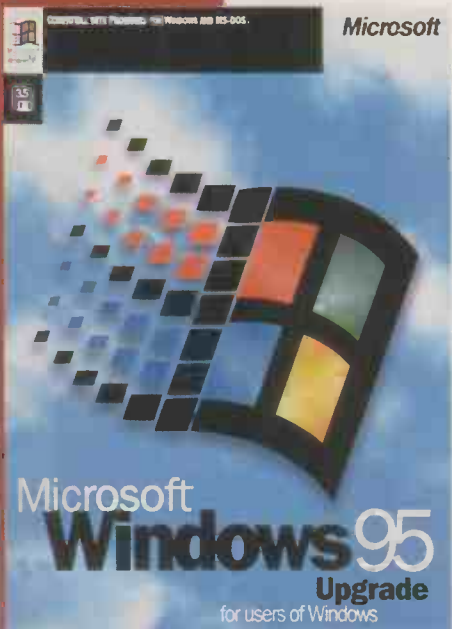
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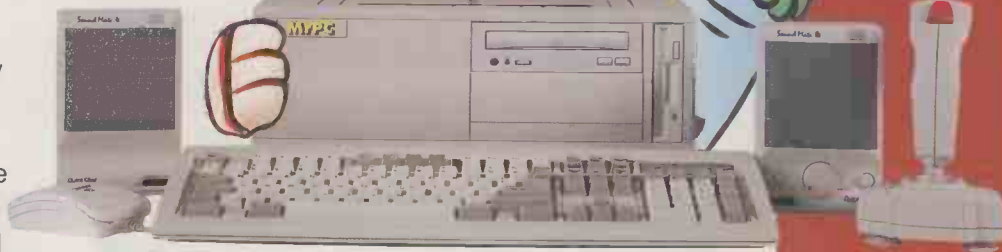
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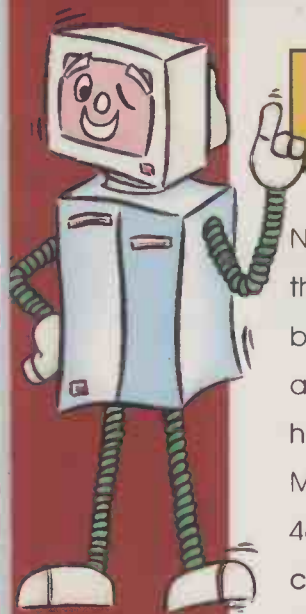
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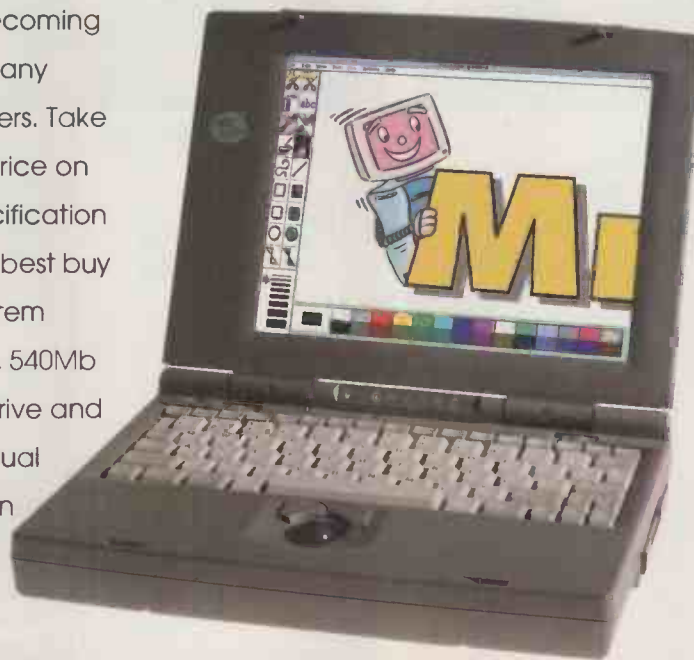
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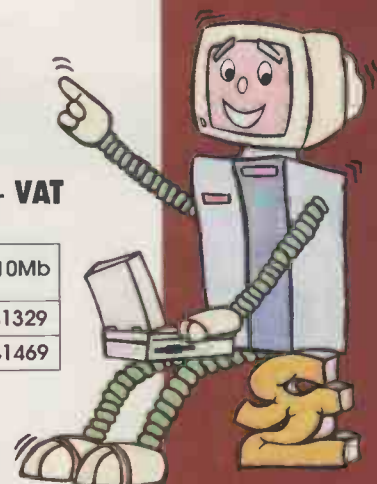
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- ✓ Graphics: VGA/SVGA, VESA local bus support
- ✓ Display: 2100 - dual scan STN mono, 9.5" diagonal
2100CS - dual scan STN Colour, 10.4" diagonal;
2100CT - high res TFT Colour LCD, 8.4" diagonal display

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- ✓ Display: CDS - STN colour LCD (640 x 480 pixel), up to 256 colours, 10.4" diagonal size
:CDT - TFT colour LCD (640 x 480 pixel), up to 65, 536 colours, 10.4" diagonal size
- ✓ Floppy Drive: CDS - External 3 1/2" 1.44MB (only available as option with 260MB version)
:CDT - external 3.5" 1.44MB (incl.)

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- ✓ Battery: NiH₂ (up to 2 hours continuous use)
- ✓ Ops System: MS-DOS 6.2x with Toshiba enhancements, MS Windows 3.11, Cardware PCMCIA cord support software, MaxTime Power Management and Plug & Play BIOS
- ✓ Included: Built-in microphone, Mousepoint, Password security and Kensington cable lock provision
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- ✓ Warranty: 36 months international (return-to-base)



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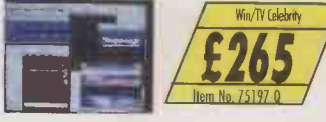
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CDA 486-011, quad Internal, IDE	76027-0	£135	
INNOVATIVE COMMUNICATIONS			
CD-952, dual, PCMCIA 2.1	78101-0	£245	
NEC (SCSI 1 & 2 I/F)			
3Ap + Portable	76194-0	£242	
4xe External	76196-0	£363	
4xi Internal	76195-0	£255	
NEC (SCSI 1 & 2 I/F KITS)			
AT ISA Bus	73050-0	£40	
PANASONIC (without I/F kit)			
CR-503, 320ms, 306KB/Sec, internal SCSI-2	75665-0	£109	
CR-562, 320ms, 306KB/Sec, internal, ISA	75664-0	£75	
CR-562B, Dual, Parallel Port	77668-0	£159	
PIONEER			
DR-U124X, Internal 4.4x IDE (with I/F)	78396-0	£135	
DR-U124X, Internal 4.4x SCSI 2	78397-0	£212	
DR-H-624X, external Jukebox 4.4x SCSI-2	78398-0	£449	
TOSHIBA			
XM-3601B, 150ms, min 660 KB/sec, Internal, SCSI-2 (w/out I/F)	77278-0	£210	
XM-3601B, 150ms, min 660 KB/sec, External, SCSI-2 (w/out I/F)	77279-0	£289	
KF-3601BA, 150ms, min 660 KB/sec, Internal, SCSI-2 (with At I/F)	77404-0	£265	
KF-3601SA, 150ms, min 660 KB/sec, Internal, SCSI-2 (with At I/F)	77405-0	£312	
WEARNEAS			
CD-220 internal ATAPI IDE	78401-0	£115	

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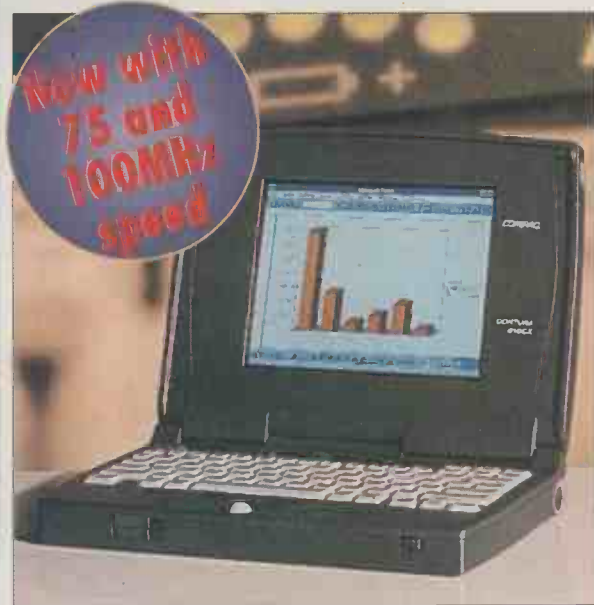
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THE NEW COMPAQ CONTURA 420 AND 430 SERIES GIVING YOU REAL PORTABLE POWER

Easy to use Notebook continuing the Compaq tradition of quality and value. These latest additions offer you great price performance. Just check out the features below

Basic specification:

- ✓ Processor: 420 i486DX4 (75 MHz) • 430 i486DX4 (100 MHz)
- ✓ Ram: 4MB or 8MB (expandable to 20MB or 32MB respectively)
- ✓ Hard Disk: 350MB up to 720MB
- ✓ Graphics: VGA/SVGA, VESA Local Bus Support
- ✓ Display: 420c or 430c dual scan STN colour, up to 256 colours, (640x480 pixels), 9.5" diagonal display
- ✓ Display: 420CX or 430CX high res TFT Colour LCD (640x480 pixel), up to 256 colours, 8.4" diagonal display
- ✓ Floppy drive: internal 3 1/2" 1.44MB
- ✓ PCMCIA Expansion: 1xR2.0 III or 2xR2.0 II
- ✓ Ops System: MS-DOS 6.2, MS Windows 3.11 (not WFWG)
- ✓ Battery: NiMH (lasts up to 5 1/2 hours)
- ✓ Included: built-in 19mm trackball
- ✓ Weight: 420-3.0Kg (6.4lbs) C or CX 2.6Kg (6.6lbs)
- ✓ Warranty: 36 months international - 1st 12 months on-site upon registration (return to Compaq)

IN STOCK NOW!

DESCRIPTION	DISPLAY SIZE	TYPE	HARD DRIVE	ITEM NO.	
CONTURA 420					
CONTURA 420C	9.5	DX4/75 COL. STN	4MB/350MB	78317-Q	£1535
CONTURA 420C	9.5	DX4/75 COL. STN	8MB/420MB	78318-Q	£1695
CONTURA 420CX	8.4	DX4/75 COL. TFT	8MB/720MB	78319-Q	£2225
CONTURA 430					
CONTURA 430C	9.5	DX4/100 COL. STN	8MB/420MB	78320-Q	£2125
CONTURA 430CX	8.4	DX4/100 COL. TFT	4MB/720MB	78321-Q	£2565

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PORTABLES

COMPAQ PORTABLES

LITE ELITE	RAM/HD	Item No.	Price
4/75C M340/W 486DX4/75	8MB/340MB	77032-Q	£1975
4/75C M510/W 486DX4/75	8MB/510MB	77033-Q	£2175
4/75CX M340/W 486DX4/75	8MB/340MB	75020-Q	£2499
4/75CX M510/W 486DX4/75	8MB/510MB	75021-Q	£2675
4/75COL M510/W 486DX4/75	8MB/510MB	77034-Q	£2975
4/75COL M810/W 486DX4/75	8MB/810MB	77035-Q	£3249
CONTURA 410	RAM/HD	Item No.	Price
410 486DX2/509.5" MONO	4MB/170MB	78550-Q	*£895
410C 486DX2/509.5" COL. STN	4MB/250MB	78551-Q	*£1375
410CX 486DX2/508.4" COL. TFT	4MB/250MB	77012-Q	£1695

* NOW WITH MS WORKS

CONTURA 420	RAM/HD	Item No.	Price
420C DX4/75COL 9.5" COL. STN	4MB/350MB	78317-Q	£1535
420CX DX4/75 9.5" COL. STN	4MB/420MB	78318-Q	£1695
420 CXDX4/75 9.5" COL. STN	4MB/720MB	78319-Q	£2375
CONTURA 430	RAM/HD	Item No.	Price
430C DX4/100 8.4" COL. STN	4MB/420MB	78320-Q	£2125
430CX DX/100 8.4" COL. TFT	4MB/720MB	78321-Q	£2725

TEXAS INSTRUMENTS

TravelMate™
5000
Maximising the Pentium's full potential



DESKTOPS

COMPAQ

PRESARIO CDS (Multimedia)	RAM/HD	Item No.	Price
522 486SX/66 14" SVGA. LOC	4MB/270MB	77986-Q	£1020
524 486DX2/66 14" SVGA. LOC	8MB/420MB	77681-Q	£1189
772 P/75 14" SVGA. LOC	8MB/535MB	77989-Q	£1625
962 P/60 14" SVGA. LOC	8MB/535MB	77991-Q	£1569
972 P/75 14" SVGA. LOC	8MB/725MB	77992-Q	£1779
PROLINEA (MONITOR REQUIRED)	RAM/HD	Item No.	Price
PROLINEA V3 4/50	4MB/270MB	77339-Q	£710
PROLINEA V3 4/66	8MB/270MB	77341-Q	£925
PROLINEA V3 4/66	8MB/420MB	77342-Q	£985
PROLINEA V3 4/100	8MB/270MB	77344-Q	£1085
PROLINEA V3 4/100	8MB/420MB	77343-Q	£1145
PROLINEA V3 5/75	8MB/270MB	77345-Q	£1199
PROLINEA V3 5/75	8MB/420MB	77346-Q	£1265
PROLINEA V4 4/66	8MB/270MB	77347-Q	£954
PROLINEA V4 4/66	8MB/420MB	77348-Q	£1019
PROLINEA V4 4/100	8MB/270MB	77349-Q	£1179
PROLINEA V4 5/75	8MB/420MB	77350-Q	£1295
PROLINEA V4 5/90	8MB/420MB	77351-Q	£1439
PROLINEA V4 5/90	16MB/720MB	77352-Q	£1695
PROLINEA V5 5/90	8MB/420MB	77357-Q	£1489
PROLINEA V5 5/90	16MB/720MB	77359-Q	£1749
PROLINEA V5 5/100	16MB/720MB	77360-Q	£2114

MODEMS

INTERNAL/PCMCIA

HAYES			
OPTIMA 144 PCMCIA 2.11 V32bis, FAX	76129-Q	£199	
OPTIMA 288 PCMCIA 2.0 FAX	78215-Q	£315	
LASAT-10 YEAR WARRANTY			
CREDIT 144 V32bis, PCMCIA 2.0 FAX	75163-Q	£165	
CREDIT 288 V34, PCMCIA 2.0 FAX	78416-Q	£199	
PACE - 5 YEAR WARRANTY			
MICROLIN FX 32+, PC BBIT ISA V32bis, FAX	73889-Q	£129	
MICROLIN FX NB32 PCMCIA 2.11 V32bis, FAX	74703-Q	£180	
MICROLIN FX NB34 PCMCIA, FAX	77910-Q	£265	
PSION DACOM - 2 YEAR WARRANTY			
GOLD CARD V32bis PCMCIA 2.11 V32bis, FAX	74526-Q	£175	
GOLD CARD V34 PCMCIA V34, FAX	77568-Q	£219	
TOSHIBA - 1 YEAR WARRANTY			
ADVANCED PCMCIA 2.11-V32 bis, FAX	70854-Q	£215	
ADVANCED PCMCIA 2.11-V34 bis, FAX	71814-Q	£339	
WORLDPORT - 5 YEAR WARRANTY			
2496 PCMCIA 2.11-V22bis, FAX	74301-Q	£129	
DUAL STD. CELLULAR, V32BIS, FAX	75652-Q	£122	
PCMCIA 28.8 2.0 V34bis FAX	78266-Q	£165	
US ROBOTICS - 5 YEAR WARRANTY			
SPORTSTER 14.4 WITH FAX V32bis, FAX	91885-Q	£110	
SPORTSTER 28.8 WITH FAX, V34 ISA	76714-Q	£162	
ZOOM - 5 YEAR WARRANTY			
ZOOM 14.4 V32BIS, FAX	74186-Q	£125	
ZOOM 28.8 V34, INTERNAL FAX	78213-Q	£165	

ZOOM 28.8X V34bis, EXTERNAL FAX 78214-Q £145
IN STOCK

DESKTOP

HAYES - 2 YEAR WARRANTY

ACCURA 144, V32bis, FAX	75092-Q	£135
ACCURA 288, V.FAST, FAX	75093-Q	£173
OPTIMA 144, V32bis FAX	74774-Q	£249
OPTIMA 288, V.FAST FAX	74775-Q	£339
OPTIMA 288 VALUE PACK	76270-Q	£645
ESP COMMUNICATIONS ACCELERATOR V2.0	74307-Q	£59
(16-BIT SERIAL BOARD, ISA PC'S & WINDOWS)		
LASAT-10 YEAR WARRANTY		
UNIQUE 144 SAFIRE V32bis, FAX	78294-Q	£120
UNIQUE 144 V32BIS, FAX	72838-Q	£195
UNIQUE 288 SAFIRE V34bis, FAX	78295-Q	£195
UNIQUE 288 V34bis, FAX	76704-Q	£295
MULTITECH - 2 YEAR WARRANTY		
MT1432BLK V32bis, FAX	91011-Q	£312
MT1932 ZDXK V32bis, FAX	74941-Q	£112
MT2834 ZDXK V34, FAX	77806-Q	£165
MT2834BLK V.F.C. - V.FAST, FAX	76234-Q	£345
PACE - 5 YEAR WARRANTY		
LINNET 32 PLUS V32bis, FAX	74346-Q	£148
LINNET 32 PLUS V32bis, VOICE/FAX	76592-Q	£225
LINNET FX V.34, FAX	77303-Q	£219
ULTRALINK 32 PLUS V32bis	94522-Q	£312
US ROBOTICS - 5 YEAR WARRANTY		
SPORTSTER 14.4 WITH FAX V32bis, FAX	91017-Q	£110
SPORTSTER 28.8 WITH FAX, V34 FAX	76610-Q	£162

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OKI LED PAGE PRINTERS AT GDI PRICES

Buy an OKI OL-400EX to give you a great value page printer that can still print from DOS

OL-400EX

Features:

- ✓ max. 4ppm output
- ✓ 1MB RAM
- ✓ Low cost per copy
- ✓ PCL4/HP2 emulation
- ✓ 42 bitmapped fonts
- ✓ Small footprint
- ✓ 12 months on site warranty



OL-400EX
£278
Item No. 71495-Q

OL-810EX
£675
Item No. 77691-Q

810EX

Features:

- ✓ max. 8ppm output
- ✓ 2MB Ram
- ✓ PCL5e emulation
- ✓ 12 TrueType, 35 Intellifonts fonts
- ✓ 12 months on site-warranty

star WINTYPE 4000

the Windows Laser Printer
Low cost, high performance

- ✓ 4ppm GDI Laser Printer
- ✓ 600dpi class Output
- ✓ Power Save Mode
- ✓ 12 Months return to manufacturer warranty



£288
Item No. 75478-Q

MINIMUM SYSTEM REQUIREMENT APPLYING INCLUDING WINDOWS 3.1 IN ENHANCED MODE

TEXAS INSTRUMENTS microMarc Color Thermal InkJet Printer

High Quality Colour at an Affordable Price

Features:

- ✓ Up to 5ppm mono
- ✓ Up to 1ppm colour
- ✓ Max 600 x 300dpi (resident fonts)
- ✓ HP DeskJet® compatible with PCL3
- ✓ Parallel I/F
- ✓ 128 KB receiver buffer
- ✓ Auto sheet feeder (120cap)
- ✓ 12 months return-to-manufacturer warranty



microMarc Color
£265
Item No. 73545-Q

INKJET PRINTERS

CANON	ITEM NO.	PRICE
BJ-30 Black	77673-Q	£152
BJ-30 White	77295-Q	£152
BJ200EX	77234-Q	£171
BJ230	91525-Q	£238
BJ300	71393-Q	£344
BJ330	71394-Q	£389
BJC-70 Black Colour	77674-Q	£225
BJC-70 White Colour	77531-Q	£225
BJC-4000 Colour	76084-Q	£232
BJC600 E Colour	77510-Q	£328
BJC800 Colour	94805-Q	£1065

EPSON	ITEM NO.	PRICE
STYLUS 800+	75400-Q	£179
STYLUS COLOUR	75397-Q	£348

HEWLETT PACKARD	ITEM NO.	PRICE
Deskjet 320	76042-Q	£165
Deskjet 320 & Support	76263-Q	£204
Deskjet 320 & CSF	76125-Q	£182
Deskjet 320 & CSF & Support	76264-Q	£215
Deskjet 540	77071-Q	£209
Deskjet 540 & Support	77080-Q	£244
Deskjet 540 & Colour Kit	77325-Q	£234
Deskjet 540 Col & Support	77333-Q	£265
Deskjet 660C Col	77073-Q	£294
Deskjet 660C Col & Support	77082-Q	£352
Deskjet 850C Col	77075-Q	£389
Deskjet 850C Col & Support	77084-Q	£449
Deskjet 1200C Col	71694-Q	£629
Deskjet 1200C & support	76093-Q	£719
Deskjet 1200C/PS Col	71752-Q	£1012
Deskjet 1600C Col	77076-Q	£829
Deskjet 1600CM Col	77077-Q	£1245
PaintJet XL300 Col	71569-Q	£1585

TEKTRONIX	ITEM NO.	PRICE
Phaser 140 Colour	77246-Q	£835

TEXAS INSTRUMENTS	ITEM NO.	PRICE
Tl microMarc Color, thermal	73545-Q	£265

Do you need a connecting cable or spare ribbons? Buy them with your printer and save money!!

LASER/THERMAL PRINTERS

Make/Model	ITEM NO.	PRICE
Brother HL-630 GDI, 6ppm	76038-Q	£324
Brother HL-630I GDI, 6ppm	76297-Q	£378
Brother HL-660 GDI	76595-Q	£464
Brother HL-1260 GDI	76596-Q	£919
Epson EPL-5200+ 6ppm	77661-Q	£462
Epson EPL-9000 A3 8ppm	76686-Q	£1058
Epson EPL-9000PS A3 8ppm	76687-Q	£1358
Fargo Primera & PC PRU	75351-Q	£599
Fargo PrimeraPro Col. Therm.	76725-Q	£1225
HP LaserJet 4L, 4ppm	71690-Q	£353
HP LaserJet 4L & Support	73002-Q	£439
HP LaserJet 5P, 6ppm	77078-Q	£579
HP LaserJet 5P & Support	77087-Q	£695
HP LaserJet 5MP, 6ppm	77079-Q	£722
HP LaserJet 5MP & Support	77088-Q	£827
HP LaserJet 4 Plus, 12ppm	75158-Q	£985
HP LaserJet 4 Plus & Support	75159-Q	£1125
HP LaserJet 4M Plus, 12ppm	75106-Q	£1299
HP LaserJet 4M Plus & Support	76463-Q	£1433
HP LaserJet 4V 16ppm	76029-Q	£1365
HP LaserJet 4V & Support	76131-Q	£1575
HP LaserJet 4MV 16ppm	76030-Q	£1989
HP LaserJet 4MV & Support	76464-Q	£2185
HP LaserJet 4Si 16ppm	71692-Q	£2085
HP LaserJet 4Si & Support	76113-Q	£2549
HP LaserJet 4Si/MX, 16ppm	71756-Q	£2965
HP LaserJet 4Si/MX & Support	76462-Q	£3395
HP Color LaserJet A3	76698-Q	£4195
HP Color LaserJet A3 & Support	77057-Q	£5395
Kyocera FS-400	77063-Q	£435
Kyocera FS-1550	76258-Q	£875
Kyocera FS-1600	76259-Q	£1069
Man Tally T9005, 5ppm	93749-Q	£325

NEC	ITEM NO.	PRICE
SuperScript Color	76775-Q	£654
3000GDI Thermal	76775-Q	£654
NEC SuperScript 610+, 6ppm	76558-Q	£282
NEC SuperScript 660, 6ppm	76565-Q	£405
NEC SuperScript 660i, 6ppm	76566-Q	£545
OKI OL400ex 4ppm	71495-Q	£278

LASER/THERMAL PRINTERS Cont.	ITEM NO.	PRICE
OKI OL410ex, 4ppm	74833-Q	£384
OKI OL810ex, 4ppm	77691-Q	£675
Panasonic KXP4430, 5ppm	94780-Q	£484
Panasonic KXP4440, 10ppm	74084-Q	£706
Panasonic KXP6100, 6ppm GDI	77649-Q	£268
Panasonic KXP6150, 6ppm GDI	78241-Q	£315
Star WinType 4000 GDI 4ppm	75478-Q	£288
Star WinType 800C Thermal	75700-Q	£595
Tl microLaser 600, 5ppm	73550-Q	£595
Tl microLaser Pro 600 PS-23, 8ppm	73547-Q	£859
Tl microLaser Pro 600 PS-65, 8ppm	76579-Q	£999
Tl microLaser Pro E1 12ppm	65325-Q	£969
Tl microLaser Power Pro, 12ppm	73546-Q	£1099

CBP Starter Kit
The CBP Printer Starter Kit provides you with everything you need to get up and running and contains:
1 x Parallel connecting cable
1 x Replacement consumable
1 x Ream A4 paper
We carry starter kits for all our top selling printers.
For Example:
Starter Kit for the HP LaserJet 4L is Item No. 76128-P at £49.95 (individual items would cost £56.30. Save £6.35 plus carriage costs)

DOT MATRIX PRINTERS

EPSON	ITEM NO.	PRICE
LX-300 9 pin	75451-Q	£95
LX-300 Colour Kit	75452-Q	£29
FX-870 9 Pin	71036-Q	£245
FX-1170 9 Pin	71018-Q	£299
LQ300 24 Pin	76651-Q	£147
LQ-570+ 24 Pin	71610-Q	£212
LQ-870 24 Pin	94019-Q	£377
LQ-1070+ 24 Pin	73860-Q	£298
LQ-1170 24 Pin	94020-Q	£435
DFX-5000 9-Pin	71508-Q	£1179
DFX-8000 9-Pin	73463-Q	£2019
DLQ-3000 24 Pin	75959-Q	£789

NEC	ITEM NO.	PRICE
PinWriter P2Q 24 Pin	72782-Q	£98
PinWriter P3Q 24 Pin	75589-Q	£178
PinWriter P72 24 Pin	71499-Q	£372

OKI	ITEM NO.	PRICE
ML321 9 Pin	71317-Q	£365
ML395B 24 Pin	71795-Q	£635
ML520 9 Pin	71482-Q	£355
ML521 9 Pin	71483-Q	£395
ML591 24 Pin	71020-Q	£499

PANASONIC	ITEM NO.	PRICE
KX-P1150 9 Pin	72974-Q	£89
KX-P3696 9 Pin	76648-Q	£266
KX-P2023 24 Pin	73145-Q	£108
KX-P 2124 24Pin	76143-Q	£199
KX-P2135C 24 Pin	76144-Q	£125
KX-P3626 24 Pin	76649-Q	£252

STAR	ITEM NO.	PRICE
LC-90 9-Pin	76351-Q	£79
LC100 9 Pin Col	92667-Q	£89
LC15 9 Pin	71797-Q	£177
LC24-15 Mk II	72783-Q	£230
LC-240 24 Pin Mono	76354-Q	£90
LC-240 24 Pin Colour	76355-Q	£103

See Warranty Key Below

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PRINTER MANUFACTURER'S WARRANTY DETAILS

† = Does not include On-Site Maintenance * = 1 Year On-Site Maintenance
** = 2 Year On-Site Maintenance *** = 3 Year On-Site Maintenance
Please note: Panasonic on-site warranty is limited to the UK Mainland

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THE GOLD CARD RANGE OF PCMCIA credit-card sized modems are the first choice of thousands of notebook users across Europe. Data throughput rates of 115,200bps and 57,600bps (V34 and V32bis respectively) are achievable and fax throughput on both models rate at 14,400bps (V17). Fax and comms software and CompuServe introductory kits are available.



ALSO AVAILABLE WITH 8 BIT ISA ADAPTOR TO CONNECT TO YOUR DESKTOP CALL FOR DETAILS

Gold Card V32bis
£175
Item No. 74526-Q

Gold Card V34
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Item No. 77568-Q

NEC Special offer -FREE NEC P100 Mobile Phone and connection* with every monitor purchased from CBP before 31-10-95. This special offer is a great way to enter the world of mobile communications

Features •15"; •28mm dot pitch •VESA, DPMS, NUTEK and Energy Star compliant •MPRII •max. res. 1024x768 @80Hz •2 year CRT warranty. Call for details of other monitors
*Subject to status



NEC XV15
£279
Item No. 76970-Q

LASAT

CREDIT PCMCIA - THE AWARD WINNING FAX/MODEM

The credit PCMCIA has received the Reviewer's Choice in a recent survey in Personal Computer magazine and Highly Recommended in Personal Computer World. Outstanding features include Autosync and a 16,500 UART chip for speeds up to 115,200 bps. An unsurpassed 10 year warranty is also included.



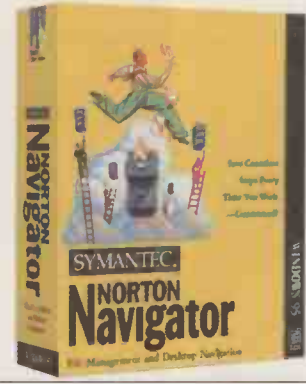
CREDIT 144
£165
Item No. 75163-Q

CREDIT 288
£199
Item No. 78416-Q

SYMANTEC™

Norton Navigator for Windows 95

Guarantees to make file management and working in Windows 95 faster and easier. Ever used Norton Desktop or PC Tools? Well here's the natural successor written just for Windows 95! Spend less time navigating the desktop and more time being productive Use fewer steps and clicks to accomplish everyday system tasks. Locate and launch files more quickly and easily. Improved desktop, application and file organization.



Norton Navigator
£69.95
Item No. 34654-Q

The NEW Kyocera FS-400 The advanced personal page printer that saves on print costs

KYOCERA

A compact 4ppm personal page printer that offers full system printer capabilities and savings on print costs due to its cartridge-free design.

Kyocera are the company which introduced low-cost printing, the FS-400 is a low cost printer that offers unrivalled potential for small businesses or organisations needing a low-volume centralised printing resource.

The only consumable needed is toner, cartridge waste is eliminated by a long life drum for a considerable reduction in page printing costs.



STANDARD FEATURES:

- Output:** 4ppm
- Emulations:** HPLJIII, IBM X24E, Epson LQ-850
- RAM:** 1MB
- Resolution:** 300 x 300dpi/300 x virtual 1200 IRT
- Interfaces:** Centronics Parallel plus high speed option I/O port
- Fonts:** 79 bitmapped, 13 scalable
- Small footprint:**
- Dimensions:** 353W x 350D x 173Hmm

OTHER MEMBERS OF THE ECOSYS COST-CUTTING, PLANET FRIENDLY PRINTER RANGE

- Input Trays:** 1 x 100 sheet Universal
- Output Trays:** 1 x 100 sheet face down



FS-400
£435
Item No. 77063-Q

FS-1550
£875
Item No. 76258-Q

FS-1600
£1069
Item No. 76259-Q

MEMORY UPGRADES • BATTERY PACKS • POWER ADAPTORS • MODEMS • CARRY CASES • KEYBOARDS • CRYPT CARDS • DOCKING STATIONS • EXTRA 2 YEAR WARRANTY • CLEARANCE SPECIALS!

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REMEMBER! IT'S THE DELIVERED COST THAT COUNTS!

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All prices and manufacturer's specifications are subject to change without notice. Please check suitability with the manufacturers before ordering. Goods are not offered on a trial basis. Goods are offered for sale subject to our standard conditions of sale available on request. Re-stocking fees may be charged. E. & O.E.

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- 1 Identify the products you need and their item code (e.g. OS050-Q).
- 2 Call us on **0181 982 6380** or Fax us on **0181 982 6367** Or post your order to the Address above
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UPGRADING TO WINDOWS 95? CHECK OUT YOUR SYSTEM. YOU MAY NEED EXTRA RAM MEMORY TO GET THE FULL BENEFIT

SOFTWARE III WINDOWS 95

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WE WILL MATCH ANY DELIVERED PRICE ADVERTISED IN THIS MAGAZINE

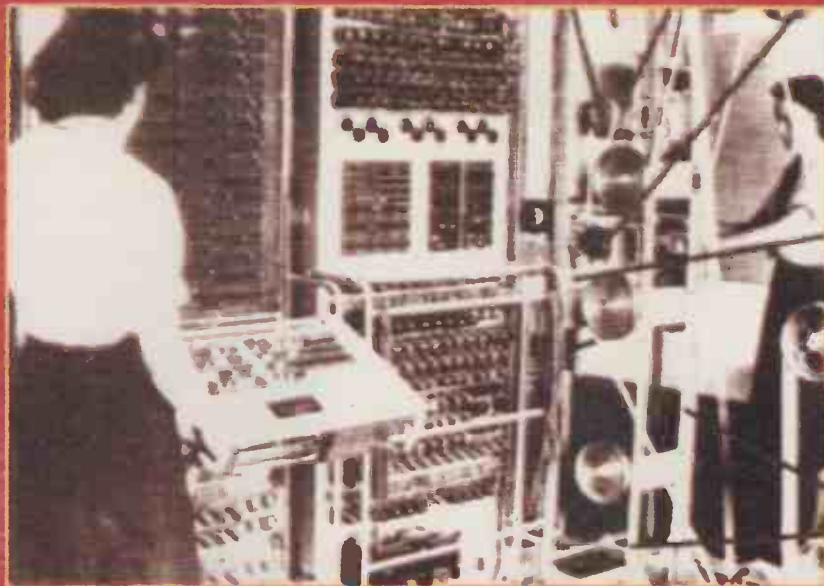
All prices exclude delivery and VAT at 17.5% Always quote the Product Item No. when you contact us.

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"The earliest programmable electronic computer was a 1500 valve
giant code named Colossus.

Formulated by Professor Max HA Newman and built by
TH Flowers, it was installed at Bletchley Park, Bucks in December
1943 to break the German coding machine "Enigma".

Today, more than 50 years on, Colossus Computer Corporation
Limited announce a comprehensive new range of PC systems,
workstations, servers, notebooks, portables and multimedia specially
built and formulated (SBF) to your individual needs plus
software, solutions and support".



Welcome please, the New Colossus SBF Series



COLOSSUS

Meet the New Colossus SBF Office Series

About Colossus

We are Colossus Computer Corporation Ltd, a wholly owned subsidiary of the Granville Technology Group of Companies, the UK's premier direct PC supplier, with a customer base approaching 200,000. While we are fascinated about the early history of electronic computers (and happy to send you more information), our main task, of course, is to ensure that you, our customer, get the best deal around.

The Colossus Company is uniquely positioned in the PC marketplace in that we enjoy the stability of being part of a thoroughly and financially sound parent company, however, at the same time we have the flexibility of a manufacturing base that enables us to build and formulate system(s) and solution(s) specifically and, indeed, individually to our customers' needs.

Colossus Quality and Service

Our manufacturing facility is streamlined. We use the most advanced design and engineering techniques and our "Burn In" testing procedures coupled with the fact that we buy only the finest components for our systems will guarantee "Award Winning" Colossus reliability. As far as our service is concerned, from placing your order, through the delivery process, right through to free Technical Support, you will find at Colossus only knowledgeable and helpful people to advise you.

The Colossus Range

Whatever system or systems you choose, you will discover that we can meet your every need to enable you to cope with today's, and importantly, tomorrow's fast moving developments in software and hardware technology. At Colossus we build every PC, client server, workstation, and transportable using our "Building Block" principle of upgrade paths right through to full solutions. Our Networking Division team provide advice on complete network systems and we are able to offer a complete range of networking services which embrace consultancy, comprehensive quotations, full installation, cabling, implementation of multi-user network applications, training and support.

Colossus BS5750

Having achieved BS EN ISO 9002 (BS5750 Quality Standards), we at Colossus have proven beyond doubt our ability to build, configure, install and maintain computer systems, and it is testament to the quality of our service and the reliability of our product, as well as our consistent value for money that the majority of our business comes from existing and recommended customers.

Colossus Warranties

In our book "The Customer is King". (that's part of our mission statement), so, customer satisfaction and peace of mind are key objectives for us at Colossus. All our systems carry a full back-to-base 12 months parts and labour warranty as well as technical telephone support and we also offer a choice of on-site maintenance options and extended warranties.

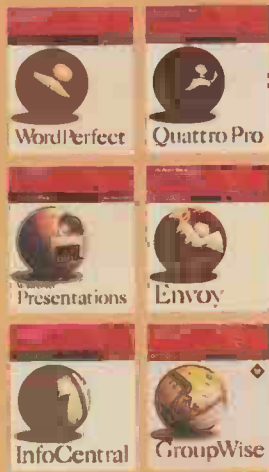
Colossus Terms of Trading

We offer credit facilities and business leasing to corporate customers (according to status). Official Government and Educational orders are welcomed. Payment can also be made by Visa, Access, Amex, cheque, etc. We can also offer finance facilities for individual customers, once again according to status.

The Colossus Range - Want to know more?

Just give us a call on the number below and you will be in touch with one of a team of knowledgeable and highly trained sales staff.

Believe us or believe us not, with new powerful software such as PerfectOffice (included here as standard) and with Windows 95 round the corner, anything less than our minimum recommended specification (which includes 8Mb RAM and Quad Speed CD) is a "NO NO", and really just doesn't make sense. Compare us like-for-like with any of our competition and you will find our systems really do stack up as the PerfectOffice Systems.



Colossus SBF Office Systems minimum specification

- 486DX2-66 processor
- Pentium® upgradeable
- 64 bit PCI graphics 1Mb
- 256k fast cache
- 8Mb RAM
- 3.5" 1.44Mb floppy drive
- 7 bay desk top case
- 14" low radiation 0.28 DP colour monitor non interlaced SVGA
- 1 parallel and 2 serial ports
- 540Mb 11ms enhanced IDE Hard Disk
- Quad speed CD-ROM drive
- 102 keyboard and mouse
- Latest MS DOS & Windows for Workgroups 3.11 (Windows 95 optional)
- Novell PerfectOffice with 6 leading software applications pre-loaded and ready to use

£999 +VAT

Colossus SBF Office Series Processor options (specifications as above)

DX2-66 £999 +VAT	Pentium processor models are inclusive of the Intel Triton chipset	75MHz Pentium® £1149 +VAT	100MHz Pentium® £1309 +VAT
DX4-100 £1049 +VAT		90MHz Pentium® £1229 +VAT	133MHz Pentium® £1549 +VAT

Colossus SBF Upgrade Options (add the following amount)

Card upgrades	Monitor upgrades
16-bit sound card and stereo speakers _____ +£50	14" to 15" _____ +£70
16-bit ethernet LR2000 combi card _____ +£40	14" to 17" _____ +£300
14,400 BAPT internal fax/voice/data modem with voice, fax and data software _____ +£80	Memory upgrades
Hard disk drive upgrades	System RAM upgrade for each 4Mb RAM _____ +£110
From 540Mb to 850Mb _____ +£50	Video DRAM upgrade to 2Mb _____ +£40
From 540Mb to 1.08Gb _____ +£100	Video upgrade to 2Mb VRAM _____ +£140
From 540Mb to 1.60Gb _____ +£200	Video upgrade to 4Mb VRAM _____ +£260



Certificate No. FS 28122
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NOVELL



pentium PROCESSOR



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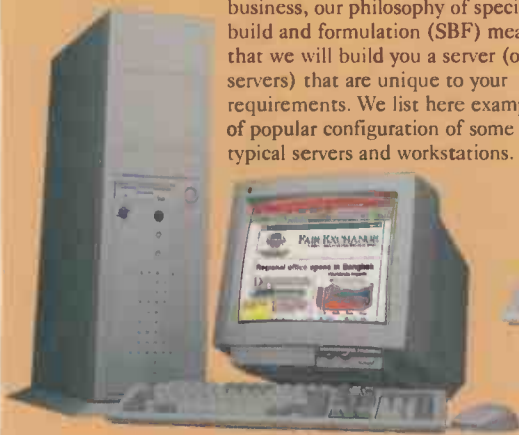


All prices exclude delivery and VAT (17.5%). Delivery-Systems £19, Lasers and large items £15, software and small items £10. Visa/Access/American Express/Switch and Government orders welcome. Prices, specifications and offers are subject to change and subject to our conditions of sale copies of which are available on request. Mail order only. No collections please. Goods are normally despatched within 7 days. All orders will be fulfilled within 28 days unless otherwise specified. Software is pre-loaded, back-up CD and manuals are available as options. E&OE.

Sales Lines are open Monday - Friday 9.00am - 6.00pm

Meet the New Colossus SBF Servers & Workstations

We did think about giving you lists and lists of specifications of our Novell Server options, but, frankly, server specifications are so unique to each individual business, our philosophy of specific build and formulation (SBF) means that we will build you a server (or servers) that are unique to your requirements. We list here examples of popular configuration of some typical servers and workstations.



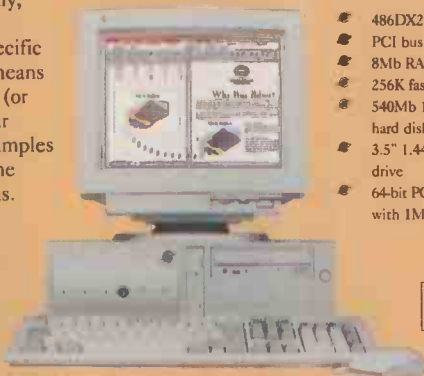
Colossus SBF 90MHz Pentium® Processor Server

- Intel 90MHz Pentium® processor
- Intel Triton PCI chipset
- Heavy duty power supply
- 9 drive bay full tower
- 16Mb RAM
- 256K fast cache
- 1.6Gb IDE hard disk
- SCSI II drive options with Adaptec 2940 PCI SCSI controller available
- 16-bit Ethernet card
- 3.5" 1.44Mb floppy drive
- 64-bit PCI bus graphic with 1Mb
- 14" SVGA 0.28 colour monitor
- 102 keyboard and mouse
- Select desired Novell Netware operating system
- Select required server options

£1529 +VAT

100Mhz Pentium +£80

Colossus SBF Desktop Network Workstation



- 486DX2-66 processor
- PCI bus
- 8Mb RAM
- 256K fast cache
- 540Mb 11ms IDE hard disk
- 3.5" 1.44Mb floppy drive
- 64-bit PCI bus graphics with 1Mb
- 14" 0.28 colour SVGA monitor
- 16-bit ethernet card
- 102 keyboard & mouse
- MS DOS & Windows for Workgroups 3.11 (Windows 95 optional)

£889 +VAT

Processor Upgrades

DX4-100 +£50 +VAT	75MHz Pentium® +£150 +VAT	90MHz Pentium® +£230 +VAT
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Midi Tower case +£10.00

Networking Example

Network configurations are infinite. Whether you require a peer to peer Network or a Client Server Network, we can offer you a complete Network Solution. Just call the number below and ask for the Network Division. Our typical Client Server plus 4 Network Stations plus software can cost as little as £6,000.



Colossus SBF Server & Networking Upgrade Options (add the following amount)

Hard Disk Upgrades	Memory Upgrades	Multimedia	Modems	Server Options (Call for details)
540Mb to 850Mb +£50	System RAM per 4Mb +£110	Double speed CD-ROM +£60	14,400 BAPT fax/voice/data modem including software +£80	Novell Netware 4.1 5 User +£100
540Mb to 1.08Gb +£100	1Mb video RAM to 2Mb +£40	Quad Speed CD-ROM +£100	28.8 Fax/Data Modem +£150	Novell Netware 4.1 10 User +£150
540Mb to 1.60Gb +£200	Monitor Upgrade	16-bit sound card +£40	Tape Backup	Novell Netware 4.1 25 User +£300
850Mb to 1.08Gb +£50	14" SVGA to 15" SVGA +£70	SoundBlaster AWE32 Value +£130	800Mb Tape back-up +£150	Cheyenne ARCserve Software
850Mb to 1.6Gb +£150	14" SVGA to 17" SVGA +£300	Network Cards	1.7Gb Tape back-up +£220	APC Smart UPS 600
1.08Gb to 1.60Gb +£100	Case Style	16-bit ethernet card combi +£40	2Gb SCSI DAT drive only +£600	APC Smart-Ups 900
1.6Gb to 2Gb SCSI II +£380	Midi tower case +£110	16-bit ethernet 3COM +£70	4Gb SCSI DAT drive only +£750	Powerchute Plus for Novell
Adaptec SCSI controller +£200	Full tower case +£50	32-bit PCI ethernet card +£150		Network installation & cabling

Colossus SBF Stand Alone Workstation 1



486DX2-66
£849 +VAT
DX4-100 CPU +£50

- 486DX2-66 processor with PCI bus
- 8Mb RAM
- 256K fast cache
- 540Mb 11ms IDE hard disk
- 3.5" 1.44Mb floppy drive
- 64-bit PCI bus graphic with 1Mb
- 14" 0.28 colour SVGA monitor
- 102 keyboard and mouse
- MS DOS & Windows for Workgroups 3.11 (Windows 95 Optional)

Colossus SBF Stand Alone Workstation 2



75MHz Pentium®
£1049 +VAT
90MHz Pentium® +£80
100MHz Pentium® +£160

- Intel 75MHz Pentium® processor
- PCI bus with Intel Triton chipset
- 8Mb RAM
- 256K fast cache
- 850Mb 11ms enhanced IDE hard disk
- 3.5" 1.44Mb floppy drive
- 64-bit PCI bus graphics with 1Mb
- 14" 0.28 colour SVGA monitor
- 102 keyboard and mouse
- MS DOS & Windows for Workgroups 3.11 (Windows 95 Optional)

Colossus SBF Stand Alone Workstation 3



90MHz Pentium®
£1539 +VAT
100MHz Pentium® +£80
133MHz Pentium® +£320

- Intel 90MHz Pentium® processor
- PCI bus with Intel Triton chipset
- 16Mb RAM
- 256K fast cache
- 1.6Gb 10ms enhanced IDE hard disk
- 3.5" 1.44Mb floppy drive
- 64-bit PCI bus graphics with 2Mb
- 14" 0.28 colour SVGA monitor
- 102 keyboard and mouse
- MS DOS & Windows for Workgroups 3.11 (Windows 95 Optional)

Meet the New Colossus SBF Power Notebook Systems

The new range of Colossus "on the move" Power Notebooks incorporate advanced features and high specifications such as exchangeable hard disk drives up to 1.2Gb, RAM capacity up to 32Mb as well as multimedia capabilities. With advanced touch pad mouse, Vesa local

bus graphics, a choice of upgradeable screens and preloaded with Novell PerfectOffice with its six leading applications, the high specification Colossus Notebook systems can be specifically built and formulated by us for you at prices that are highly competitive.

Colossus SBF Mono



£1109_{+VAT}

- 486DX4-75 Processor (486DX4-100 £100 extra)
- 4Mb RAM expandable to 32Mb
- Removable 1.44Mb 3.5" floppy disk drive
- Removable 340Mb hard disk drive
- Choice of mono, Dual Scan or TFT Screen
- 1Mb VESA local bus graphics
- 86 key keyboard, 12 function keys
- One DB-25 pin parallel port. Bi-directional with EPP/ECP support. One 9 pin serial port (16550 UART), keyboard, external monitor & mouse ports PS/2 type
- Additional ports for docking and optional IRDA and TV tuner modules.

Colossus SBF Dual Scan



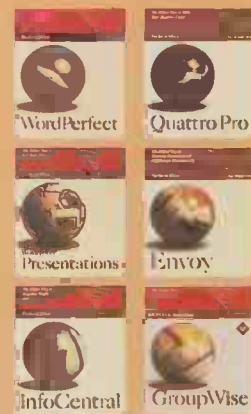
£1479_{+VAT}

- Two speakers built-in (SoundBlaster & Windows Sound System 2.0 compatible). Optional - Sound card module
- Two type II, or one type III PCMCIA slot
- LCD icon indicators
- Nickel metal hydride (NiMH) battery, 120/240 auto-switching adaptor. Full APM support. System supports suspend to RAM and suspend to disk functions
- Phoenix Systems BIOS, Flash upgradeable. Includes setup in ROM, user-defined power management options
- 8.85"(D) x 11.62"(W) x 1.97"(H). Weight 6.2 pounds
- MS DOS 6.22, Windows 3.11 for Workgroups
- Novell PerfectOffice Suite pre-loaded

Colossus SBF TFT



£1979_{+VAT}



Upgrades & Options

RAM upgrade per 4Mb	_____	+£140
From 340Mb to 540Mb hard drive	_____	+£90
From 340Mb to 810Mb hard drive	_____	+£260
From 340Mb to 1.2Gb hard drive	_____	+£480
486DX4-75 to 486DX4-100 CPU	_____	+£100
12v DC car adaptor	_____	+£60
Additional NiMH battery	_____	+£99
Docking station	_____	+£329
SMART battery pack	_____	+£120
Sound card module	_____	+£80
TV tuner module, Infra-red & port Replicator	_____	£TBA

Meet the New Colossus SBF Power Portable Systems



pentium
PROCESSOR

The new Colossus Power Portable range provides incredible computing power for users who need desktop performance in a portable package. They are designed for mobile and industrial applications that require

speed, expandability, and ruggedness and the most popular uses are in network management, instrumentation, data capture, presentations and multimedia applications.

Colossus SBF CRT Colour



£1679_{+VAT}

- Colossus CRT portable features 9" Sony SVGA colour monitor
- Colossus "Lunchbox" portable case features LCD VGA Mono, Dual Scan Colour or TFT Colour screens
- 486DX2-66 processor
- 8Mb RAM expandable to 128Mb
- 256K External cache & PCI bus

Colossus SBF Mono



£1399_{+VAT}

- 540Mb IDE hard drive
- 3 drive bays and 5 slots
- 3.5" 1.44Mb floppy drive
- PCI s3 64-bit 1Mb graphics on CRT model (special card in others)
- Parallel & 2 serial ports & keyboard
- MS DOS & Windows 3.11 for Workgroups (Windows 95 optional)

Colossus SBF Dual Scan



£2099_{+VAT}

- Colossus Portable Upgrades**
- | | | |
|----------------------------------|-------|-------|
| From 540Mb to 810Mb | _____ | +£50 |
| From 540Mb to 1.08Gb | _____ | +£100 |
| From 540Mb to 1.60Gb | _____ | +£200 |
| from 540Mb to 2Gb SCSI II | _____ | +£580 |
| Adaptec 2940 PCI SCSI controller | _____ | +£200 |

- Processor Upgrades**
- | | | |
|-------------------------------|-------|-------|
| From 486DX2-66 to 486DX-100 | _____ | +£50 |
| From 486DX2-66 to P75 Triton | _____ | +£150 |
| From 486DX2-66 to P90 Triton | _____ | +£230 |
| From 486DX2-66 to P100 Triton | _____ | +£310 |
| From 486DX2-66 to P133 Triton | _____ | +£550 |

Colossus SBF TFT



£2999_{+VAT}

- Other Options**
- | | | |
|--------------------------------|-------|-------|
| NEC 6XI SCSI CD-ROM | _____ | +£300 |
| NEC SCSI/AT adaptor | _____ | +£60 |
| 16-bit sound card | _____ | +£40 |
| SoundBlaster AWE 32 Value | _____ | +£130 |
| 14" additional screen | _____ | +£160 |
| 15" additional screen | _____ | +£230 |
| 17" additional screen | _____ | +£460 |
| 14.4 BABT voice/fax/data modem | _____ | +£80 |
| 28.8 BABT fax/data modem | _____ | +£150 |
| 800Mb Tape back-up | _____ | +£150 |
| 1.7Gb Tape back-up | _____ | +£220 |

Additional RAM

RAM per additional 4Mb _____ +£110

Meet the New Colossus Home/Office High Spec Multimedia & More

If you are taking the plunge on multimedia, PLEASE DO IT PROPERLY. We have taken a long, hard look at the minimum specifications we believe make sense for our Multimedia Systems and have decided to include in all our systems, voice/fax/data modems (also for Internet use), quad speed drives as well as Novell PerfectOffice. We have even included the "PipeX Internet 30 day trial pack" which you will find fascinating.

£1149 +VAT
486DX4-100 +£50
850Mb Models +£50



- 486DX2-66 processor
- 8Mb RAM
- 256K fast cache
- 540Mb 11ms IDE hard disk
- 3.5" 1.44Mb floppy drive
- 64-bit s3 PCI bus graphics with 1Mb
- 8 bay Midi-Tower case (or 7 bay Desktop case £10 less)
- 14" 0.28 colour SVGA monitor

- 102 keyboard and mouse
- BAPT approved 14,400 fax/data/voice modem
- Quad speed CD-ROM drive
- 16-bit sound card and speakers
- MS DOS & Windows for Workgroups 3.11 (Win 95 optional)
- Novell PerfectOffice Software
- PIPEX Internet access pack

- CD Software**
- Time Almanac CD
 - Bodyworks 3.0 CD
 - UFO for Windows CD
 - Dinosaur Museum CD
 - EZ Language CD
 - Play & Learn Educational CD

Colossus 75MHz Pentium® Multimedia

£1399 +VAT

- Intel 75MHz Pentium® processor
- Intel Triton PCI chipset
- 8Mb RAM & 256K fast cache
- 850Mb 10ms enhanced IDE hard disk
- 3.5" 1.44Mb floppy drive
- 64-bit PCI bus graphics with 1Mb
- 7 bay Desktop case (Midi Tower optional)
- 15" 0.28 colour SVGA monitor
- 102 keyboard and mouse
- 14,400 BAPT fax/data/voice modem
- Quad speed CD-ROM drive
- 16-bit sound card and speakers
- MS DOS & Windows for Workgroups 3.11
- Novell PerfectOffice Software Suite
- 6 CD multimedia titles
- PIPEX Internet access 30 day trial pack

Colossus 90MHz Pentium® Multimedia

£1789 +VAT

- Intel 90MHz Pentium® processor
- Intel Triton PCI chipset
- 16Mb RAM & 256K fast cache
- 1080Mb 10ms enhanced IDE hard disk
- 3.5" 1.44Mb floppy drive
- 64-bit PCI bus graphics with 2Mb
- 7 bay Desktop case (Midi Tower optional)
- 15" 0.28 colour SVGA monitor
- 102 keyboard and mouse
- 14,400 BAPT fax/data/voice modem
- Quad speed CD-ROM drive
- 16-bit sound card and speakers
- MS DOS & Windows for Workgroups 3.11
- Novell PerfectOffice Software Suite
- 6 CD multimedia titles
- PIPEX Internet access 30 day trial pack

Colossus 100MHz Pentium® Multimedia

£2199 +VAT

- as 90MHz Pentium® with
- Intel 100MHz Pentium® processor
- 1600Mb 10ms IDE hard disk
- 64-bit PCI bus graphics with 2Mb
- 17" 0.28 colour SVGA monitor

Colossus 133MHz Pentium® Multimedia

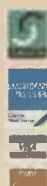
£2599 +VAT

- as 100MHz with 133MHz Pentium® processor and 4Mb VRAM Video RAM

Multimedia Options

- PC TV card with Teletext +£160
- SoundBlaster AWE32 value upg. +£90
- 14.4 to 28.8 fax/data modem upg. +£70

All prices exclude delivery and VAT (17.5%). Delivery-Systems £19, Lasers and large items £15, software and small items £10. Visa /Access/ American Express /Switch and Government orders welcome. Prices, specifications and offers are subject to change and subject to our conditions of sale copies of which are available on request. Mail order only. No collections please. Goods are normally despatched within 7 days. All orders will be fulfilled within 28 days unless otherwise specified. Software is pre-loaded, back-up CD and manuals are available as options. E&OE.



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4-Port Multi-User Serial Card

High Quality AT Bus 4-Port Serial Communications Card. Shown above. Supplied with 16550 UARTs for baud rates to 115kbps

- ▼ Port address 100H - 3F8H
- ▼ Interrupts IRQ2-7, 10-12, 15
- ▼ Transmit & Receive LEDs
- ▼ Compatible with Arnet 4-Port Card
- ▼ Can be used for adding 4 ports to Windows and SCO Unix
- ▼ Also supports RS422/RS485
- ▼ Supplied with 4-way cable set

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16550 Serial Card

Ideal for hardware requiring high speed communications. Highly recommended for Windows.

- ▼ Two 16550 serial ports COM1-COM4, IRQ2-5
- ▼ Bi-directional Parallel Port LPT1-LPT3, IRQ5,7
- ▼ Optional games port
- ▼ Enable/disable any port

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AT bus Serial Card

The most flexible 2-Port Serial Card on the market. Supports any port address and high interrupts. Perfect for COM1-COM4 under windows.

- ▼ 2 RS232 serial ports
- ▼ Interrupts IRQ2-7, 10-12, 14-15
- ▼ Port address 100H-3F8H
- ▼ 16 bit AT bus

£75

Add £20 for 16550 option

Dual RS422/RS485 Card

Offering 2 high speed serial ports for transmissions up to 4000 feet

- ▼ 2 RS422/RS485 serial ports
- ▼ Supplied with 16550 UARTs
- ▼ Up to 115K baud
- ▼ Port address 200H-3F8H
- ▼ IRQ2-7, 10-12, 15
- ▼ 16 bit AT bus

£89

Also Isolated RS422/RS485 Card £109

DigiBoard Serial Cards

The Best Engineered Multi-Channel Boards on the market today. The DigiCHANNEL PC/X is ideal for use in multi-user environments, most operating systems are supported with drivers available for DOS, XENIX, UNIX, OS/2, and many more.

PC/4	4-Port RS232 Card	£295
PC/8	8-Port RS232 Card	£395
PC/16	16-port RS232 Card	£750
PC/4s	4-Port with 16550	£325
PC/8s	8-Port with 16550	£450
PC/16s	16-Port with 16550	£850

DigiBoard PC/Xe Cards

The DigiCHANNEL PC/Xe range are intelligent multi-port RS232 high speed communication boards with on-board 80186 processor and 64K memory for increased throughput. Drivers available for DOS, Windows NT, Windows, OS/2, Xenix and UNIX.

PC/2e	2-Port Intelligent Card	£189
PC/4e	4-port Intelligent Card	£395
PC/8e	8-Port Intelligent Card	£495

DigiBoard PC/Xem System

An Intelligent Modular System offering 16 to 64 high speed serial channels. The system comprises one host adapter with on-board 20MHz RISC processor and 1 to 4 external concentrators each providing 16 serial ports. Data rates of 115kbps can be achieved on 32 ports. Drivers for DOS, SCO UNIX, OS/2, Netware Connect and Windows NT.

PC/Xem	Host Adapter	£395
Ports/16em	Connector Box	£600

Isolated RS232 and Current-Loop Card

Providing 2 Isolated RS-232 or current loop serial ports with baud rates up to 56Kbps.

- ▼ Supplied with 16550 UARTs
- ▼ Provides 500VDC isolation
- ▼ Port address 200H - 3F8H
- ▼ Interrupts IRQ2-7, 10-12, 15
- ▼ 16-Bit AT bus

£119

Synchronous Serial Card

Single channel, multi-protocol communications adapter which uses an AMD 85C30-10 serial communications controller (SCC) as standard.

- ▼ RS232 interface
- ▼ Synchronous mode to 1.23M baud
- ▼ IRQ2-7, 10-12, 14-15
- ▼ DMA Channels 1 - 3

£220

Also Synchronous RS422/RS485 £220

Remote Data Acquisition Modules for RS485 Network

ADAM Modules (shown below) are compact intelligent sensor-to-computer interface units designed specifically for reliable operation in harsh environments. Their built-in microprocessors, encased in rugged industrial grade plastic packages provide analog I/O, digital I/O, thermocouple measurement and data display. Each module has a built-in RS485 serial interface for data transfer with the host computer.



Isolated RS232/RS485 Converter

ADAM modules need only 2 wires to communicate with their controlling host computer over a multidrop RS-485 network. ADAM modules also accept any power source between 10V and 30V and are protected against power reversal.

- ▼ Automatic control of data flow
- ▼ Input RS232 (4-wire)
- ▼ Output RS485 (2-wire)
- ▼ Baudrate 1.2K to 38.4K

£99

Analog Input module

ADAM modules can accommodate multiple types and ranges of analog input. You select type and range remotely by issuing ASCII commands from your host computer.

- ▼ Input for thermocouple, mV, V, or mA
- ▼ Input range 15mV to 2.5V, 20mA
- ▼ 10 samples per second
- ▼ 1 digital input / event counter
- ▼ 2 digital outputs
- ▼ Baudrate 1.2K to 19.2K

£165

ADAM Modules

ADAM 8ch Analog Input Module	£210
ADAM 8ch Thermocouple Module	£225
ADAM Analog Output Module	£165
ADAM Digital I/O Module	£119
ADAM Relay Output Module	£119
ADAM Counter/Frequency Module	£210
ADAM IP66 Industrial Enclosure	£85
ADAM Power Supply Unit 24V	£149

PCMCIA Analog and Digital I/O Card

PCMCIA Type II Data Acquisition Card for laptop computers. Ideal for field data logging and portable measurement systems.

- ▼ Low power consumption
- ▼ 12-bit A/D 30KHz
- ▼ 8 differential A/D inputs
- ▼ Input range $\pm 10V$, 0-10V
- ▼ Amplifier x2, x4, x8
- ▼ CJC Reference
- ▼ 4 digital inputs
- ▼ 4 digital outputs
- ▼ Wiring Terminal Board

£295

IEEE-488 Interface Card

Provides complete IEEE-488 functionality on a half size card.

- ▼ Powerful, easy to use software command set
- ▼ DMA & Interrupt
- ▼ On-board firmware driver
- ▼ 16 digital outputs
- ▼ Basic, Pascal & C drivers
- ▼ IEEE-488 cable 2m

£199

Digital I/O Card

The simple solution for providing digital I/O and timer functions.

- ▼ 32 digital inputs
- ▼ 32 digital outputs
- ▼ 3 channel programmable counter/timer
- ▼ Breadboard area

£89

144 bit Digital I/O Card

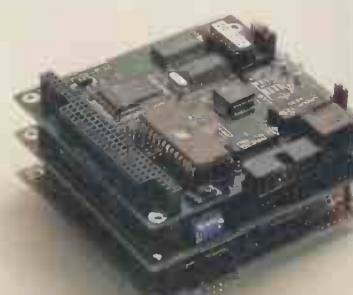
High Density mixed digital I/O Card for industrial monitoring & control.

- ▼ 144 Digital I/O lines
- ▼ Buffered circuits for higher driving capacity than the 8255
- ▼ Interrupt handling
- ▼ Output status readback

£155

Wiring Kit & Relay Boards

Wiring Terminal Board	£35
Industrial Wiring Kit	£30
Isolated Digital input board 16ch	£99
Isolated Digital input board 24ch	£109
Relay Board 16ch, 120V 1A	£115
Relay Board 24ch, 120V 1A	£135
Relay Board 16ch, 250V 5A	£130
Relay Board 24ch, 250V 5A	£165
SSR Module Carrier Board 8ch	£70
SSR Module Carrier Board 16ch	£80
SSR Module 280V AC 3A	£9
SSR Module 60V DC 3A	£9



Analog & Digital I/O Card

Versatile fully integrated multifunction A/D, D/A and Digital I/O card.

- ▼ 12 bit 40KHz
- ▼ 16 single-ended or 8 differential A/D inputs
- ▼ 1 D/A output
- ▼ 16 digital inputs
- ▼ 16 digital outputs
- ▼ Pacer Clock
- ▼ Timer/Counter
- ▼ DMA and Interrupt
- ▼ Wiring Terminal Board

£199

High Performance A/D Card

The complete and cost-effective solution for your PC based automation needs.

- ▼ 12 bit 100KHz
- ▼ 16 single-ended or 8 differential A/D inputs
- ▼ Built in 1K word FIFO
- ▼ Amplifier x0.5 to x1000
- ▼ 1 D/A Output
- ▼ 16 digital inputs
- ▼ 16 digital outputs
- ▼ Timer/counter
- ▼ Pacer Clock
- ▼ DMA and Interrupt
- ▼ Wiring Terminal Board

£375

Relay Output and Isolated Digital Input Card

Offering 8 programmable electro-mechanical relays for ON/OFF control or small power switching, and 8 opto-isolated inputs which can be used as digital input under noisy environment or floating potential.

- ▼ 8 on-board SPDT relays
- ▼ LED indicators to show activated relays
- ▼ 8 opto-isolated digital input channels
- ▼ Easy to use and program

£109

Industrial I/O Cards

D/A Output Card 2ch.	£155
D/A Output Card 6ch.	£285
D/A Output Card 12ch.	£399
24 bit Digital I/O Card	£60
48 bit Digital I/O Card	£80
32 ch Isolated Digital I/O Card	£105
4 1/2 Digit Voltmeter Card	£295
Stepping Motor Control Card	£255

Industrial Workstation with 14" Colour CRT

Rugged heavy duty workstation for 19" rack or panel mounting.

- ▼ Highly integrated PC Workstation
- ▼ 1024 x 768 Colour CRT Monitor
- ▼ 27-key membrane keypad
- ▼ IP56/IP52 sealed hardened front panel
- ▼ Heavy duty aluminium and steel chassis
- ▼ 250-watt power supply
- ▼ 8 ISA slots

£1600

Industrial Workstation with 9.4" LCD Display

Rugged heavy duty workstation with flat-panel LCD display and 80-key membrane keypad.

- ▼ Highly integrated PC Workstation
- ▼ 640 x 480 colour TFT display
- ▼ 19" rack/panel mount
- ▼ IP56/IP52 front panel
- ▼ 200-watt power supply
- ▼ 8 ISA slots

£3200

Also with B/W LCD display £1400
Also with EL display £2550

Industrial Chassis + Intel Pentium 90MHz Motherboard

Robust 19" Industrial Chassis fitted with Intel Pentium 90MHz Motherboard. Ideally suited for heavy duty use in television, multimedia and communications and other professions requiring Pentium power in a rugged industrial grade format.

- ▼ 19" Industrial Chassis 250W
- ▼ Pentium 90MHz processor
- ▼ 4 ISA slots, 3 PCI slots
- ▼ 2 serial ports, 1 parallel
- ▼ 8Mb Fast EDO Memory
- ▼ 540Mb IDE Drive
- ▼ 1.44Mb Floppy Drive
- ▼ PCI S3 Display Card

£1650

For other configurations, custom build, SCSI peripherals, please call.

Disk Drives & Controllers

Only supplied as part of a system.

Adaptec ISA SCSI Master Kit	£220
Adaptec ISA SCSI Board only	£170
Adaptec PCI SCSI Master Kit	£240
IDE Hard Drive 420Mb	£140
IDE Hard Drive 540Mb	£155
IDE Hard Drive 1Gb	£280
SCSI Hard Drive 1Gb	£380
SCSI Hard Drive 2Gb	£770

Industrial 19" Chassis

The rugged all steel chassis conforms to the 19" rack mounting standard. The unit includes a 14 slot passive backplane and a high efficiency switching power supply (250W) in a dual-fan cooled chassis.

- ▼ Supports 286/386/486 CPU Cards
- ▼ Mounting for up to 4 drives
- ▼ Hold down clamp to protect plug in cards from vibration
- ▼ Positive air pressure inside generated by dual (push-pull) cooling fans
- ▼ Removable air filters
- ▼ Dust-proof lockable door

£495

Flash/RAM/ROM Disk Card

Half-size disk card which can use up to 3Mb of SRAM, EPROM or Flash memory chips to replace a floppy disk drive. It offers faster access times and better protection from vibration, vapors and contaminants than physical drives.

- ▼ Emulates drive A,B,C or D
- ▼ Boots when emulating drive A
- ▼ Accepts 128Kx8 or 512Kx8 EPROMs, Flash Memory or SRAM.
- ▼ Simple installation
- ▼ No software required

£110



Industrial CPU Cards

Industrial Grade CPU Cards designed to be highly reliable in harsh industrial environments. Built to ensure high end stability under extremes of temperature, shock and vibration. Special features include watchdog timers, RAM/ROM disk, PC-104 interface, floppy/IDE interface, parallel and RS232/RS485 serial ports.

Half-size Cards	
CPU Card 286SX/16	£190
CPU Card 386SX/25	£240
CPU Card 386SX/33	£290
CPU Card 486SX2/50	£370
CPU Card 486DX2/66	£420
CPU Card 486DX4/100	£520
Full-size Cards	
CPU Card 486SX2/50 256K cache	£400
CPU Card 486DX2/66 256K cache	£450
CPU Card 486DX4/100 256K cache	£550

Display and Keyboards

14" SVGA Colour Monitor	£250
Rack Mount Kit for 14" Monitor	£250
ISA SVGA Display Card 1Mb	£80
PCI S3 Display Card 1Mb	£90
Rack Mounted Compact Keyboard	£199
Compact keyboard	£60
Standard Keyboard	£40

Memory Components

Only supplied as part of a system

SIMM 1Mb 72pin	£50
SIMM 4Mb 72pin	£140
SIMM 8Mb 72pin	£280
SIMM 16Mb 72pin	£420
EPROM Memory 512Kb	£20
FLASH Memory 512Kb	£50
SRAM Memory 128Kb	£20

Passive Backplanes

Passive Backplane 3 slot	£30
Passive Backplane 6 slot	£45
Passive Backplane 8 slot	£50
Passive Backplane 12 slot	£60
Passive Backplane 14 slot	£70
Passive Backplane 20 slot	£130

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30 & 72 PIN SIMM

30 PIN SIMM	60NS	70NS	80NS	100NS	30 PIN SIMM	60NS	70NS	80NS	100NS
256K X 8 BIT - 2 CHIP				3	1MB X 9 BIT - 3 CHIP	CALL	30	28	
256K X 9 BIT - 3 & 9 CHIP	10	10	8		1MB X 9 BIT - 9 CHIP	CALL	31	31	CALL
1MB X 8 BIT - 8 CHIP			28		4MB X 9 BIT - 9 CHIP	115	105	105	
72 PIN SIMM	60NS	70NS	80NS	72 PIN SIMM	60NS	70NS	80NS		
1MB = 256K X 36 BIT		40	40	8MB = 2MB X 36 BIT	250	240			
2MB = 512K X 36 BIT		75	75	16MB = 4MB X 32 BIT	370	350			
4MB = 1MB X 32 BIT	115	110		16MB = 4MB X 32 BIT EDO	480				
4MB = 1MB X 32 BIT EDO		140		16MB = 4MB X 36 BIT	420	395			
4MB = 1MB X 36 BIT		130	125	32MB = 8MB X 32 BIT		680			
8MB = 2MB X 32 BIT		230	220	32MB = 8MB X 32 BIT EDO		950			
8MB = 2MB X 32 BIT EDO		260		32MB = 8MB X 36 BIT	740	720			

CACHE RAM CHIPS

8K X 8 BIT - 20 NS	4.50	32K X 8 BIT - 20 NS	5.00
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DRAM CHIPS - PLEASE CALL CYRIX PROCESSOR UPGRADES

PROCESSOR UPGRADES	80386DX - 16/ 20 MHZ TO 486 - 40 MHZ	135		
80386SX - 16/ 20 MHZ TO 486 - 40 MHZ	135	80386DX - 25 MHZ TO 486 - 50 MHZ	155	
80386SX - 25 MHZ TO 486 - 50 MHZ	155	80386DX - 33 MHZ TO 486 - 66 MHZ	175	
NUMERIC PROCESSORS	80387SX - 0 TO 33 MHZ	45	80387DX - 0 TO 40 MHZ	48

WORKSTATION MEMORY

HEWLETT PACKARD	4MB	8MB	16M	32M	64M
HP 3000 9x7 SERIES 937; 947; 957; 967; 977; 987; 9x7LX SERIES 917LX; 927LX; 937LX; 947LX; 957LX; 967LX; 9000 SERIES 807S; 817S; 827S; 837S; 847S; 857S; 867S; 877S; 887S; 897S			520	980	1800
HP APOLLO 9000 SERIES 375; 380; 400d; 400s; 400t; 425e; 425t; 433s	160	275	500	920	
HP APOLLO 9000 SERIES 382; 425e	160	275	500		
HP APOLLO 9000 SERIES 700/RX 16Ca; 16Cb; 19Ca; 19W	140	260			
HP APOLLO 9000 SERIES 705; 710		300	560	1000	
HP APOLLO 9000 SERIES 745; 747i; 715/33; 715/50; 725/50		300	560	1000	1950
HP APOLLO 9000 SERIES 720; 730; 735; 750; 755			560	1000	1950
IBM	4MB	8MB	16M	32M	64M
XSTATION 120; 130	140				
RS/6000 POWERSTATION/ POWERSERVER 220 SERIES	140	260			
RS/6000 POWERSTATION/ POWERSERVER 320; 320E; 320H; 340; 340R; 350; 350R; 520; 520H; 530; 530E 530H; 550; 550E; 550S; 560; 560F; 580; 730; 930; 950; 970; 980			780	1150	2100
SUN MICROSYSTEMS	4MB	8MB	16M	32M	64M
MODEL 3/60; 3/80; 4/110	140	440			
SPARCSTATION ELC (4/25); IPX (4/50)			420		
SPARCSERVER/ SPARCSTATION 330; 370; 390		260			
SPARCSTATION SL (4/20)	140				
SPARCSTATION IPC (4/40); 1 (4/60); 1+ (4/65); 2 (4/75)	140	440			
SPARCSTATION CLASSIC LC (4/15); LX (4/30)		260	880		
SPARCSERVER/ STATION/ ENGINE 10 MODEL 30; MODEL 41; MODEL 52/ 54			500	1850	
SPARCSERVER 630MP; 870MP; 690MP					1850

DESKTOP MEMORY

AST	2MB	4MB	8MB	16M	32M	64M
ADVANTAGE 386SX/20; 386SX/25; PRO 386SX/25; BRAVO 3/25s; 3/33s	56	220				
ADVANTAGE 486/25; 486/33; 486/33p; 486SX/20; BRAVO 4/33(original); 486/25 PREMIUM 386/33TE; 486/25; 486/25E; 486/25TE; 486/33; 486/33E; 486/33TE PREMIUM II 386/35; 386/33; 486/33; 486SX/20; POWER PREMIUM 3/33; 4/33; 4/33s; 4/50d; 4/66d; PREMIUM SERVER SE 4/33	60	300				
ADVANTAGE PRO 486DX/33; 486SX/25; BRAVO 4/25s; 4/33; 4/33s; 4/50d; 4/66d BRAVO LC 4/25s; 4/33; 4/33s; 4/50d; 4/50s; 4/66d; 4/100t; BRAVO LP 4/25s; 4/30s; 4/33; 4/33s; 4/66d; BRAVO MS 4/50s; 4/66d; 4/100t; P/60; P/90; P/100; BRAVO MT 4/33; 4/33s; 4/50s; 4/66d; P/60	80	115	220	380	720	
ADVANTAGE PLUS 486DX/33; 486DX/25; 486DX/266		115	220	400		



AST (CONT.)	2MB	4MB	8MB	16M	32M	64M
BRAVO 286s; 386SX/16; 386SX/20; 386SX/25	70	210				
PREMIUM 386; 386C		120				
PREMIUM 386/25; 386/33; 386/33T; 386SX/16; PREMIUM II 386SX/20; 386SX/25 PREMIUM SERVER SE 4/50; 4/66; CUPD MEMORY BOARD		140				
PREMMIA 4/33; 4/33s; 4/50d; 4/66d; PREMMIA SE 4/66d; P/60; PREMMIA MTE 4/66d; P/60	150	270	500	920		
PREMMIA GX P/90; P/100; PREMMIA LX P/60; PREMMIA MX 4/66d; 4/100t; P/60			240	470	810	1590
COMPAQ	2MB	4MB	8MB	16M	32M	64M
DESKPRO 286N; 3/25; 3/33; 386/25M; 386/33M; 386N; 386s/20; 386s/20N; 4/25S; 4/33; 4/66; 486/33M; 486s/16M; 486s/25M; 486DX/250M; 486DX/266M; DESKPRO XE 433s; 450; 466; PROLIANT 1000 486DX/266; ENHANCED PROLINEA; PROLINEA 4/25s; 4/33; 4/33s CDS; 4/50; 4/66; NET 1/25e; 1/25s; 1/25r; PROLINEA MT 4/33s; 4/50; 4/66; PROSARIO 400; 425; 433; 520; 520 CDTV; 600; 633; 660; 720 CDS; 724; 800; 833 CDS; 850; 866; 860 CDS; 920 CDS; 920 CDTV; 924; 924 CDS; PROSIGNIA PC SERVER 486/33; 486DX/266; PROSIGNIA VS; SYSTEMPRO/LT 386/25; 386/33; 486/33; 486DX/250; 486SX/25	75	130	240	400	790	
DESKPRO 386/33; 386/33L; 486/25; 486/33L; 486/50L; SYSTEMPRO 386/33; 486/33	80	280	1000			
DESKPRO 5/60M; 5/66M; XE 5/60; PROLIANT 1000 5/60; PROLIANT 2000 486/50; 5/66; PROLIANT 4000 486/50; 5/66; PROSIGNIA PC SERVER 5/60; 5/90		280	520	960	1800	
PROLINEA 3/25s; 3/25zs	56	220				
SYSTEMPRO XL 486/50; PENTIUM			520	980	1800	
DESKPRO 386/16	1MB	1-2MB	4-8MB	8MB	4MB MOD.	4MB BOARD
80	180	320	470	DESKPRO 386s	150	185
				DESKPRO 386/20; 386/20e; 386/25; 386/25e	150	185
DELL	2MB	4MB	8MB	16M	32M	64M
SYSTEM 316SX; 320SX (REV.1); 325SX	70					
SYSTEM 320SX (REV.2); 325D; 325P; 333D; 333P; 433P		130				
DIMENSION 386DX/33; 486SX/25; 486SX/33; 486DX/250; LOW PROFILE DESKTOP 486P/16; 486P/20; 486P/25; 486P/33; LOW PROFILE POWER DESKTOP 486P/50; 486P/66; NETPLEX P SERIES; POWER DESKTOP 486D/16; 486D/20; 486D/25; 486D/33; 486D/50; 486D/66; PRECISION 386DX/33; 486 SERIES	130	420				
DIMENSION XPS 450V; 466V; 4100; DIMENSION XPS midsize 466; DIMENSION XPS midsize 4100; OPTIPLEX 433V; 450V; 466V; 4100E; 425s/L(V); 433s/L(V); 433s/L(V); 450/L(V); 466/L(V); 425s/M(V); 433s/M(V); 433s/M(V); 450/M(V); 466/M(V); PERFORMANCE 425s/L; 425s/M; 433/L; 433/M; 433s/L; 433s/M; 433/T; 450/L; 450/M; 450/T; 466/L; 466/M; 466/T	130	240	420	750		
DIMENSION XPS P60; P60FS; P60MDT; P90; P90MDT; OMNIPLEX 433M/E; 450M/E; 466M/E; 4100M/E; OPTIPLEX XL590; XMS90; POWEREDGE XE433; XE433s; XE450; XE466		240	470	810	1590	
OMNIPLEX 560M/E; 560M/E; 590M/E POWEREDGE SP433; SP450; SP466; SP560; SP566; XE560; XE566; XE590; XE100		260	520	925	1870	
OPTIPLEX 425/LXe; 433/LXe; 450/LXe; 460/LXe; 4100/LXe OPTIPLEX 425/MXe; 433/MXe; 450/MXe; 466/MXe; 4100/MXe	130	250	460	910		
PERFORMANCE 425s/M/E; 433M/E; 433s/M/E; 450M/E; 466M/E 4000XE SERIES 486/33; 486/50; 486/66		260	925			
SYSTEM 425TE; 433TE; POWERLINE WORKSTATIONS 420DE; 420SE; 425DE; 425SE; 433DE; 433SE; 450DE; 450DE/2; 450SE; 450SE/2; 466DE; 466SE	80	150	260	520		
HEWLETT PACKARD	2MB	4MB	8MB	16M	32M	64M
NETSERVER LE SERIES 486DX/33; 486DX/266; 486SX/33; NETSERVER LM SERIES 4/33 LM; 4/66 LM; 5/60 LM; VECTRA 386/25 PC; 486/25M; 486/25N; 486/25NI; 486/25T; 486/25U PC; 486/33U PC; 486/25V/L; 486/33M; 486/33MI; 486/33N; 486/33NI; 486/33T; 486/33T PC; 486/33V/L; 486/33X/M; 486/50N; 486/50U PC; 486/50X/M; 486/66X/M; 486/66N; 486/66ST; 486/66U PC; 486/66V/L; 486 PC; 486s/20; 486s/33M; 486s/33MI; 486s/33NI; 486s/33X/M	130	260	460	910		
VECTRA 386/16N PC; 386/20N PC; 386/35N PC; 386/33N; 386/33NI	80	240				
VECTRA M2; N2; XM2; XP; XU; VECTRA VL2 4/25e; 4/33s; 4/33se; 4/50; 4/66; 4/100	130	260	460	910		
VECTRA QS/16S; QS/20; RS/20; RS/20C; RS/25; RS/25C	130					
IBM	1MB	2MB	4MB	8MB	16M	32M
APTIVA 310; 330; 350; 510; 530; 710; 730; PC 300 (6571); (6573); (6575); (6581); (6583); (6585); PC 700 (6875); (6876); (6885); (6886)			120	230	400	790
PS/1 286 (2011); PS/1 386SX (2121)	80	140				
PS/1 PRO 386SX (2123); (2133- 72PIN); (2155- 72PIN); (2168- 72PIN) PS/Valuepoint (6381);(6382);(6384-72PIN);(6387);(6472); (6482); (6484); (6492); (6494)	75	130	240	400		
PS/1 (2133- 30PIN); (2155- 30PIN); PS/VALUEPOINT (6384- 30PIN)		120	440			
PS/2 25286; 30286	75					
PS/2 25SX; 35LS; 35SX; 40SX; 50Z; 55LS; 55SX; 56; 56SLC LS; 56SX; 56LS; 57; 57SLC; 57SX; 60; 65SX; 70; 76; 77; 80; 90 XP 486; 95 XP 486 (8595); E (9533); SERVER 85; PREMIER PS/2 56; 57; 76; 77; ULTIMEDIA-M57; M77	40	75	130	240		
PS/2 95 XP 486 (9595); SERVER 95 (9595); SERVER 95 ARRAY (9595)		140	280	460		
PS/2 SERIES 16/32 BIT MCA MEMORY BOARD (6450609 & 34F3077)	190	250	360	600		

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PORTABLE MEMORY

AST	2MB	4MB	8MB	16MB	
ADVANTAGE EXPLORER: ASCENTIA 700N; BRAVO NB		140		430	
ASCENTIA 800N; 810N		140	270	460	
ASCENTIA 900N; 910N		140	280	450	
PREMIUM EXECUTIVE 286/12; 386SX/20; 386SX/25; 386SX/25C		140			
POWER EXECUTIVE 3/25SL; 3/25SL-C; 4/25SL (SE); 4/33SL; COLOUR; COLOUR PLUS; EL	75	140	260	430	
POWER EXECUTIVE 4/25SL; COLOUR; COLOUR PLUS		140		450	
CANON	2MB	4MB	8MB		
NOTEJET 486/25 (BN-22)	75	130	250		
NOTEJET II 486C50 (BN-32P)	75	130	250		
NOTEJET 486C25 (BN-100C); 486C33 (BN-100C); 486M33 (BN-120); INNOVA 486NX		140	240		
COMMODORE	2MB	4MB			
C286-LT; C386SX-LT (16 MHZ)		85			
C386SX-LT (20 MHZ)			180		
COMPAQ	1MB	2MB	4MB	8MB	16MB
CONCERTO 4/25; 4/33; LTE ELITE			145	260	480
CONTURA 3/20; 3/25; 3/25C	75	130	240		
CONTURA 4/25; 4/25C; 4/25CX; 4/25EX		140	280	480	
CONTURA 400; 410		145	260	480	
CONTURA AERO		140	240	480	
LT 286	45	80	130		
LTE 386s/20	60	90	160		
LTE LITE/20; LITE/25; LITE/25C; LITE/25E		90	160	290	480
LTE LITE 4/25; 4/25C; 4/25E; 4/33C		145	260	480	
PORTABLE 486/66; 486C/66	40	75	120	240	
SLT 286	60		120		
SLT 386s/20	55	95	180		
DELL	2MB	4MB	8MB	16MB	
212N; 320N; 320N+	80				
316LT; 320LT; 320LX	70				
320SLI; 325SLU	80				
LATITUDE 433; 433C; 433CX; 450C; 450CX		140		430	
LATITUDE 433M; 433MC; 450NC; 450MCX		140	270	460	
LATITUDE XP 450C; 450CX; 475C; 4100CX		130	245	435	
NL20; NL25	80				
EVEREX	2MB	4MB	8MB	16MB	
TEMPO CARRIER	80				
TEMPO LX	80				
STEPNOTE 486SX/33; 486DX/250; 486DX4/75		130	435		
IBM	1MB	2MB	4MB	8MB	16MB
AMBRA TREKA 386SL	75				
LEXMARK SE10		145			
PS/2 CL57SX; THINKPAD 700; 700C; 720; 720C		155	215		

IBM (CONT.)	1MB	2MB	4MB	8MB	16MB
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PS/2 N51 SLC; N51 SX		75	135	265	
PS/2 P70 031; 061; 121; P75	40	75	130	240	
PS/NOTE 2618 C45; E35; M40; THINKPAD 350; 350C			120	235	410
PS/NOTE N45 SL		90			
THINKPAD 230C; 230Cs			130	260	
THINKPAD 300		75		255	
THINKPAD 330; 340; 355; 360; 730T			140	265	430
THINKPAD 360; 360C; 360CS; 360P; 750; 750C; 750Ce; 750Cs; 750P; 755C; 755Cs; 755Cd			140	265	430
THINKPAD 500; 510Cs			145	270	525
THINKPAD 710T		75	135	280	
THINKPAD TP701 SERIES			130	260	460
MITAC	4MB				
3026E		180			
PANASONIC	1MB	2MB	4MB	8MB	16MB
CF-170; 270; 370		40			
CF-380; 480C		90	170	240	
CF-580			140		480
CF-1000			170		
CF-V21P (CD-NOTE); CF-41			150	270	480
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PCL 300; 304		85	180		
SANYO	2MB				
17/NB; 18/NB; NB6		80			
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PC 6440		140			
PC 6600; 6621; 6641; 6661		90			
PC 6700; 6741; 6781; 6785; 6800; 6841; 6881; 6891		75	125		
PC 7700; 7750; 8150; 8650; 8650II; 8660			135		435
PC 8501 COLOURSTAR		95			
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TRAVELMATE 3000; 3000 WinSX; WinSLC/25			80		
TRAVELMATE SERIES 4000 Win; 4000E Win; 4000M				160	790
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T1600	40				
T1900; 1900C; 1910; 1950; 1950CS; 1950CT; 1960 T4500; 4500C; 4600; 4600C; 4700; 4700CS; 4700CT; 4800; 4850; 4900; DYNAPAD T200			145	280	540
T2100; 2105; 2150CT			150	280	520

TOSHIBA (CONT.)	2MB	3MB	4MB	8MB	16MB
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T3200		50			
T3300SL	80		145		
T4400C DX; 4400SX; 4400C SX; 4400SXG; 6400DX; 6400DXC; 6400SX; 6400SXG; 6600C; 6600C/CD; 6600C/CDV	80		150	260	480
TS200; 5200/100; 5200/200; 5200C; 8500	80			320	
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SLIMNOTE 330S; 550S; 550T; 575T; 5100T		145	260	470	
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SUPERSPORT SX			100		
MASTERSPORT 386SL; 386SLe; II; ZDS- 600nl; 620nl; 625nl; Z-STAR 433VL			80		
MASTERSPORT 386SX			80		
Z-SPORT 420S; 425S				160	
Z-STAR EX			140		
Z-NOTE 320L; 320Lb; 325L; 325Lc; 325Lp			75		260
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HL-10DPS; 10DV; 10PS; 10V		100	165		
HL-10h; 660; 1260	40	130	240		
HL-630; 641; 645	65	85			
CANON	1MB	2MB	3MB	4MB	8MB
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LBP-4SX	65	95			
LBP-430; 8IV; 4I; 4U	40			130	
LBP-8II; 8IIR; 8IIT	70	105	170		
LBP-8III; 8III PLUS	100	130	160		
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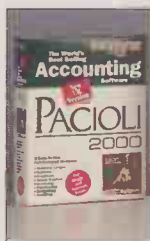


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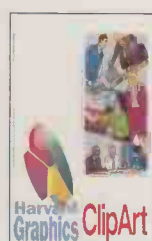
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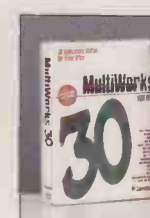
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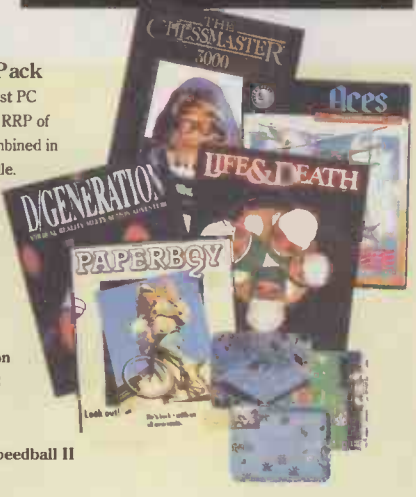
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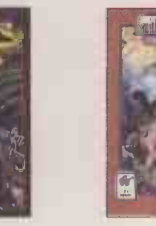
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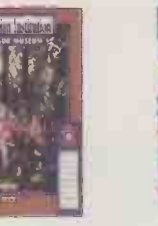
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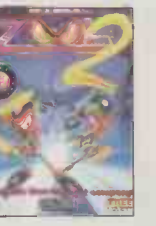
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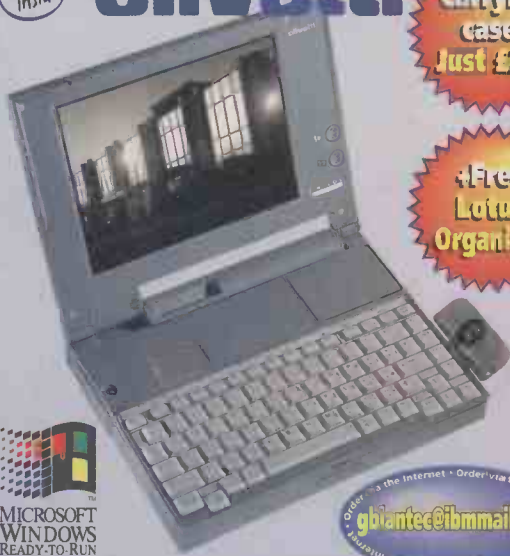
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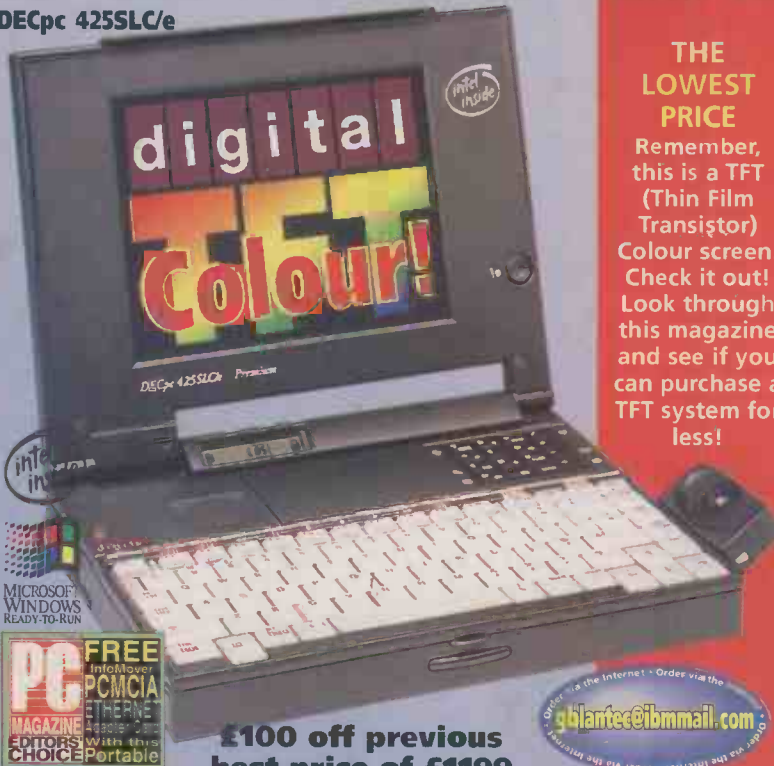
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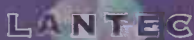
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For anyone looking for a great bargain in 486s, look no further, you've found it! But you'll have to call us for the details we're not allowed to print here - like the name of the manufacturer of this superb 50MHz 486 PC. Just check out this specification and price!

- Manufactured in the UK by a VERY well known manufacturer to the highest quality
- 80486 processor
- 50 MHz clock speed
- 240Mb Hard disk
- Western Digital LocalBus Video Controller
- Acer Low Emission SVGA Display
- Display dot pitch .28mm
- Windows version 3.1
- Quality keyboard
- Quality mouse
- MS DOS 6.2

£599
+VAT



E-Mail us for the details!
gblantec@ibmmail.com

SALE SALE SALE SALE

Compaq Presario CDS 520 Multimedia

- The superb Compaq Presario CDS 520
- 486 SX2 processor
- 66 MHz clock speed
- 420Mb Hard disk
- 4Mb RAM expandable to 64Mb
- Dual speed CD ROM Drive
- Built-in 16 bit sound system, microphone and speakers
- Integrated 9600/2400 fax/data modem
- Integrated 14" SVGA Monitor with 512Kb VRAM
- MS DOS 6.2 & Windows version 3.1 included
- Software included: • Microsoft Works • Microsoft Money • Microsoft Entertainment Pack • Microsoft Encarta on CD ROM • Dorling Kindersley Ultimate Human Body • MaxFax and CompuServe WINCIM

£899
+VAT

LANTEC Stock Clearance Price
(RRP was £1,275!)



Only a few left!



The Hewlett-Packard DeskJet 660C

Fast, professional-quality black printing for crisp, sharp characters • Enhanced, clear and vivid colours • Easy to use • Easy to set up • Built-in sheet feeder • Three years warranty



- HP DeskJet 660C £299
- HP DeskJet 660C SupportPack £65
- HP DeskJet 660C spare black cartridge .. £19
- HP DeskJet 660C spare colour cartridge £21



The Hewlett-Packard DeskJet 320 A great companion to any PC



- 3 pages per minute in mono
- Up to 7 minutes per page in colour (with optional colour kit)
- 600 x 300 DPI with RET on plain paper (mono), 300DPI in colour
- 500 pages monthly usage
- Optional 60 sheet input tray
- 6 typefaces and 13 scalable Windows fonts
- 1 year warranty included
- Warranty extendable to on-site with Hewlett-Packard SupportPack

- HP DeskJet 320 £169
- HP DeskJet 320 & Cut Sheet Feed £189
- HP SupportPack £40
- HP DeskJet 320 Colour Kit £28
- HP DeskJet 320 Battery pack £25
- HP DeskJet 320 spare black cartridge £15
- HP DeskJet 320 spare colour cartridge £22

Private and Business Sales: Corporate & Government:

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Prices EXCLUDE VAT and DELIVERY and are subject to change without notice. PC Delivery Charge £14. Call the LANTEC DIRECT Orderline or fax your order to 01753 777780 or send your order with a cheque or postal order to: LANTEC DIRECT • Langley Business Centre • Station Road • Langley • Berkshire • SL3 8YR. Please allow seven working days for cheque clearance. Although most orders are despatched the same or following day, please allow up to 28 days for delivery. Credit cards will not be debited until goods are ready for despatch. Screen displays may be simulated. E&OE. All orders are subject to LANTEC DIRECT Terms and Conditions of Sale, copies of which are available upon request. LANTEC Information Services Limited are licenced credit brokers.

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TOSHIBA

A WHOLE PAGE OF
TOSHIBA! ...FROM
LANTEC DIRECT

T2100 Range with even lower prices!

Base Model: The Toshiba T2100

- Intel 486DX2 microprocessor
- 50Mhz clock speed
- 4Mb RAM expandable to 28Mb
- 260Mb hard disk
- 1.44Mb floppy
- SVGA graphics adapter
- 9.5" mono dual scan STN display
- 64 greyscales on STN display
- External monitor port (256 colours)
- 640 x 480 pixel resolution
- 2 x PCMCIA Release 2.0 Type II slots
- PS/2 keyboard/mouse port
- Optional Port Replicator
- Toshiba Trackpoint
- 84 full-size keys & 12 function keys
- Built-in autosensing AC adapter
- MS DOS 6.2 & Windows version 3.11
- Rechargeable NiH2 4.5 hour battery
- One year international warranty

£849

T2150CDT

As T2100 but with:

- Intel 486DX4
- 75Mhz clock speed
- 8Mb RAM
- Expandable to 32Mb
- 520Mb hard disk
- Integrated IDE CD ROM drive
- External 1.44Mb floppy included
- Sound system built-in
- 10.4" colour TFT display
- 64,000 colours on 640 x 480 TFT display
- Rechargeable NiH2, 2 hour battery

£2719

T2100CS

As T2100 but with:

- 350Mb hard disk
- 10.4" colour dual scan STN display
- 256 colours on 640 x 480 STN display
- 640 x 480 x 64,000 colours or 1024 x 768 x 256 colours on external monitor
- Rechargeable NiH2 3.5 hour battery

£1349



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T1910CS

The UK's most popular portable PC model!

(according to ROMTEC figures)

- Intel 4886SX Processor
- 33Mhz clock speed
- 4Mb RAM expandable to 20Mb
- 200Mb hard disk
- 3.5" floppy drive
- 9.5" STN colour display
- External VGA monitor port
- 1 x PCMCIA type II or III slot
- Quickport mouse
- 3.5 hours battery life
- DOS 6.2 and Windows 3.1
- 1 year world-wide warranty

LANTEC DIRECT PRICE

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T2110CS



- Intel 4886DX4 Processor
- 75Mhz clock speed
- 4Mb RAM expandable to 28Mb
- 350Mb hard disk
- 3.5" 1.44Mb floppy drive
- 10.4" STN colour display
- External SVGA monitor port
- 2 x PCMCIA type II or 1 x type III slot
- Mousepoint pointing device
- 4 hours battery life
- Built-in autosensing AC adapter
- Optional Port Replicator
- DOS 6.2 and Windows 3.1
- 1 year world-wide warranty

LANTEC DIRECT PRICE

£1529



T2130CT



- Intel 4886DX4 Processor
- 75Mhz clock speed
- 8Mb RAM expandable to 32Mb
- 520Mb hard disk
- 3.5" 1.44Mb floppy drive
- 10.4" TFT colour display
- External SVGA monitor port
- 2 x PCMCIA type II or 1 x type III slot
- Mousepoint pointing device
- 3.5 hours battery life
- Built-in autosensing AC adapter
- Optional Port Replicator
- DOS 6.2 and Windows 3.1
- 1 year world-wide warranty

LANTEC DIRECT PRICE

£2119



Satellite Pro 400



- Intel Pentium Processor
- 75Mhz clock speed
- 8Mb EDO RAM expandable to 40Mb
- 810Mb hard disk
- Removable 3.5" floppy drive (STN Model)
- Removeable CD-ROM and external floppy drive (TFT Model)
- 10.4" TFT or STN colour displays
- External SVGA monitor port
- 2 x PCMCIA type II or 1 x type III slot
- Mousepoint pointing device
- 4 hours battery life
- Built-in autosensing AC adapter
- Built-in Sound system
- Infra-red file transfer software and interface
- Optional CARDStation port replicator
- Optional Port Replicator
- DOS 6.2 and Windows for Workgroups 3.1
- 3 years world-wide warranty

STN MODEL

£2419

TFT MODEL

£3139



Portege 610CT



- Intel Pentium Processor
- 90Mhz clock speed
- 8Mb EDO RAM expandable to 40Mb
- 720Mb hard disk
- External 3.5" floppy drive
- 9.5" TFT colour display
- External SVGA monitor port
- 2 x PCMCIA type II or 1 x type III slot
- Mousepoint pointing device
- 4.5 hours battery life
- Built-in sound system
- Optional Port Replicator
- MS-DOS 6.2
- Windows for Workgroups 3.1
- 3 years world-wide warranty

LANTEC
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PRICE

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LANTEC present the digital HiNote family

The Digital "HiNote" colour notebooks

- Choice of 486SX 33Mhz with 240Mb hard drive or 486DX2 50Mhz with 340Mb hard drive
- 4Mb RAM expandable to 20Mb
- 9.5" DSTN screen
- Local Bus video providing 640 x 480 x 256 colours on internal screen or up to 1024 x 768 x 16 colours on external display (1024 x 768 x 256 colours on DX2 50)
- Integrated trackball mouse and palm rest area
- 8Kb internal cache memory
- PCMCIA 2.1 type III or II slot (2 x type II slots in DX2 50)
- 1.44Mb floppy drive
- Long life Nickel-Metal-Hydride (NiMH) Battery
- Serial and parallel port
- MS DOS 6.22 and Windows for Workgroups 3.11 pre-installed
- Windows '95 ready
- Free Lotus Organizer
- Weighs under 2.5kg
- 3 year return to base warranty



486SX 33Mhz
DSTN 240Mb
 New Low Price! **£1099**

486DX2 50Mhz
DSTN 340Mb
 New Low Price! **£1499**

The Digital "HiNote Ultra" colour notebooks

- 486DX2 50Mhz Intel processor
- 340Mb hard drive
- Choice of 9.5" colour DSTN with 4Mb RAM (maximum 20Mb) or 9.5" colour TFT with 8Mb RAM (maximum 24Mb)
- Integrated trackball mouse
- Business Audio/MS Sound System, microphone and speaker (SoundBlaster compatible)
- Local Bus video & accelerator providing 640 x 480 x 256 colours on internal screen or up to 1024 x 768 x 256 colours on external display
- Wireless InfraRed connectivity
- 1 x PCMCIA 2.1 type III or 2 x type II slots
- Zero footprint, hot dockable snap-on 1.44Mb floppy drive
- Long life Lithium Ion (Lilon) flip-down battery
- Serial and parallel port
- MS DOS 6.22 and Windows for Workgroups 3.11 pre-installed
- Windows '95 ready
- Free Lotus Organizer
- Unique ultra-thin design
- Lightweight - just 2.1kg
- 3 year return to base warranty



486DX2 50Mhz
340Mb DSTN
 New Low Price! **£1749**

486DX2 50Mhz
340Mb TFT
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COMPAQ Portables + a free Modem with each Elite*

Compaq LTE Elite 4775CX



- 486DX4 75Mhz SL-Enhanced Intel Microprocessor
- 16KB of internal cache memory
- 8Mb of RAM memory expandable to 24Mb
- 2 x PCMCIA Rel 2.0 Type II slots (or 1 x Type III)
- Integrated internal AC power adapter/charger
- 9.5" Compaq TFT Active Matrix colour LCD Screen
- VGA graphics supports 27,000 colours
- Integrated Compaq enhanced EasyPoint Trackball
- Total carrying weight from 6.9lbs
- SmartStation and MiniStation desksbases available
- 3 years world-wide warranty

Model 340/W Model 510/W
£2459 £2629

*Free Modems only whilst stocks last

Compaq Contura 410C



- Now includes MS Works and Symantec Games Pack!
- 486 DX2 50Mhz SL-Enhanced Intel processor
 - 8kb of internal Cache Memory
 - 4mb RAM, expandable to 20Mb
 - 350Mb Hard disk (upgradable)
 - 9.5" STN dual scan colour screen 640 x 480 VGA
 - 1Mb of Video RAM providing 1024 x 768 resolution on optional external monitor
 - 2 x PCMCIA Rel 2.0 Type II slots (or 1 x type III)
 - Integrated 19mm trackball mouse
 - DOS 6.2, Windows 3.1, Lotus Organizer
 - Weighs just 5.9lbs and includes free slip case
 - Up to 5.5 hours battery life
 - Port replicator available for Ethernet connectivity
 - 3 Years European Warranty

£1359

Compaq Contura 420C



- 486 DX4 75Mhz Intel processor
- 16kb of internal Cache Memory
- 8mb RAM, expandable to 20Mb
- 420Mb Hard disk (upgradable)
- 10.4" STN dual scan colour screen 640 x 480 VGA
- 1Mb of Video RAM providing 1024 x 768 resolution on optional external monitor
- 2 x PCMCIA Rel 2.0 Type II slots (or 1 x type III)
- Integrated 19mm trackball mouse
- DOS 6.2, Windows 3.1, Lotus Organizer
- Weighs just 5.9lbs and includes free slip case
- Up to 5.5 hours battery life
- Port replicator available for Ethernet connectivity
- 3 Years European Warranty

£1689

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 A few late items from the LANTEC Summer Sale. These are warehouse soiled, obsolete or ex-demonstration items. All genuine bargains! Profit from LANTEC's Summer Stock Clearance Sale!

43238 Compaq 5/66Mhz Systempro SL processor board £999	41276 16Mb RAM for Compaq Pagemarq printer £459
41414 Compaq 486/66mhz upgrade board for Deskpro M £599	43641 Compaq Pagemarq NetlingToken ring interface £159
39129 Compaq 486/25mhz upgrade board for Deskpro M £149	41280 Compaq Pagemarq Appletalk interface £99
39705 Compaq 2400 baud modem for Lite £149	5897 200mb HD for Toshiba T1900 £399
42184 Compaq LTE 386 AC adapter £49	32143 Toshiba T1200 HB Battery £10
39703 Compaq Lite Lite 386/25 mono 84mb HD, 4mb (ex-demo) £399	34139 Toshiba T1200 charger £10
47057 Compaq Contura Aero 4/25 mono 84mb HD, 4mb, (ex-demo) £519	40194 Toshiba T2000 charger £10
39706 Compaq Lite Lite Expansion base £285	34150 2Mb RAM for Toshiba T5100 £15
44380 Compaq Concerto Battery Charger £59	34502 2Mb RAM for Toshiba T3100 £15
37057 1Mb RAM for Compaq Deskpro I and M £19	41059 2Mb RAM for Toshiba T3300 £15
37058 2mb RAM for Compaq Deskpro I and M £39	38008 Toshiba Deskstation II £49
40542 2Mb RAM for Compaq Prolinea 386 £35	38009 Toshiba Deskstation III £49
40547 2Mb RAM for Compaq Prolinea 486 £65	37503 Toshiba TC2400 modem £15
41273 2Mb RAM for Compaq Pagemarq printer £49	41078 Toshiba TL24 modem £15
41274 2Mb RAM for Compaq Pagemarq printer £99	1484 HP LaserJet IIIsi Postscript Upgrade £319

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PCI Power!

DABS 486 100 SYSTEM

- 486 DX4/100 Processor
- 4Mb RAM
- Enhanced IDE 540Mb Hard Disc
- PCI Accelerated 1Mb video card
- Onboard EIDE Mode 3 controller
- 14in non-interlaced SVGA monitor
- 256k 15ns standard secondary RAM
- 1.44Mb Floppy drive
- 3 PCI and 4 ISA expansion slots
- 2 fast serial, ECP parallel and game
- Cherry high quality 102 key keyboard
- Original Microsoft Serial Mouse V2.0
- MS DOS 6.22 and MS Windows 3.11
- 12 months On-Site Warranty*



£820

486DX4/100MHz PCI

DABS P75 SYSTEM

- Intel® Pentium® 75MHz Processor
- Triton Chip set
- Upgradeable past 133MHz
- 8Mb EDO RAM
- Enhanced IDE 540Mb Hard Disc
- PCI Accelerated 1Mb video card
- Onboard EIDE Mode 3 controller
- 14in non-interlaced SVGA monitor
- 256k 15ns standard secondary RAM
- 1.44Mb Floppy drive
- 4 PCI and 4 ISA expansion slots
- 2 fast serial, ECP parallel and game
- Cherry high quality 102 key keyboard
- Original Microsoft Serial Mouse V2.0
- MS DOS 6.22 and MS Windows 3.11
- 12 months On-Site Warranty*



£1000

Pentium 75MHz PCI

DABS P90 SYSTEM

- Intel® Pentium® 90MHz Processor
- Triton Chip set
- Upgradeable past 133MHz
- 8Mb EDO RAM
- Enhanced IDE 540Mb Hard Disc
- PCI Accelerated 1Mb video card
- Onboard EIDE Mode 3 controller
- 14in non-interlaced SVGA monitor
- 256k 15ns standard secondary RAM
- 1.44Mb Floppy drive
- 4 PCI and 4 ISA expansion slots
- 2 fast serial, ECP parallel and game
- Cherry high quality 102 key keyboard
- Original Microsoft Serial Mouse V2.0
- MS DOS 6.22 and MS Windows 3.11
- 12 months On-Site Warranty*



£1050

Pentium 90MHz PCI

DABS P100 SYSTEM

- Intel® Pentium® 100MHz Processor
- Triton Chip set
- Upgradeable past 133MHz
- 8Mb EDO RAM
- Enhanced IDE 540Mb Hard Disc
- PCI Accelerated 1Mb video card
- Onboard EIDE Mode 3 controller
- 14in non-interlaced SVGA monitor
- 256k 15ns standard secondary RAM
- 1.44Mb Floppy drive
- 4 PCI and 4 ISA expansion slots
- 2 fast serial, ECP parallel and game
- Cherry high quality 102 key keyboard
- Original Microsoft Serial Mouse V2.0
- MS DOS 6.22 and MS Windows 3.11
- 12 months On-Site Warranty*



£1120

Pentium 100MHz PCI

Desktop or Mini Tower available at the same price

DABS P120 SYSTEM

- Intel® Pentium® 120MHz Processor
- Triton Chip set
- Upgradeable past 133MHz
- 16Mb EDO RAM
- Enhanced IDE 1.2Gb Hard Disc
- PCI Accelerated 1Mb video card
- Onboard EIDE Mode 3 controller
- 14in non-interlaced SVGA monitor
- 256k 15ns standard secondary RAM
- 1.44Mb Floppy drive
- 4 PCI and 4 ISA expansion slots
- 2 fast serial, ECP parallel and game
- Cherry high quality 102 key keyboard
- Original Microsoft Serial Mouse V2.0
- MS DOS 6.22 and MS Windows 3.11
- 12 months On-Site Warranty*



£1465

Pentium 120MHz PCI

DABS P133 SYSTEM

- Intel® Pentium® 133MHz Processor
- Triton Chip set
- Upgradeable past 133MHz
- 16Mb EDO RAM
- Enhanced IDE 1.2Gb Hard Disc
- PCI Accelerated 1Mb video card
- Onboard EIDE Mode 3 controller
- 14in non-interlaced SVGA monitor
- 256k 15ns standard secondary RAM
- 1.44Mb Floppy drive
- 4 PCI and 4 ISA expansion slots
- 2 fast serial, ECP parallel and game
- Cherry high quality 102 key keyboard
- Original Microsoft Serial Mouse V2.0
- MS DOS 6.22 and MS Windows 3.11
- 12 months On-Site Warranty*



£1765

Pentium 133MHz PCI

DABS P75MULTIMEDIA SYSTEM

- Intel® Pentium® 75MHz Processor
- Triton Chip set
- Upgradeable past 133MHz
- 8Mb EDO RAM
- Enhanced IDE 540Mb Hard Disc
- PCI Accelerated 1Mb video card
- Onboard EIDE Mode 3 controller
- 14in non-interlaced SVGA monitor
- 256k 15ns standard secondary RAM
- 1.44Mb Floppy drive
- 4 PCI and 4 ISA expansion slots
- 2 fast serial, ECP parallel and game
- Cherry high quality 102 key keyboard
- Original Microsoft Serial Mouse V2.0
- MS DOS 6.22 and MS Windows 3.11
- Creative Labs Soundblaster 16 IDE
- Quad speed CD drive
- Active Speakers
- MS Works, MS Encarta
- 12 months On-Site Warranty*



£1225

Pentium 75MHz PCI
Multimedia

DABS P120MULTIMEDIA SYSTEM

- Intel® Pentium® 120MHz Processor
- Triton Chip set
- Upgradeable past 133MHz
- 16Mb EDO RAM
- Enhanced IDE 1.2Gb Hard Disc
- PCI Accelerated 1Mb video card
- Onboard EIDE Mode 3 controller
- 14in non-interlaced SVGA monitor
- 256k 15ns standard secondary RAM
- 1.44Mb Floppy drive
- 4 PCI and 4 ISA expansion slots
- 2 fast serial, ECP parallel and game
- Cherry high quality 102 key keyboard
- Original Microsoft Serial Mouse V2.0
- MS DOS 6.22 and MS Windows 3.11
- Creative Labs Soundblaster 16 IDE
- Quad speed CD drive
- Active Speakers
- MS Works, MS Encarta
- 12 months On-Site Warranty*



£1690

Pentium 120MHz PCI
Multimedia

* DSM agreement on hardware commences 14 days after receipt of goods.

486 OPTIONS

8Mb instead of 4Mb add	99
16Mb instead of 4Mb add	299
Extra 1Mb DRAM on Video card	50
Midi Tower (3 x 5.25" bay) add	10
Adaptec 1542C and SCSI HD	150

These prices only available with systems.

PENTIUM OPTIONS

16Mb EDO RAM instead of 8Mb add	235
32Mb EDO RAM instead of 8Mb add	706
512k cache instead of 256k add	40
Extra 1Mb DRAM on Video card	50
Midi Tower (3 x 5.25" bay) add	10

These prices only available with systems.

MONITOR UPGRADE OPTIONS

15" LR 1280x1024 NI, MPR-II add	80
17" LR 1280x1024 NI, MPR-II add	330
20" LR 1280x1024 NI, MPR-II add	900
21" LR 1280x1024 NI, MPR-II add	1000*
Sony GPD-16SF add	150
17" Idek VisionMaster MF-8617A add	355*

These prices only available with systems.

HARDWARE OPTIONS

Tape Streamer 420Mb Int add	95
Tape Streamer 850Mb Int add	155
Microsoft Natural Keyboard add	50
250/280VA UPS (single PC) add	90
USR Sportster 14K4 Int modem add	107
USR Sportster 28K8 Int modem add	156

These prices only available with systems.

DABS SYSTEM CONFIGURATIONS

486 CONFIGURATION OPTIONS

System/HD	540Mb	850Mb
486DX4/100MHz PCI	820	855
System/HD	1.2Gb	1.6Gb
486DX4/100MHz PCI	940	1145

PENTIUM CONFIGURATION OPTIONS

System/HD	540Mb	850Mb
Pentium 75MHz PCI	1000	1035
Pentium 90MHz PCI	1050	1085
Pentium 100MHz PCI	1120	1155
Pentium 120MHz PCI	1465	1500
Pentium 133MHz PCI	1765	1800
System/HD	1.2Gb	1.6Gb
Pentium 75MHz PCI	1120	1325
Pentium 90MHz PCI	1170	1375
Pentium 100MHz PCI	1240	1445
Pentium 120MHz PCI	1585	1790
Pentium 133MHz PCI	1885	2090

MULTIMEDIA UPGRADE OPTIONS

Creative Soundblaster 16 Value IDE	64
Creative AWE32 Value sound card	125
Quad Speed CD Drive	99
12w Speakers	14
25w Speakers	21
50w Speakers Bass, Treble	35
MPEG 1Mb Video Card add	45

These prices only available with systems.

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TOTAL PACKAGE PRICE

"Nicely configured, easily upgradable and quick."





DABS DIRECT

PERSONAL COMPUTER SYSTEMS

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CD-ROM DRIVES

CREATIVE LABS

Discovery 2x	170	Discovery 4x	269
Multimedia Home 4x	230	Gameblaster AWF 4x 299	
AWE32 MCD	165		

Goldstar GCD-R5 40B Quad Speed CD ROM Drive
 Enhanced IDE (ATAPI) Interface
 Intelligent 256K data buffering system
 220ms access time
 500KB/sec sustained transfer rate
 4.5MB/sec
 Photo CD Multiresolution support
 CD-DA, CD-R/W/XA, CD-I support
 Video CD Ready
 High Fidelity audio support
 Motor tray loading mechanism
 60,000 POH MTBF

£169

GOLDSTAR

GCD-R5 208	69	GCD-R5 40B	103
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MITSUMI

FX400 IDE 4x	101	Secondary IDE iV7	9
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Quad Speed IDE iNT 115 3xpi SCSI External 242
 iV6 SCSI Internal 240 6x SCSI External 363
 2x2 7-disc SCSI Ext 349 Parallel SCSI iV1 90

PANASONIC

CR-562	72	AT interface	10
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Phase Change SCSI 450
 DRU-124x 4x IDE 139 DRM-602X 2x SCSI 395
 DRM-604X 4x SCSI 789

PIONEER

DRU-124x 4x IDE	139	DRM-602X 2x SCSI	395
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TOSHIBA

XMS302B Int 4x IDE	115	5201B Int 3.4x SCSI	130
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Multimedia Kit 2000 £270

Everything you need to create your own affordable entertainment centre

- Quad speed CDROM, 500Kb/s access time
- Wavetable upgradable Diamond sound card
- Pair of stereo speakers, microphone, headphones
- 7 Top titles:
 - Compton's Interactive Encyclopedia 1995
 - Magic Carpet, Sim City 2000, Cybernia-mission Norway, Dragon Lore, Wing Commander II Deluxe, The Lemmings Chronicles.

DIAMOND

CD RECORDING

Philips CD0522 Kit	1495	JVC XR-2001E Kit	1399
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Yamaha CDR100E Kit 2040 Ricoh RS1060 1399
 WinOnCD 659 WinOnCD to Go 149
 Corel CD Creator 129 Toast Pro 2.5 Mac 399

Kits include SCSI card, cable, software & 1 disc

IDE HARD DISCS

Bracketed figure is nominal capacity in Mb

CONNER

CFS420A (420)	99	CFS540A (540)	104
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QUANTUM

TR420D	100	TR850AT	143
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SAMSUNG

30560A (560)	104	30854A	155
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SEAGATE

ST3491A (425)	107	ST3660A (540)	110
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WESTERN DIGITAL

AC2420 (420)	13	AC2540 (540)	143
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SCSI HARD DISCS

Bracketed figure is nominal capacity in Mb

CONNER

CFP1060 (1.06Gb)	326	CFP1080 (1.08Gb)	305
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MICROPOLIS

427 (1.1Gb)	624	32434G (1Gb)	1065
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QUANTUM

FB540S (540Mb)	119	TR850S (850Mb)	170
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SEAGATE

ST31230N (1Gb)	332	ST32430N (2.1Gb)	637
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SPEAKERS

GENERIC

12 watt Tone	13	25 watt Tone	25
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SONY

PC30	33	PC50	50
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All active (amplified) except where stated

CASES

Slimline - Not VLB - 2 x 5.25", 2x3.5", 1xHD, 200w	45
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MONITORS

ALL Monitors listed are MPR-II, Low Radiation and Non-Interlaced EXCEPT where marked *

ADI

ProVista 14"	0.28	1024x768	155
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DAEWOO

1424S 14"	137	1424SM 14"	148
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IYAMA

MF-8115 15"	259	MF-8617 17"	490
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More than Just a Monitor...

All ADI Monitors Feature:

- 2 year On-Site Swap out warranty
- Energy Star Vesa DPMS Power Saving
- MPR II Low Radiation
- Digital Image Control
- Non-Interlaced Refresh frame rates
- Full Screen Image for up to 15% larger display area.

Prices from **£165**

Better Monitors at Competitive Pricing

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17" FST colour, 0.26 mm dot pitch, dual focus, CRT, LCD, VESA, DPMS, Energy Star compliant. MPRII, TUV and ISO 9241 3 standards compliance, up to 1780x1024@60Hz, 27-95kHz, 135MHz band.

£490

GoldStar

GoldStar 14" High Resolution Monitor

- 14" XGA Ultra High Resolution
- 0.26mm Anti-Static Non-Glare Dark
- 1024 x 768 Non-Interlaced
- DPMS Power Management
- MPR II Low Radiation
- Front Controls

£175

Valuegraph 447V090

- 17" FST, Antiglare Antistatic
- Built in Stereo Speakers
- Max resolution 1024x768, 0.26mm dot pitch
- Refresh rate 1024x768@60Hz
- Power Saving, MPRII

£479

Viewsonic V15G TCO'92

- 15" FST, Antistatic, Antiglare
- Max resolution 1280x1024
- 0.28mm dot pitch
- horizontal scanning frequency 30-64KHz
- vertical scanning frequency 50-90 KHz
- Refresh rate 1024x768@76Hz

£319

WYSE WY-14+

- Digital Front Controls
- Separate and/or composite sync
- MTBF 70,000 hours
- MPRII & Energy Star Compliant
- Max Res: 1024x768 @ 60Hz
- Bandwidth 65MHz

£185

GOLDSTAR

GS1462DM 14"	175	GS1520DM 15"	227
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NEC

XV14 14"	215	Multisync XV15 15"	276
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NOKIA

MBS090P 14"	225	449E090P 15"	305
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PHILIPS

14C LR 14"	174	14A NI 14"	207
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PANASONIC

TX1537 NI LR 15"	335	TX1732 LR 17"	470
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SAMSUNG

CVM4967P LR 14"	175	CVM4238 NI LR 14"	185
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SONY

CPD-15SF1 15"	305	CPD-17SF1 17"	585
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TAXAN

400 LR 14"	196	410 LR 14"	189
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VIEWSONIC

V56E 14"	165	V51S55 15"	245
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WYSE

WY-1450	165	WY-14+	185
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For pricing on other monitors please call

DISPLAY ADAPTERS

ARK LOGIC

1000FP PCI 1Mb	65	2000 PCI 1Mb MPEG	95
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CIRRUS LOGIC

5422 1Mb ISA	45	5423 1Mb VLB	55
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CREATIVE

30D Blaster	265	V CoDer External	100
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miro VIDEO 20T DIVE

Watch TV/cable and play back in full image, full speed. Graphics accelerator, video overlay and TV reception all in one board!

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WinTV Prisma	145	WinTV Cinema	182
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ORCHID

Fahrenheit 64 1Mb	114	Fahrenheit 64 2Mb	135
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MOTHERBOARDS

All exclude processor and heatsink

486/P24C 3VL8/BISA 256k 72pin ZIF	69
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INTEL

Pentium 90 4 PCI/4 ISA & CPU 256k	700
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PROCESSORS

486DX2/80	81	486DX4/100	95
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INTEL OVERDRIVE

Any 486 → DX4/75	153	Any 486 → DX4/100/179	159
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SIMM MEMORY

30pin x9	30pin x8	72pin x32	72pin x36	72pin x 32 EDO
256k 10	10	1M 38	38	120

Memory pricing is volatile - please call before ordering

INTERFACE CARDS

IDE DRIVE CONTROLLERS

2 HD+2 FD+2 serial+1 parallel+1 game ISA	10
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ADAPTE SCASI CONTROLLERS

1505 kit ISA	42	1515 kit ISA	65
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PORTS ONLY (PCMCIA)

CREATIVE LABS

SB 16 Pro Value IDE	64	SB 16 Pro IDE	87
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ORCHID

Gamewave 32+	92	Sounddrive 16 EZ	59
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JOYSTICKS

CH PRODUCTS

VirtPilot Flight Yoke	55	VirtPilot Pro Ftt Yoke	62
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LOGITECH

Max Joystick	10	Control Pad Cordless	20
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MICE

MICROSOFT

Mouse V2 IP Combo	38	Home Mouse	27
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LOGITECH

Pilot Serial or PS/2	17	Pilot Trackball	25
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PRIMAX

3 button serial (white/black/blue/red)	7
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FLOPPY DRIVES

3.5" 1.44Mb	21	5.25" 1.2Mb	32
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STREAMERS

COLORADO

Jumbo 250Mb Int	88	Jumbo 340Mb Int	94
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COLORADO POWERTAPE

1100 1Gb SCSI Int	405	2400 2.4Gb SCSI Int	720
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HEWLETT PACKARD

Model	Int	Ext	Kit
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WANGTEK SCSI

250 Series	85	250 Parallel	165
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WANGDAT SCSI

3100 2Gb Int	525	3100 2Gb Ext	525
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Colorado Trakker 350

EXTERNAL PARALLEL PORT BACKUP SYSTEM

- Play and Copy. No hardware installation
- Up to 340 Megabyte Capacity with data compression
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- Easy portability, light weight durable case
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- Automated, scheduled or customized
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D2 - SYQUEST DRIVES

98Mb Ext SCSI	245	200Mb Ext SCSI	395
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FUJITSU - MQ DRIVES

230Mb Int SCSI	419	230Mb Ext SCSI	585
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PRINTER SERVERS

EMULEX

NetQue 2port	339
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HP

JetDirect MIO	288	JetDirect External	245
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INTEL

Netport EL 2p	259	Netport XL 15 2p	319
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UPS

APC

SmartUPS 250	175	SmartUPS 400	198
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System 60 600VA True On-Line	349
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UPSONIC

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 4/100 Model 420 1295 5/75 Model 420 1464
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 5/90 Model 420 1666 5/90 Mod 420CDS 1877
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 5/75 Model 420 1253

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 4/100 Model 420 1169 5/75 Model 420 1287
 5/90 Model 420 1340 5/90 Model 720 1683

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 5/75 Model 420 1329 5/75 Mod 420CDS 1531
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 5/90 Model 720 1725 5/100 Model 720 2088

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 410C M350 1495 410CX M350 1912

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 DX/4/75 4/260 DSTN 1595 DX/4/100 4/260 DSTN 1676
 SX/33 4/260 TFT 2015 DX2/50 4/260 TFT 2038
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 600C DX50 M260 1809 600C DX/4/75 M260 2122
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COMPATIBLE
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 DE-220CAT Combo-AUI 70 DE-220T UTP ISA 55
 DE-620CT Combo Par 129 650CT Combo PCM 129

GENERIC
 NE2000 BNC 25 NE2000 Combo 25
 NE2000 Combo PCI 70 NE2000 Combo Par 85

INTEL
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NOVELL
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 NE2000+3 Combo 70 NE2/C BNC MCA 159
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SMC
 Elite Ultra 16 59 Elite Ultra 16 Combo 85
 TokenCard Elite 155 PCI-100MB/S 389

PCMCIA
 EliteCard PCMCIA Ethernet Adapter UTP 94
 EliteCard PCMCIA Ethernet Adapter Combo 115
 EliteCard PCMCIA Ethernet Adapter UTP Spk 365
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Optional UK Power Supply 39

PCI ADAPTERS
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 EtherPower PCI Adapter BNC 89 395
 EtherPower PCI Adapter Combo 98 465

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 EtherEZ Plug 'n' Play Adapter BNC 58 275 980
 EtherEZ Plug 'n' Play Adapter UTP 58 250 850
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All cards are ISA unless otherwise specified

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 WY-60 315 WY-120 315
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 VT-525C System Unit 205
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 TigerHub CX3 3Port WorkGroup BNC 210
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Sage DOS		Win DOS Net Win Net	
Bookkeeper	55	75	
Accountant 159	189		
Accountant+ 241	271	399	449
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31	Sage Job Costing	109
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384	Database 5.3u DOS/540	
225	dBase 5 DOS	324
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51	PageMaker 5	389
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195	Fractal Des Painter	315

20	AfterDark	69
785	ArcSolo Win	135
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50	CheckIt Pro	135
29	CleanSweep	69
58	CP Backup 2 Win	62
65	Dashboard Win	35
106	Dr Sol AntiVirus DOS/58	
70	Fingers Win	16
45	Norton Anti-Virus	87
60	Norton Utilities 8	85
32	Lotus Organizer	80
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19	PFS Power Album	19
20	QEMM 7.5	49
14	Slidebar	26
63	Stacker OS/2 & DOS 80	
66	Telemagic	175
90	Xtreme Gold Win	70

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228	Word 6.0 Win	195
73	Word 6.0 Win CCP Upp	281
211	WordStar Win	29

27	3D Atlas	42
23	Along the Rhine	30
24	BioForce	35
7	Bloodwings	29
15	Canon Fodder 2	29
32	Card Forces	32
24	Disc World	35
33	Dreadnoughts Plus	22
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25	Machievell the Prince	25
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29	Pizza Tycoon	29
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24	Sim City 2000	26
35	Theme Park	26
15	US Navy Fighters	30
35	XCom	25

218	Project 4 Win	279
475	Superproject Win	495

35	ARoute Exp UK/IRE FD	47
35	ARoute Exp Europe FD	47

215	Excel 5	219
149	Supercalc Win	60

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489	Network 4.1 10u	1025
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650Mb/74min	10	8	7		
CABLES	2m	3m	5m	10m	
IBM Parallel Printer	4	6	7	15	
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IBM D25-D25 (M or F)	4	6	7	18	
IBM DF-D25M Modem	5	5	5	7	
Centronics C36M-C36M	6	8	10	17	
Ethernet Coax BNC-BNC	5	5	5	10	
				1m	2m
Twin IDE HD 140F-140F Internal				3	-
Twin FD 134F-134F Internal				3	-
IEC Mains or IEC-IEC Extension				5	10
Twin SCSI 150F-150F Internal				5	-
SCSI 650M-C50M				8	15
SCSI 650M-HC50 Micro D				19	29
SCSI HCS0 Micro D - HCS0 Micro D				29	39
SCSI 650M-HC88 Wide SCSI				65	-
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ABC Colour	123	Swift 90 Mono	113
Swift 200 Mono	136	Swift 240 Colour	178
Swift 240x	215	Swift 9x	169
DEC			
LA75S-AE	425	LA310-AE	480
LA70-AE	250	LA660-AE	2369
EPSON			
LX-300	95	LX-1050	180
FX-870	242	FX-1170	299
LQ-100	97	LQ-150	112
LQ-150 Colour kit	25	LQ-300	147
LQ-570+	212	LQ-870	305
LQ-1060 Col	589	LQ-1070+	292
LQ-1170+	425	DLO-3000	780
DPX-8000	1939		
FUJITSU			
DL-900	189	DL-4600 mono	749
DL-4600 colour	900	DL-1150 80col	240
DL-5600 colour	1110	DL1000 24pin	199
MANNESMANN TALLY			
T2016	89	MT83	159
MT84	199	MT136	299
MT150/9	262	MT150/9F	345
MT83F 80col	159	MT83F 80col	185
MT84F 136col Col	225	MT130/9 80col	264
MT130/24 80col	330	MT131/9F 136col	300
MT131/24 136col	385	MT150/9 80col	275
MT151/9 136col	315	MT151/24 136col	399
MT151/9F 80 Colour	325	MT151/24F 80Col	430
MT350F 136c	935	MT350/24 136col	1038
MT360 136col	1199	MT360F 136col	1259
MT645	2615	MT691	5375
NEC			
P20	98	P30	178
P72	385	OKI	400
OKI			
280 Parallel	190	320 Parallel	309
321 Parallel	365	380 Parallel	200
305 Parallel	310	520 Parallel	339
521 Parallel	395	395 Mono	635
305 Colour	715	880 Parallel	435
591 Parallel	489	3410	849
OTC			
850XL 9pin 136 col 850pins	1649		
PANASONIC			
KX-P1150	75	KX-P2023	107
KX-P1274	191	KX-P2124 Colour	220
KX-P2135 Colour	129	KX-P1624	199
KX-P3626	252	KX-P3696	269
SEIKOSHA			
SP1900	88	SP2400	122
SP2415	165	MP1350	268
SP350	295	SL90+	95
SL96	132	SL150	215
SL210	315	SL270	375
LT20DX	140	BP5780 MXII	979
BP7800	1099	SBP10	1749
STAR			
LC90	81	LC100 Colour	89
LC240	90	LC240C	102
LC24-300	177	LC15	179
LC24-15 MKII	231	ZA200C + OSM	255
ZA250C + OSM	315	XB24/200C + OSM	314
XB24/250C + OSM	380		

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HL-660 GDI	445	HL-1260	899	
CANON				
LBP-4u	365	LBP-430	329	
LBP-1260	899	LBP-8iHR	1520	
EPSON				
EPL-3000	369	EPL-5200+	449	
EPL-5600	576	EPL-9000	1159	
EPL-9000PS	1359			
HEWLETT PACKARD				
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Laserjet 5MP	695	Laserjet 4V	929	
Laserjet 4M+	1249	Laserjet 4i	1365	
Laserjet 4MV	1969	Laserjet 4Si	2054	
Laserjet 4SiMX	2925	Laserjet Colour	4179	
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LJ III/IIIPI/P	89	139	239	-
4 (4,III,PIV,Col) PJ, 1600	69	119	167	329
4L				
4MP uses same as 4P, etc.				
4/4+ Postscript level 2	225	4P Postscript 2	190	
4+ Duplex Unit	497	4Si Duplex Unit	389	
(Pacific Page PE/P/PS Cart. 79	Pacific Page XL	179		
KYOCERA				
FS400	434	FS1550	875	
FS1600	1069	FS3400	1389	
FS3600	1810	FS3500	2120	
FS5500	3365			
LEXMARK				
Optra L	1369	Optra LX	1895	
Optra LXI	2229	Optra R	365	
Optra RX	1469	4019-001 10ppm	959	
4039-12R laser	1039	4039-10R0100ppm	1295	
4039-10R 10ppm	1099	4039-16L plus	2350	
Winwriter 200 4ppm	359			
MANNESMANN TALLY				
T/Min	245	19005	319	
79005Plus	447	79005PS	689	
MT9008	749	79017	1749	
MINOLTA				
SP101S	649	SP101 PS	949	
SP3000	629	SP3500	1069	
SP1000	549	SP1500	699	
SP1700	910			
NEC				
SuperScript 610+	283	SuperScript 660	389	
SuperScript 660i	565	SuperScript 3000	639	
\$102P	945			
OKI				
0L410ex	275	0L410ex	379	
0L400ex	739	0L970	769	
PANASONIC				
KX-P4401	285	KX-P4430	475	
KX-P5400	519	KX-P4440	409	
KX-P6100	268	KX-P6150	399	
SAMSUNG				
SL1081A 8ppm DSB laser795				
SHARP				
JK-9660	750			
STAR				
LS-05	364	WinType 4000	287	
TEKTRONICS				
220e colour	2100			
TEXAS INSTRUMENTS				
MicroWriter PS23	475	Pro600 23 font	725	
Pro600 65 font	949	600PS 2Mb 5ppm	545	
600Plus PS 4Mb	699	PowerPro	1025	
OMS				
PS 420 PS col	1225	PS 660 600dpi	3200	
860 Plus A3/A4 PS	3828	Col' script 210 A4	3694	
ColourScript 230 A3	5995	ColourScript 1000	7870	
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HJ-400 80 col	249		
CANON			
BJ-30	152	BJC-70	225
BJ-200ex	170	BJ-230	237
BJ-300	344	BJ-330	398
BJC-4000	232	BJC-600e	327
BJC-800	1065	BJC-920	1159
EPSON			
Stylus Color	332	Stylus 1000	325
SO-B70	440	SO-1170	589
B-200	297	B-100	203
HEWLETT PACKARD			
Deskjet 320	163	Deskjet 320 + ASF	177
Deskjet 320/540 Col Kit	28	Deskjet 540	206
Deskwriter 540	206	Deskjet 660C	293
Deskwriter 660C	293	Deskjet 850C	383
Deskjet 1200C	625	Deskjet 1600C	832
Deskjet 1600CX	1219	XL300C A4	1534
XL300C A3	1769	XL300C PS	2585
LEXMARK			
PS4079 A3 col 360dpi	2185	ExecJet IIC 300dpi	225
MANNESMANN TALLY			
T7010	169	T7018	149
T7118	77	M793	339
MT94	379	T7010	239
NEC			
Jetmate 400	99	Jetmate 800	149
OKI			
OkJet 300c	289		
STAR			
SJ-144	178	WinType 800C	592
TEKTRONICS			
Phaser 140 360dpi 8MB/1247	289	Other printers	Call
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MicroMarc colour	250		

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AGFA			
StudioScan	485	Studio Scan Isi	529
Arcus Plus & Trans	2340		
DEXXA			
Colour Media	150	Colour Office	245
CANON			
IX4015 Flatbed SCSI	529	Iron RC250 PC kit	358
EPSON			
GT-8500 Par & SCSI	428	GT-9000 Par & SCSI	530
GTx-8500 SCSI+PS LE	477	GTx-8500 Para+PS LE	509
GTx-8500 SCSI+PS LE	575	GTx-9000 Para+PS LE	615
GT-9000 SCSI+PS full 892	695	GT-8500 SCSI+PS full	777
GT-9000 SCSI+PS full 892	GT Transparency unit	436	
GT Auto Doc Feeder	310	LapCAT	335
Gtx bundle includes: Adobe Photoshop LE, Omnipage Direct, GTI bundle includes: Adobe Photoshop 3.0			
HEWLETT PACKARD			
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Scanjet 3e ISA	599	Scanjet 3e MCA	599
Scanjet 3c MAC	599	3c Document Feeder	150
3c Document Feeder	359	3c Transparency unit	445
Scanjet Mono DSM	85	Scanjet Colour DSM	135
LOGITECH			
Scanman 256 Win	78	Scanman Colour	165
Scanman Easytouch	99	PowerPage	288
All Logitech includes OCR software			
MICROTEK			
ScanMaker II	295	ScanMaker IIG	335
ScanMaker IHR	799	ScanMaker IIS	420
ScanMaker III	1815	Transparency Adaptor	275
Photshop LE	30	Photshop Full	130
Photshop can only be bought with scanners			
NIKON			
Scantouch PC & OCR	915	Cool Scan 35mm	390
PRIMAX			
Lector 256 Win	75	True Colour Handheld	119
Colour Mobile Pro	146	Colour Mobile Direct	110
Colour Flatbed	149	Datapen	237
T630	449	Vista S8	475
Vista S6 Pro	585	DXY-1250	710
Vista S8 Pro	955	UC1260	765
UC1260 Pro	1035	PowerLoop Pro	1970
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VISIONEER			
PaperPort Win	232	PaperPort Mac	282

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H5466A	HP DeskJets/Writers (Colour)	3 Year Unit Exchange	3 Year on-site - next day	£65
H5467A	HP Fax-900, HP Fax-950	1 Year Unit Exchange	3 Year on-site - next day/exchange	£70
H5468A	HP ScanJets (Mono)	1 Year Return	3 Year on-site - next day	£85
H5473A	HP LaserJet 4L, HP DeskJet 1200C/PS, 1600C/CM	1 Year Unit Exchange or 1 Year Return	3 Year on-site - next day	£100
H5475A	HP ScanJets (Colour)	1 Year Return	3 Year on-site - next day	£135
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- 1Mb memory, upgradeable to 5Mb
- 300 x 300 dpi resolution
- OKi's Microfine Spherical Toner
- OKi LED technology
- 42 resident bit mapped fonts
- Dimensions, 160x320x360mm

- Paper tray - A4, 100 sheet
- Optional 250 sheet tray
- HP PCL 4.5 compatible
- LED 4ppm page printer
- 27 seconds to first print
- Energy Star approved
- Power saving mode
- Printer life, 180,000 pages



OL410ex £379

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- 300 x 300 dpi resolution
- MicroRes 600
- OKi LED technology
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- Dimensions, 160x320x360mm

- Paper tray - A4, 100 sheet
- Optional 250 sheet tray
- HP PCL 5 compatible
- LED 4ppm page printer
- 25 seconds to first print
- Energy Star approved
- Power saving mode
- Extended toner & drum life



OL810ex £739

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- Data Compression
- 2Mb memory, upgradeable to 34Mb
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- OKi LED technology
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- Dimensions, 200x330x377mm

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- Optional 250 sheet tray
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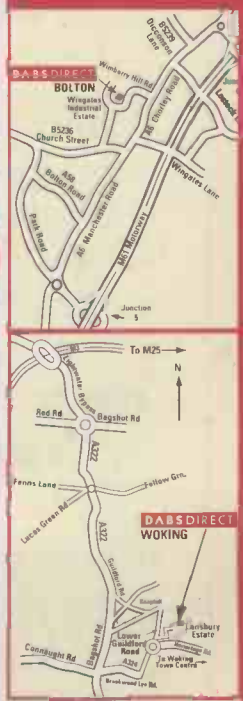
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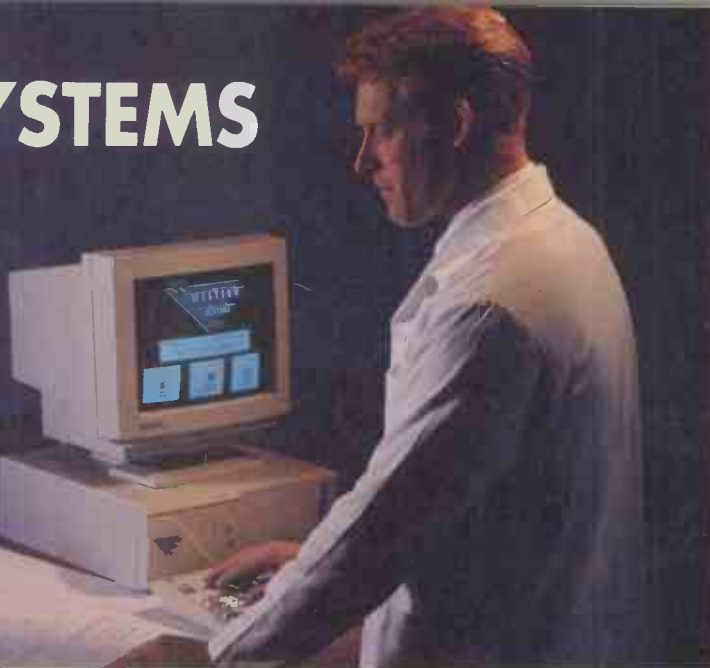
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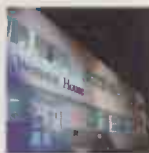
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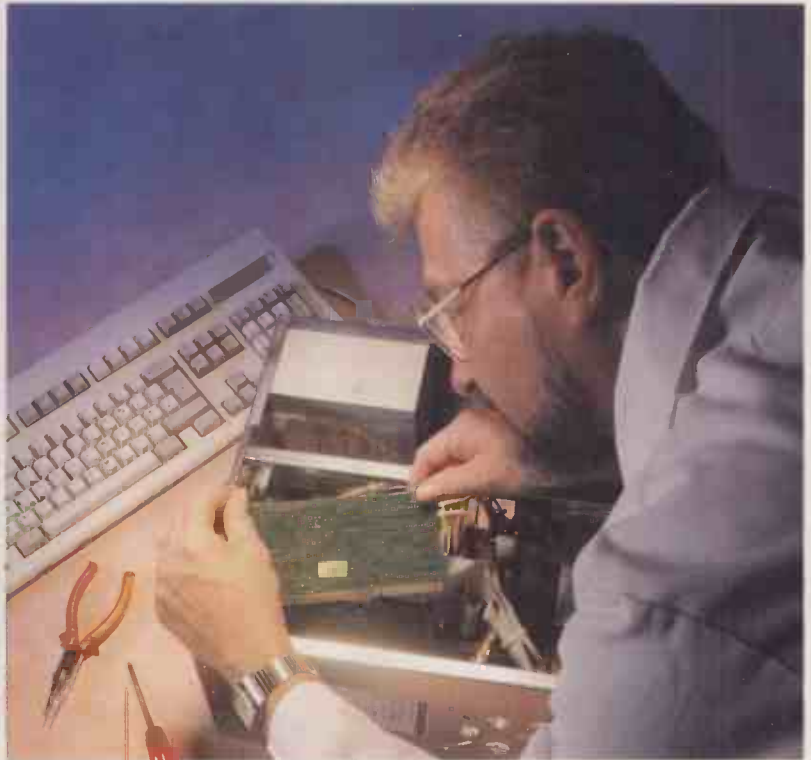
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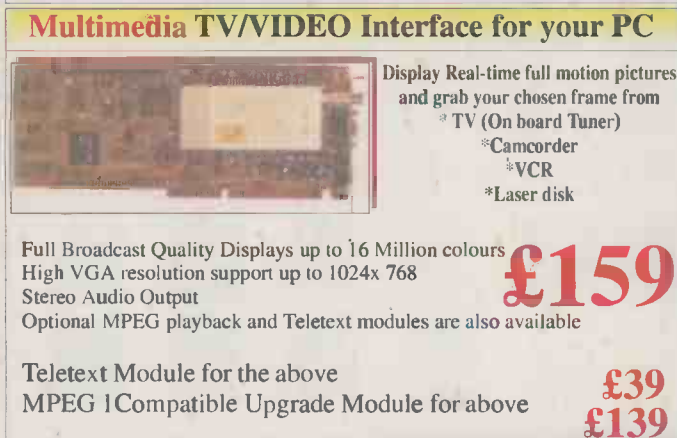
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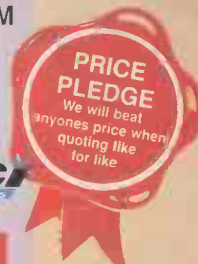


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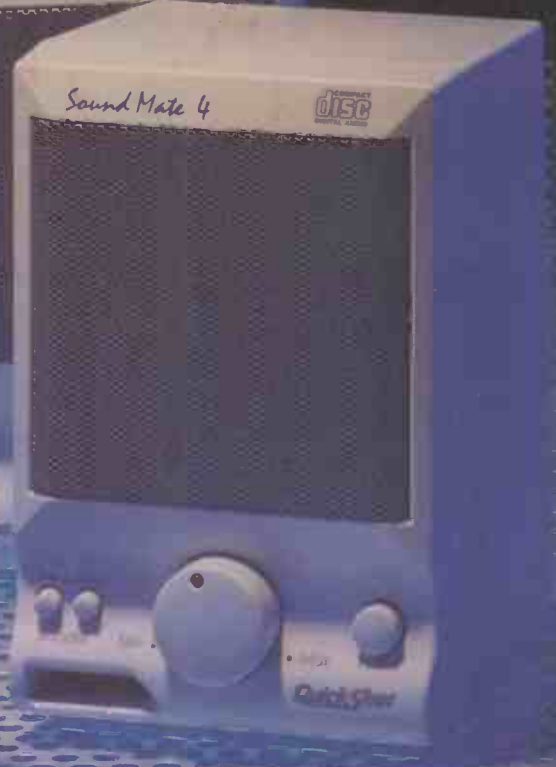
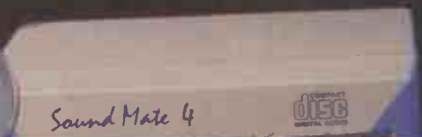
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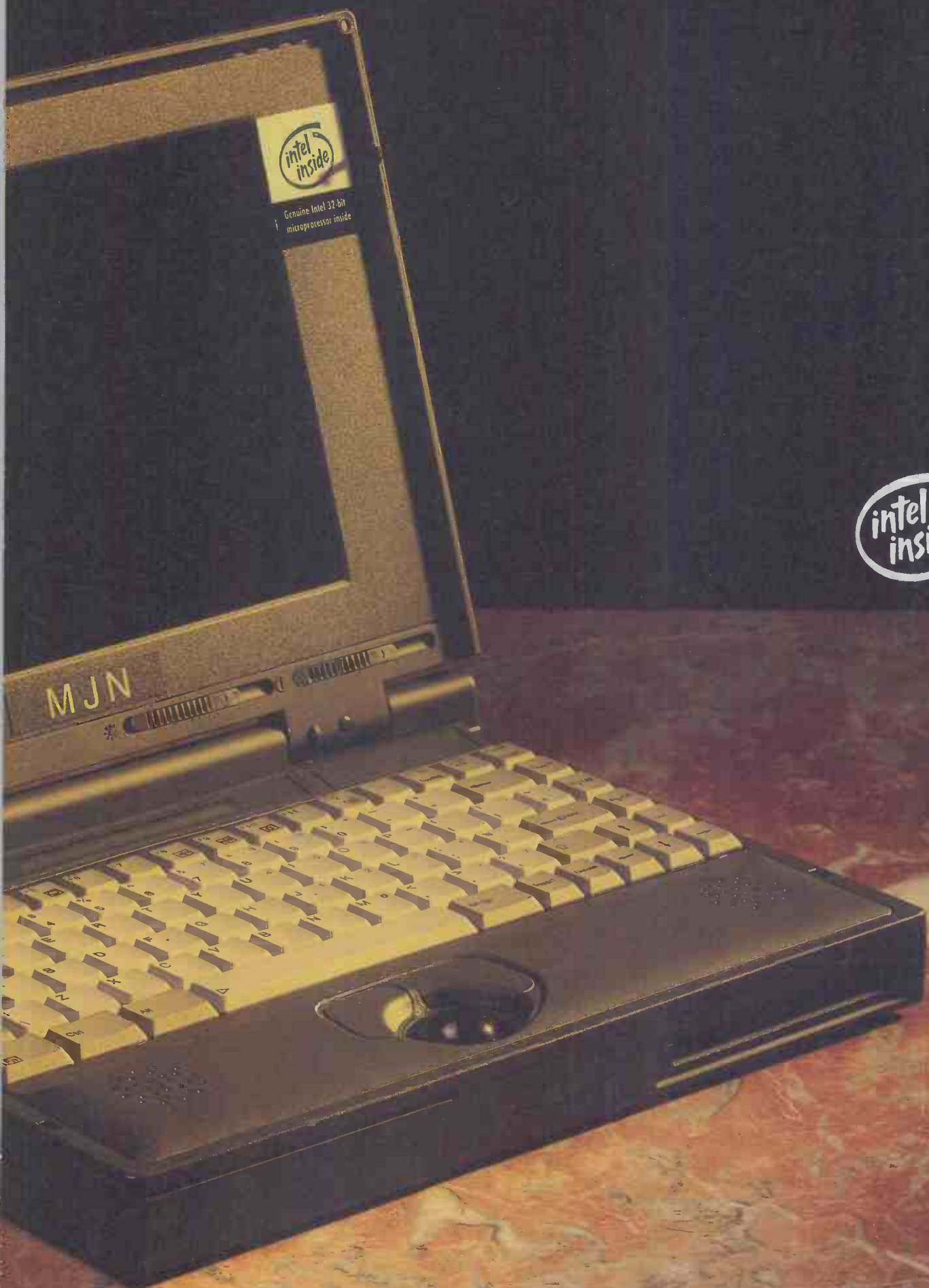
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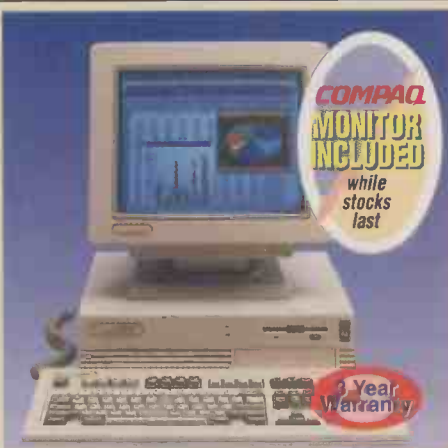
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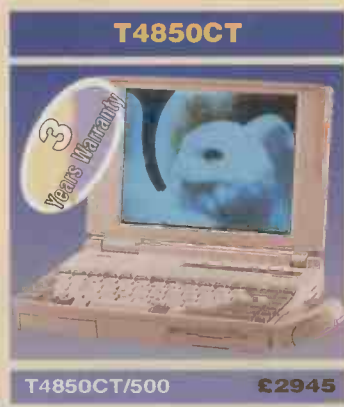
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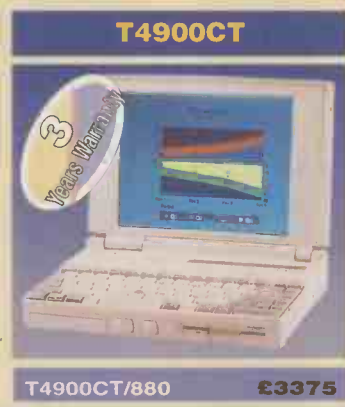
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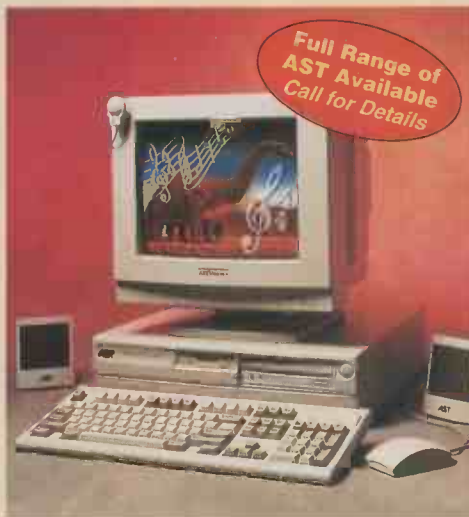
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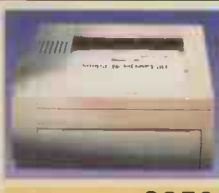


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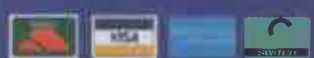
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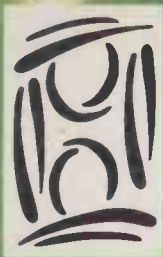
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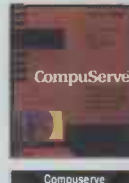
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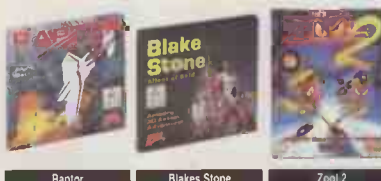
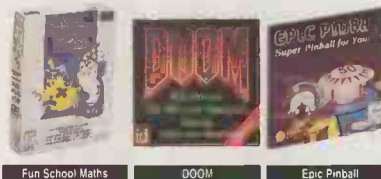
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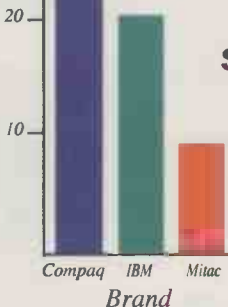
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£10 plus VAT (£11.75) for smaller items purchased separately

PRICES

System prices are shown without VAT (17.5%) and delivery. All Interest Free Credit prices include delivery & VAT. Please note that prices are subject to change and that these offers in this current advert are limited whilst current stocks last. Please order early to avoid disappointment. All trademarks are acknowledged. Prices, specifications and offers are subject to change, availability and subject to our conditions of sale copies of which are available on request. Please contact our sales staff for the latest up to date details. Intel Inside and Pentium logos are trademarks of the Intel Corporation. E&OE.

INTEREST FREE EXAMPLE

The following example shows a typical purchase.
All these interest free prices include delivery & VAT

Cash purchase	Credit Purchase	Deposit	24 Monthly Payments	Total
Time Machine E £1196.15	Time Machine E £120.95	£44.80		£1196.15
Lexmark Laser Pack £486.45	Lexmark Laser Pack £54.45	£18.00		£486.45
Total (inc. Del & VAT) £1682.60	Totals	£175.40	£62.80	£1682.60

TOTAL CASH PRICE = TOTAL CREDIT PRICE
 Interest Free Credit is available subject to status. Written quotations are available on request. Be sure you can afford the payments before entering into a credit agreement.
 The deposit may be paid by credit card or cheque. Most customers also purchase other options (e.g. floppy disks, 3 year extended warranty, Multimedia kit etc). Most of these are also available on Interest Free Credit whilst others can be paid for by increasing the deposit. Please call for details.



COMPUTER SHOPPER
 1994 Awards Winner
 Fair Trading Award
 (Software Dealers)



Certificate No. FS 28122
 BS EN ISO 9002:1994

IBM Aptiva PowerStation

SYSTEM SPECIFICATION

- 486DX2-66 or 486DX4-100 processor
- 4Mb RAM or 8Mb RAM
- 540Mb IDE hard drive
- 3.5" 1.44Mb floppy drive
- Integrated VESA local bus graphics
- 4 drive bays and 4 slots
- Parallel, serial and mouse ports
- 14" SVGA 0.28dp (0.39dp on model A) MPRII colour screen
- MS compatible mouse and 102 keyboard
- PC DOS 6.3 and MS Windows 3.1
- 12 month warranty extendable to 3 or 5 years
- IBM Helpline support

Multimedia (MM) Models

Also include 16-bit sound card, stereo speakers, fitted CD-ROM drive, PC joystick and a superb range of educational and leisure CD multimedia titles



PRE-LOADED SOFTWARE*

Please see software section for details

- Lotus 1-2-3 v5 spread sheet
- Lotus Ami Pro v3.1 word processor
- Lotus Approach v3 database
- Lotus Organizer v2
- Lotus SmartPics graphics
- Lotus Training for 1-2-3, Ami Pro and Approach
- New Quicken v4 personal finance pack
- GST Pressworks 2 desktop publishing pack
- GST Designworks 2 art and graphics pack
- Paciol! 2000 business accounts
- Microsoft Works v3 and AptivaWare software

The new high performance IBM Aptiva PowerStation is the perfect solution for the home or business user. Only models from Time Computers come with the additional software including the Lotus software suite, GST DTP & graphics suite, new Quicken v4 personal finance pack and some excellent Multimedia CD titles (with MM models only). These models are not available on Interest Free Credit



Aptiva PS A 486SX-33 4Mb £799 Plus VAT	Aptiva PS 1 486DX2-66 4Mb £999 Plus VAT	Aptiva PS 2 486DX4-100 8Mb £1199 Plus VAT	Aptiva MM PS 3 486DX2-66 4Mb Multimedia Model £1199 Plus VAT	Aptiva MM PS 4 486DX4-100 8Mb Multimedia Model £1399 Plus VAT
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IBM Aptiva Solutions: These models come with additional software, fax and Internet pack and are also available on Interest Free Credit, please call for details.

BUY NOW

Pay only £120.95 deposit with nothing more to pay for 6 months



PAY LATER

After 6 months pay just £44.80 per month for 24 months on Interest Free Credit. APR 0%* . (Time Machine E)

These amazing high performance 486 systems come complete with a powerful suite of the best business, educational and leisure programs and provide the ideal solution for the home and business user. They are available on a truly incredible interest free credit offer.

PC SPECIFICATION

- 486DX2-66, 486DX4-100 or Pentium® Processor
- 540Mb or 850Mb fast IDE hard disks
- 4Mb or 8Mb RAM expandable to 96Mb
- Fitted CD Drive shown is £100+VAT extra
- 1.44Mb Floppy drive, 256K external cache
- Pentium® Technology upgradeable
- SVGA graphics controller with 1Mb
- 14" or 15" SVGA non-interlaced low radiation colour screen with 0.28dp
- Desktop case with 4 drive bays and 7 slots
- 102 keyboard and Microsoft® compatible mouse
- DOS and Windows® 3.11 (Windows 95 option available)
- Manufactured by Mitac in the UK
- 12 Month warranty extendable to 5 Years

PRE-LOADED SOFTWARE*

Please see software section for details

Business Software

- Lotus Software suite including Lotus 1-2-3, Ami Pro, Approach, Organizer 2, SmartPics and Lotus Training
- GST Pressworks 2 and Designworks 2
- TurboCAD for Windows
- Organize Your Way
- CV & Job Search Pro
- Paciol! 2000 Business Accounts
- Masterclips SE and Picture This!

Educational Software

- Fun School 4, Fun School Maths and Typing Tutor
- Computerworks, Bodyworks and Autoworks
- EZ Language French, German and Spanish

Leisure Software

- PC Paintbrush
- Arts & Letters Draw and Wired for Sound lite
- Doom, Blake Stone, Pinball and Raptor
- Shareware Games

Time Machine E

486DX2-66, 540Mb, 4Mb RAM, 14" Screen

£44.80 Per Month

£120.95 deposit, nothing more to pay for 6 months and then 24 monthly payments of £44.80. Total price £999+VAT = £1196.15 inc delivery & VAT. APR 0%*

Time Machine G

486DX4-100, 850Mb, 8Mb RAM, 15" Screen

£62.00 Per Month

£178.15 deposit, nothing more to pay for 6 months and then 24 monthly payments of £62. Total price £1399 +VAT = £1666.15 inc delivery & VAT. APR 0%*

Time Machine H

Pentium® 75, 850Mb, 8Mb RAM, 15" Screen

£71.00 Per Month

£197.15 deposit, nothing more to pay for 6 months and then 24 monthly payments of £71. Total price £1599 +VAT = £1901.15 inc delivery & VAT. APR 0%* P90 model £79 + VAT Extra P100 model £179 + VAT Extra

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Blackburn Road,
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Multimedia Time Machines

SYSTEM SPECIFICATION

486 Models

- 486DX2-66, 486DX2-80 or 486DX4-100 processor
- 540Mb, 850Mb or 1.0 Gb fast IDE hard disks
- 4Mb or 8Mb RAM expandable to 64Mb
- 1.44Mb floppy drive, 256K external cache
- Pentium® technology upgradeable
- VESA SVGA graphics controller with 1Mb
- 14", 15" or 17" SVGA non-interlaced low radiation colour screen with 0.28dp
- Desktop case (new design) with 4 drive bays and 7 slots
- 102 keyboard and mouse
- DOS and Windows 3.11 (Windows '95 option available)
- Manufactured by Mitac in the UK
- 12mths warranty extendable to 5 years

Pentium® Models

- Intel Pentium® 75, 90, 100, 120 or 133MHz based processors
- 8Mb or 16Mb RAM expandable to 128Mb
- PCI Pentium® board with PCI graphics and PCI IDE hard disks

Rest of specification as 486

Multimedia Hardware

- Double or Quad speed IDE CD-ROM drive
- 16-bit high quality sound card
- Twin stereo speaker system
- PC joystick

Fax & Internet Pack 1

- BABT approved data and fax modem
- Fax software
- Communications software
- Introductory subscription to CompuServe with Internet Mailbox

The Multimedia Time Machines are powerful, high specification 486 and Pentium® systems that provide the complete solution for the home and small business environment. They all come with excellent business software from Lotus and other leading manufacturers plus a range of educational and leisure software. All are fully multimedia ready with fitted CD-ROM drives, 16-bit sound cards and a superb range of CD multimedia titles from Microsoft. Also included is the Fax & Internet Pack

allowing these systems to function as a powerful fax machine and allowing you to get on-line to services such as CompuServe and the Internet. At these amazing prices with Interest Free Credit available for a limited period, these systems are without doubt the best computer solutions for the home and small business user. Add a quality Printer Pack or Scanner Pack (available on Interest Free Credit) for a complete solution.

PRE-LOADED SOFTWARE**

Please see software section for details

Business Software

- Lotus software suite including Lotus 1-2-3, Ami Pro, Approach, Organizer 2, SmartPics and Lotus Training
- GST Pressworks 2 and Designworks 2
- TurboCAD for Windows
- Organize Your Way
- CV & Job Search Pro
- Pacioll 2000 Business Accounts
- Masterclips SE and Picture This!
- Quicken v4 personal finance

Educational Software

- Fun School 4, Fun School Maths and Typing Tutor
- Computerworks, Bodyworks, EZ Language French, German and Spanish

Leisure Software

- PC Paintbrush, Arts & Letters Draw and Wired for Sound Lite
- Doom, Blake Stone, Pinball and Raptor Shareware Games

Microsoft® Multimedia Software

- Microsoft Encarta® '95 Encyclopaedia CD, Microsoft Works CD, Microsoft Golf CD, Microsoft Beethoven CD, Microsoft Dangerous, Creatures CD



*APR

0%

INTEREST FREE CREDIT

Interest Free Credit is available subject to status. Written quotations are available on request. Be sure you can afford the payments before entering into a credit agreement. See page 3 for Interest Free example. Software is pre-loaded. Pack shots shown for illustration only. See software section for software details.

Multimedia Time Machine 1 486DX2-66/DX2-80/DX4100

486DX2-66 with 540Mb hard drive, 4Mb RAM, 14" screen and modem

£39 Per Month

£159.15 deposit and 24 monthly payments of £53.00 OR
£495.15 deposit and 24 monthly payments of £39.00
Total price £1199.00+VAT = £1431.15
inc delivery & VAT. APR 0%*

Model 1B 486 DX2-80.....£50 Extra
Model 1C 486DX4-100.....£100 Extra
RAM upgrade to 8Mb.....£Call

Multimedia Time Machine 2 486DX4-100

486DX4-100 with 850Mb hard drive, 8Mb RAM, 15" screen and modem

£49 Per Month

£199.65 deposit and 24 monthly payments of £66.00 OR
£607.65 deposit and 24 monthly payments of £49.00
Total price £1499.00+VAT = £1783.65
inc delivery & VAT. APR 0%*

15" to 17" upgrade £250

Multimedia Time Machine 3A Pentium® 75

Pentium® 75 with 540Mb hard drive, 8Mb RAM, 14" screen and modem

£59 Per Month

£186.40 deposit and 24 monthly payments of £69.00 OR
£426.40 deposit and 24 monthly payments of £59.00
Total price £1549.00+VAT = £1842.40
inc delivery & VAT. APR 0%*

Multimedia Time Machine 4 Pentium® 75, 90, 100

Pentium® 75 with 850Mb hard drive, 8Mb RAM, 15" screen and modem

£69 Per Month

£229.40 deposit and 24 monthly payments of £77.00 OR
£421.40 deposit and 24 monthly payments of £69.00
Total price £1749.00+VAT = £2077.40
inc delivery & VAT. APR 0%*

Pentium® 90 upgrade £79
Pentium® 100 upgrade £179
15" to 17" upgrade £250

Multimedia Time Machine 5 Pentium® 90, 100, 120, 133

Pentium® 90 with massive 1.08Gb hard drive, 16Mb RAM, 2Mb PCI S3 64-Bit Video RAM, 15" screen and modem

£79 Per Month

£278.15 deposit and 24 monthly payments of £97.00 OR £562.65 deposit and 24 monthly payments of £79.00
Total price £2199.00+VAT = £2606.15
inc delivery & VAT. APR 0%*

Pentium® 100 upgrade £79
Pentium® 120 upgrade £299
Pentium® 133 upgrade £329
15" to 17" upgrade £250



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Mitac Systems

The best deals on the best hardware!

If you have already standardised on your software and are simply looking for the best hardware, these Mitac systems provide truly incredible specification at amazing prices.

These amazingly low prices are achieved by allowing you to select the software you need. For most home and small business users looking for a system with top quality software, our PowerStation and Time Machine bundles still provide the best value.

If you do not see the hardware configuration you are looking for, please give us a call and we will configure a system to your requirements.

MITAC 486DX2-66

SYSTEM SPECIFICATION

- 486DX2-66 processor
- 4Mb RAM expandable to 64Mb
- Pentium® technology upgradeable
- 127Mb, 340Mb or 540Mb IDE hard disk
- 3.5" 1.44Mb floppy drive
- Local Bus VESA graphics with Windows accelerator
- 14" SVGA colour screen
- IDE hard and floppy controller
- Parallel, 2 serial, joystick and keyboard ports
- Expandable desktop case
- 4 drive bays and 7 expansion slots (2 VESA)
- 102 Enhanced keyboard
- Microsoft compatible mouse

£ **499**
+ VAT

340Mb Model£549 +VAT
540Mb Model£599 +VAT



Please note case design may vary
CD-ROM drive shown is only £70 extra

MITAC 486DX4-100

SYSTEM SPECIFICATION

As above but with

- 486DX4-100 processor
- 8Mb RAM
- 540Mb IDE hard drive

£ **669**
+ VAT

CD MULTIMEDIA MODELS

These also include double or quad speed CD-ROM drive, 16-bit stereo sound card and twin stereo speakers.

Double Speed Kit£150 +VAT
Quad Speed Kit£200 +VAT

MITAC 486DX4-100 S

SYSTEM SPECIFICATION

- 486DX4-100 processor
- 256K external cache
- 540Mb IDE hard disk
- 8Mb RAM expandable to 64Mb
- Pentium® technology upgradeable
- 3.5" 1.44Mb floppy drive
- 1Mb VESA bus graphics with Windows accelerator
- 14" SVGA colour screen
- IDE hard and floppy controller
- Parallel, 2 serial, joystick and keyboard ports
- Expandable desktop case
- 4 drive bays and 7 expansion slots (2 VESA)
- 102 Enhanced keyboard
- Microsoft compatible mouse

£ **799**
+ VAT

850Mb Model£849 +VAT

MITAC P75

SYSTEM SPECIFICATION

- Intel 75MHz Pentium® Processor
- 8Mb RAM expandable to 128Mb
- 540Mb enhanced IDE (Fast ATA) hard disk
- 256K external SRAM cache
- 3.5" 1.44Mb floppy drive
- PCI Bus with 4 PCI slots
- PCI bus graphics with 1Mb Video RAM and super-fast 64-bit 3 Windows accelerator - the best (other suppliers only offer slower cards with their Pentium® systems)
- 14" SVGA colour screen
- Enhanced PCI IDE hard and floppy controller
- Parallel, 2 fast serial and keyboard ports
- Expandable desktop case
- 4 drive bays and 7 expansion slots (3 PCI)
- 102 Enhanced keyboard
- Microsoft compatible mouse

£ **899**
+ VAT

850Mb Model£949 +VAT
1.08Gb Model£999 +VAT

MITAC P90

SYSTEM SPECIFICATION

As P75 model but with

- Intel 90MHz Pentium® Processor

£ **999**
+ VAT

850Mb Model£1049 +VAT
1.08Gb Model£1099 +VAT

MITAC P100

SYSTEM SPECIFICATION

As P75 model but with

- Intel 100MHz Pentium® Processor

£ **1099**
+ VAT

850Mb Model£1149 +VAT
1.08Gb Model£1199 +VAT
1.6Gb Model£1299 +VAT

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Compaq Presario Multimedia PowerStations

SYSTEM SPECIFICATION

- 486DX2-66 or 486DX4-90 processor
- 8Mb RAM expandable to 64Mb
- 420Mb hard disk
- 3.5" 1.44Mb floppy drive
- Local Bus SVGA graphics
- Compact 3 bay case with 2 expansion slots shown (Standard Desktop model with 3 bays & 3 slots and Mini-Tower Models with 5 bays & 5 slots also available)
- Serial, parallel, joystick, MIDI and mouse ports
- 14" Low radiation NI SVGA colour screen
- 16-bit stereo sound card, microphone & speakers
- Quad Speed multisession CD-ROM drive
- Integrated 9600/2400 fax/data modem with telephone answering & CompuServe
- MS DOS 6.2, Windows 3.1, Tabworks, Welcome Centre, Control Centre and Learning Centre
- PowerStation Model A features 486/SX2-66, 4Mb RAM and double speed CD

Compaq Presario PowerStation 4:

Pentium® 75 Model includes 720Mb hard drive, 256K Cache, Mini-Tower case, PCI Bus graphics but no modem. Rest of specification as above.



SOFTWARE™

Pre-loaded or on CD

- Lotus 1-2-3 v5 spread sheet
- Lotus Ami Pro v3.1 word processor
- Lotus Approach v3 database
- Lotus Organizer v2
- Lotus SmartPics graphics
- Lotus Training for 1-2-3, Ami Pro and Approach
- New Intuit Quicken v4 personal finance pack
- GST Pressworks 2 desktop publishing pack
- GST Designworks 2 art & graphics pack
- Pacioli 2000 Business Accounts
- Microsoft Works v3 all-in-one package
- MS Money finance pack
- MS Entertainment pack
- Microsoft Encarta® '95 Encyclopaedia
- EZ Language French, German, Spanish & more
- The Ultimate Human Body

Compaq Presario Multimedia PowerStations provide you with famous brand, high quality solutions for home and business use. Only systems from Time come with additional software including the Lotus Business Suite, GST Graphics & DTP packages and New Quicken v4 personal finance pack. Also included are some excellent CD titles including Microsoft Encarta, EZ Language and The Ultimate Human Body.

Most systems feature high quality Quad Speed Multimedia and 486 system also include fax & data modem with answerphone facilities.



MS Works

MS Money

MS Entertainment Pack

Encarta '95 CD

EZ Language

The Ultimate Human Body



Compact Model

Presario PowerStation A
486SX2-66, 4Mb, double speed **£999^{+VAT}**

Presario PowerStation 1
486DX2-66, 8Mb, quad speed **£1299^{+VAT}**



Standard Desktop Model

Presario PowerStation 2
486DX4-90, 8Mb, quad speed **£1399^{+VAT}**



Mini-Tower Model

Presario PowerStation 3
486DX4-90, 8Mb, quad speed **£1449^{+VAT}**



Mini-Tower Model

Presario PowerStation 4
Pentium 75, 8Mb, quad speed **£1699^{+VAT}**

Compaq

The superb Compaq Contura TFT Colour models with Pace portable modem. Simply the best buy in TFT colour notebooks.

- Intel 486DX-25 processor
- 4Mb or 8Mb RAM
- 120Mb or 209Mb IDE hard disk
- Superb VGA TFT colour screen
- Built-in trackball mouse
- 1.44Mb floppy drive
- All standard ports
- MS DOS 6.2 and Windows 3.1
- Pace portable fax & data modem with software
- Compaq 3 year warranty

486DX-25 120Mb TFT colour **£1299**
486DX-25 209Mb TFT colour **£1499**

RAM upgrade 4Mb to 8Mb **£155**



Toshiba

The new T2100 range of Mono, Dual Scan and TFT Colour notebooks with built-in AC adapter.

- Intel 486DX2-50 or 486DX4-75 Processor
- 4Mb or 8Mb RAM
- 260Mb, 320Mb or 520Mb IDE hard disk
- VGA STN Mono, Dual Scan STN Colour or TFT Colour screens
- Mousepoint mouse & 1.44Mb floppy
- PCMCIA slots and standard ports
- Built-in AC adapter & battery
- MS DOS 6.22 and Windows 3.11

T2100 486DX2-50 Models

T2100 4Mb 260Mb 9.5" Mono **£899**
T2100CS 4Mb 350Mb 10.4" DS Colour **£1499**
T2100CT 8Mb 520Mb 8.4" TFT Colour **£2149**

T2150 CD 486DX4-75 Models

2150CD models include built-in sound cards, speakers, microphone and internal double speed CD-ROM Drive! External 3.5" floppy is included.
2150CDS 4Mb 260Mb CD 10.4" DS Colour **£2249**
2150CDS 4Mb 520Mb CD 10.4" DS Colour **£2399**
2150CDT 8Mb 520Mb CD 10.4" TFT Colour **£2999**

4Mb RAM Module (PA2026U) **£215**
8Mb RAM Module (PA2027U) **£385**
16Mb RAM Module (PA2014U) **£875**



Texas Instruments

Texas instruments latest 4000M models with built-in Multimedia. The CD-ROM portable dock option converts it into a full-feature multimedia PC.

- Intel 486DX2-50, 486DX4-75 or 486DX4-100 processor
- 4Mb RAM upgradeable to 20Mb
- 340Mb, 455Mb or 520Mb IDE hard disk
- VGA Dual scan or TFT colour screen
- 1Mb VESA Video
- Built-in 16-bit sound card, microphone and speakers
- Built-in point mouse
- Adaptec fast SCSI-II port
- Optional CD-ROM drive
- 1.44Mb floppy drive
- PCMCIA II/III and all standard ports
- MS DOS 6.2 and Windows 3.1

486DX4-75 455Mb Dual Scan STN **£1799**

486DX2-50 455Mb TFT Colour **£1499**
486DX4-75 455Mb TFT Colour **£1799**
486DX4-100 520Mb TFT Colour **£2499**

4Mb RAM Module **£149**
Portable CD-ROM Dock **£499**



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Compaq Multimedia Time Machines

SYSTEM SPECIFICATION

- 486DX2-66 or 486DX4-90 processor
- 8Mb RAM expandable to 64Mb
- 420Mb hard disk
- 3.5" 1.44Mb floppy drive
- Local bus SVGA graphics
- Standard desktop case with 3 bays and 3 expansion slots shown (Compact and Mini-Tower models also available)
- Serial, parallel, joystick, MIDI and mouse ports
- 14" Low radiation NI SVGA colour screen
- 16-bit stereo sound card, microphone and speakers
- Quad speed multisection CD-ROM drive
- Integrated 9600/2400 fax/data modem with telephone answering and CompuServe
- MS DOS 6.2, Windows® 3.1, Tabworks, Welcome Centre, Control Centre and Learning Centre
- PC joystick is included
- Model A features 486SX2-66, 4Mb RAM and double speed CD-ROM drive

Compaq Time Machine 4: Pentium® 75 model includes 720Mb hard drive, 256K cache, Mini-Tower case, PCI bus graphics but no modem. Rest of specification as above.



Microsoft® & Additional Multimedia Software

SOFTWARE

Pre-loaded or on CD
Please see software section for software details

Business Software

- Lotus Software suite including Lotus 1-2-3, Ami Pro, Approach, Organizer 2, SmartPics and Lotus Training
- GST Pressworks 2 and Designworks 2

- TurboCAD for Windows
- Organize Your Way
- CV & Job Search Pro
- Quicken v4 personal finance pack
- Pacioli 2000 Business Accounts
- Masterclips SE and Picture This!

Educational Software

- Windows Training and Windelete
- Computerworks and Autoworks

- Fun School 4, Fun School Maths and Typing Tutor

Leisure Software

- PC Paintbrush
- Arts & Letters Draw and Wired for Sound file

- Doom, Blake Stone, Pinball and Raptor Shareware Games

Microsoft Software

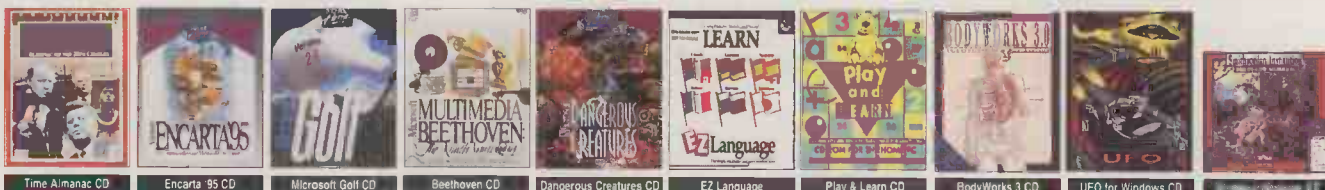
- Microsoft Works v3 all-in-one package
- Microsoft Money finance pack
- Microsoft Encarta, '95 Encyclopaedia CD

- Microsoft Entertainment pack
- Microsoft Golf CD
- Microsoft Beethoven CD
- Microsoft Dangerous Creatures CD

Additional Multimedia Software

- Time Almanac CD
- Bodyworks 3 CD
- EZ Language CD
- Play & Learn CD

- UFO for Windows CD
- Dinosaur Museum CD
- The Ultimate Human Body CD



Compaq Multimedia Time Machines are powerful multimedia systems that come with all the software you are ever likely to need. These systems include extra business, educational and CD multimedia titles not included with some of our other systems. All systems are exclusive to Time Computer

Systems and feature high quality high speed multimedia with a PC joystick as standard. 486 Systems also include a fax and data modem with answerphone facilities. These systems are also available on Interest Free Credit and monthly payment examples are shown below.

*APR
0%
INTEREST FREE CREDIT

Interest Free Credit is available subject to status. Written quotations are available on request. Be sure you can afford the payments before entering into a credit agreement. See page 3 for Interest Free example. Software is pre-loaded or on CD. Pack shots shown for illustration only. See software section for software details.

Compact all-in-one model features 3 drive bays and 2 slots



Mini-Tower models feature 5 drive bays and 5 slots

Compaq Time Machine A 486SX2-66

Compact Model
420Mb, 4Mb RAM, double speed and modem

£39 Per Month

£156.65 deposit and 24 monthly payments of £58.00 OR
£612.65 deposit and 24 monthly payments of £39.00
Total price £1299.00+VAT = £1548.65 inc delivery & VAT. APR 0%*

Compaq Time Machine 1 486DX2-66

Compact Model
420Mb, 8Mb RAM, quad speed and modem

£49 Per Month

£186.40 deposit and 24 monthly payments of £69.00 OR
£666.40 deposit and 24 monthly payments of £49.00
Total price £1549.00+VAT = £1842.40 inc delivery & VAT. APR 0%*

Compaq Time Machine 2 486DX4-90

Standard Desktop Model
420Mb, 8Mb RAM, quad speed and modem

£59 Per Month

£207.90 deposit and 24 monthly payments of £73.00 OR
£543.90 deposit and 24 monthly payments of £59.00
Total price £1649.00+VAT = £1959.90 inc delivery & VAT. APR 0%*

Compaq Time Machine 3
(Mini Tower Model) is £50 + VAT Extra

Compaq Time Machine 4 Pentium 75

Mini Tower Model
720Mb, 8Mb RAM, quad speed

£79 Per Month

£245.90 deposit and 24 monthly payments of £91.00 OR
£533.90 deposit and 24 monthly payments of £79.00
Total price £2049.00+VAT = £2429.90 inc delivery & VAT. APR 0%*

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Multimedia Family PC

SYSTEM SPECIFICATION

- 486DX2-66, 486DX4-100 or Pentium® 75 processor
- Massive 540Mb fast IDE hard disk
- 4Mb RAM or 8Mb RAM
- 1.44Mb Floppy drive
- Pentium® technology upgradeable
- 32-bit Local Bus SVGA graphics controller (64-bit PCI graphics on Pentium model)
- 14" (monitor shown is 15" digital, available at extra cost) SVGA colour screen
- Desktop case with 4 bays and 7 slots
- 102 Keyboard and Microsoft compatible mouse
- DOS and Windows 3.11 (Windows 95 option available)
- Made by Mitac in the UK

Multimedia Hardware:

Double Speed CD-ROM drive (quad speed optional), 16-bit high quality soundcard and Twin stereo speaker system. Free software with 8Mb RAM models only



PRE-LOADED SOFTWARE

See Software section for details

Business Software Suite

- Lotus Software suite including Lotus 1-2-3 Spread sheet, Lotus Ami Pro Word processor, Lotus Approach Database, Lotus Organizer 2, Lotus SmartPics graphics
- New Quicken v4 personal finance package
- TurboCAD v2 for Windows CAD & design package

Training Software

- Lotus Training on 1-2-3, Ami Pro and Approach

Educational Software

- EZ Language French, German and Spanish
- Play & Learn Educational CD

Leisure Software

- Doom, Blake Stone, Pinball and Raptor Shareware Games
- Wired for Sound Lite



Included **FREE** for a limited period until end of month

These powerful, high specification 486DX2-66, 486DX4-100 and Pentium® 75 CD Multimedia Systems provide the complete solution for the home. They all come with excellent business software from Lotus and other leading manufacturers plus a range of

educational and leisure software titles.

All are fully multimedia ready with fitted CD ROM drives, 16-bit sound cards and stereo speaker system. At just £798 this is the best home multimedia deal in the UK!

Multimedia Family PC

Family PC 2
486DX2-66 4Mb

£798 +VAT

8Mb models with extra software £160 +VAT
Model 3: 486DX4-100, 8Mb £999 + VAT
Model 4: Pentium® 75, 8Mb £1199 + VAT

WHAT WILL IT DO FOR YOU?

Our Multimedia Family PC includes everything you need now and is designed to be upgradeable and future-proof as your needs grow. These are just some of the things you can do:-

General Business

Lotus Software Suite includes 5 leading software packages with an RRP over £800 that provide all your general business needs for word processing, financial reports, database filing, organizing and graphics.

Home/Business

TurboCAD is a full-feature CAD package that lets you design your home, garden, floorplans and much more. Quicken personal finance pack manages all your personal accounts

Training

Training programs show you how to get the most out of your PC with comprehensive training on Microsoft Windows®, Lotus 1-2-3, Lotus Ami Pro and Lotus Approach.

Education

Play & Learn educational CD provides programs that include essential elements of the National Curriculum whilst Language programs teach French, German and Spanish.

Leisure

Superb games eg DOOM come as standard with this PC and a quality joystick option is available.

CD Multimedia & Sound

Our multimedia PC uses the fastest CD-ROM drives providing around 650Mb of data on each CD! and high quality 16-bit sound with stereo speaker system. You can also play your standard music CDs.

Fax & Internet Option

Our low cost Fax & Internet option converts your PC into a full-feature fax machine and allows you to connect to services such as CompuServe and the Internet.

Why Multimedia PC from Time?

We are confident that at just £798, our Multimedia Family PC offers the best value in the UK. Here are just some reasons why:-

- 1. 540Mb Hard Drives**
Forget 270 or 420Mb drives, 540Mb is the minimum you should consider. Lack of hard disk space is the most common reason for system upgrades.
- 2. Quality Components**
Our Mitac systems feature top quality components and are designed to be future-proof and upgradeable.
- 3. Fastest Processors**
You should not consider anything less than 486DX2-66 or 486DX4-100 processors. The 486DX4-100 processor is faster than the Pentium® P60 processor on many benchmarks
- 4. Lotus Software Suite**
Lotus Software suite alone has a combined RRP over £800 and is the best collection of business software available.
- 5. Home, Educational & Leisure Software**
Quicken v4 Personal Finance, TurboCAD v2 CAD, IMSI EZ Language Training Pack, Paciolli 2000 Business Accounts and Play & Learn Educational Pack are leading packages in each field and allow your PC to be used for these purposes.

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486 & 586 PowerStations

SYSTEM SPECIFICATION

- Intel Pentium® 75, 90, 100, 120 or 133 120 processor on 526 models
- 486DX2-66, 486DX2-80 or 486DX4-100 processor on 486 models
- 540Mb, 850Mb or 1.2Gb fast IDE hard disks
- 4Mb, 8Mb or 16Mb RAM
- CD-ROM drive (shown) is £100 extra
- 1.44Mb FD. 256K external cache
- Local Bus SVGA graphics with 1Mb or 2Mb Video RAM
- 14", 15" or 17" SVGA NI low rad colour screen with 0.28dp
- Desktop case (new design) with 4 bays and 7 slots
- 102 keyboard and mouse
- DOS and Windows 3.11 (Windows 95 option available)
- Manufactured for Time by Mitac in the UK



PRE-LOADED SOFTWARE**

Included with all systems.

See Software section for details

- Lotus 1-2-3 v5 spread sheet
- Lotus Ami Pro v3.1 word processor
- Lotus Approach v3 database
- Lotus Organizer v2
- Lotus SmartPics graphics
- Lotus Training for 1-2-3, Ami Pro and Approach
- Pacioli 2000 Business Accounts
- GST Pressworks 2 desktop publishing pack
- GST Designworks 2 art and graphics pack
- New Quicken v4 for Windows personal finance package

Mitac 486 & 586

The Mitac PowerStation is an incredible high performance PC system ideal for the business user and professional. It features fast 486 and Pentium® processors with a choice of high performance hard disks, and superb graphics. These systems are very expandable and can be tailored to your requirements with additional CD and multimedia options,

extra RAM, high performance modems and scanners. The excellent business software from Lotus, GST and Intuit is all you will need to keep you fully productive. At a price of just £699, the Mitac PowerStation is the best value PC in the UK today.

Mitac PowerStation 1A 486DX2-66	Mitac PowerStation 2 486DX4-100	Mitac PowerStation 3A Pentium® 75	Mitac PowerStation 4 Pentium® 75, 90, 100	Mitac PowerStation 5 Pentium® 90, 100, 120, 133
486DX2-66 with 540Mb hard drive, 4Mb RAM and 14" screen	486DX4-100 with 850Mb hard drive, 8Mb RAM and 15" screen	Intel Pentium® 75 CPU with 540Mb hard drive, 8Mb RAM and 14" screen	Intel Pentium® 75 CPU with 850Mb hard drive, 8Mb RAM and 15" screen	Pentium® 90 with massive 1.08Gb hard drive, 16Mb RAM, 2Mb PCI S3 64-bit video RAM and 15" screen
£699	£999	£1049	£1199	£1599
Model 1B 486DX2-80 . . . £749 Model 1C 486DX4-100 . . . £799 RAM Upgrade to 8Mb . . . £call	15" to 17" Upgrade £250		Pentium® 90 Model £79 Extra Pentium® 100 Model . . . £179 Extra	Pentium® 100 Upgrade £79 Pentium® 120 Upgrade £299 Pentium® 133 Upgrade £329 15" to 17" Upgrade £250

Multimedia POWER SYSTEMS

These systems include everything listed in the above Mitac PowerStation models and come with additional CD software, dual or quad speed CD-ROM drives, multimedia 16-bit sound, Fax & Internet Modem packs and are only £200 extra.

Multimedia Hardware

- Double speed (standard) or quad speed IDE CD-ROM drive
- 16-bit high quality sound card
- Twin stereo speaker system
- PC joystick

Fax & Internet Pack 1

- BABT approved data and fax modem
- Fax software
- Communications & on line software

Multimedia CD Software

- EZ Language Multimedia CD
- World Atlas CD
- Play & Learn Educational CD
- Shareware

More CD titles available (at extra cost)

SPECIFICATIONS

Identical specifications to above PowerStation models including software plus the following extras:-

MULTIMEDIA POWER PC MODELS

£200 +VAT EXTRA Quad Speed Models . . . £Call



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Ultimate Time Machine

The PC you have always wanted. Now affordable at Just £99 per month at APR 0%!

SYSTEM SPECIFICATION

- Intel Pentium® 100,120 or 133 (optional extra) processor
- 16Mb RAM expandable to 128Mb
- 1.6Gb 11ms enhanced IDE hard disk
- 17" SVGA non-interlaced MPR II low radiation colour screen with 0.28dp
- Quad speed IDE CD-ROM drive
- 1.7Mb tape back up system with cartridge
- Super-fast 28.8 V.34 approved fax & data modem with Fax & Internet Pack
- 256K external cache
- 1.44Mb floppy drive
- 16-bit high quality sound card
- Twin stereo speaker system
- PC joystick
- Microphone
- Desktop case with 4 drive bays and 7 slots
- 102 Keyboard and Microsoft compatible mouse
- DOS and Windows 3.11 (Windows 95 option available)
- Manufactured by Mitac in the UK
- 12m warranty extendable to 5 years



PRE-LOADED SOFTWARE**

The Ultimate Time Machine comes with virtually all the software in the Software section.

Business Software

- Lotus software suite including Lotus 1-2-3, Ami Pro, Approach, Organizer 2, SmartPics and Lotus Training
- GST Pressworks 2 and Designworks 2
- TurboCAD for Windows
- Organize Your Way
- CV & Job Search Pro
- Pacioli 2000 Business Accounts
- Masterclips SE and Picture Thist
- Quicken v4 finance pack

Educational Software

- Fun School 4, Fun School Maths and Typing Tutor
 - Computerworks, Bodyworks and Autoworks
 - EZ Language French, German and Spanish
- ### Leisure Software
- PC Paintbrush
 - Arts & Letters Draw and Wired for Sound lite
 - Doom, Blake Stone, Pinball and Raptor Games

Microsoft Multimedia Software

- Microsoft Encarta® Encyclopaedia CD
- Microsoft Works CD
- Microsoft Golf CD
- Microsoft Beethoven CD
- Microsoft Dangerous Creatures CD

Additional CD Software

- TIME Almanac CD
- EZ Language CD
- Play & Learn CD
- Bodyworks 3 CD
- UFO for Windows CD
- Dinosaur Museum CD



The Ultimate Time Machine is the most powerful PC system you can buy today. This system, manufactured for Time by Mitac comes with a truly incredible specification and high quality components that are ideal for the power user.

Take a closer look at the specification which includes the fastest Intel Pentium® processors, 1.6Gb Enhanced IDE hard drives, a minimum of 16Mb RAM, the fastest 64-bit s3 PCI graphics with 2Mb video RAM, superb 17" screen, superfast 28.8 modem, 1.7Gb tape back up and quad speed full-feature multimedia.

What makes the system truly unbeatable is the powerful range of Lotus and CD multimedia titles - virtually everything you are ever likely to need is included.

If you could afford it, this is the machine you would buy. Now at just £99 per month on an incredible Interest Free Credit offer, you can afford it!

P120 MHz Pentium® upgrade £220 + VAT
P133 MHz Pentium® upgrade £250 + VAT

Ultimate Time Machine 2

£99

Per Month

£397.15 deposit and 24 monthly payments of £141 OR
£1405.15 deposit and 24 monthly payments of £99. Total price £3199 +VAT = £3781.15 inc delivery & VAT.

APR 0%*

*APR

0%

INTEREST FREE CREDIT

Interest Free Credit is available subject to status. Written quotations are available on request. Be sure you can afford the payments before entering into a credit agreement. See page 3 for Interest Free example. Software is pre-loaded. Pack shots shown for illustration only. See software section for software details.

Just Look At The Spec !

- 100MHz, 120MHz or 133MHz Pentium® processor
- 1.6Gb enhanced IDE hard disk
- 17" NI MPRII screen
- 28.8 Fax/data modem
- 16Mb RAM; 256K cache
- S3 64-bit Graphics with 2Mb video RAM
- 1.7Gb Tape Back up
- Quad speed multimedia
- The best software bundle in the UK
- Superb CD multimedia titles



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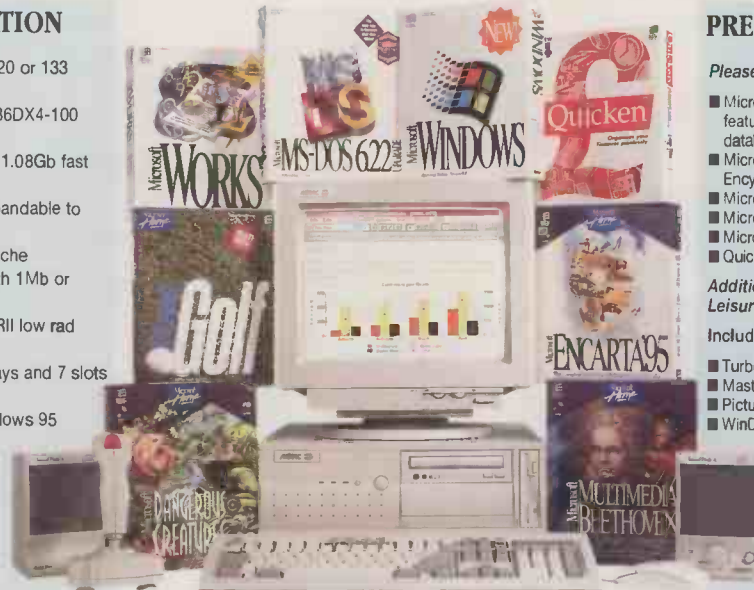
Multimedia Office

SYSTEM SPECIFICATION

- Intel Pentium® 75, 90, 100, 120 or 133 processors on 586 models
- 486DX2-66, 486DX2-80 or 486DX4-100 processor on 486 models
- 540Mb, 850Mb or a massive 1.08Gb fast IDE hard disks
- 4Mb, 8Mb or 16Mb RAM expandable to 64/128Mb
- 1.44Mb FD, 256K external cache
- Local Bus SVGA graphics with 1Mb or 2Mb Video RAM
- 14", 15" or 17" SVGA NI MPRII low rad colour screen with 0.28dp
- Mitac desktop case with 4 bays and 7 slots
- 102 Keyboard and mouse
- DOS and Windows 3.11(Windows 95 option available)

Multimedia HardWare

- Quad Speed Super-fast IDE CD-ROM drive
- 16-bit high quality soundcard
- Twin stereo speaker system
- PC Joystick



PRE-LOADED SOFTWARE*

Please see Software section for details

- Microsoft Works v3 integrated package featuring wordprocessing, spreadsheet, database, and business graphics CD
- Microsoft Encarta Multimedia Encyclopaedia CD
- Microsoft Dangerous Creatures CD
- Microsoft Multimedia Beethoven CD
- Microsoft Multimedia Golf CD
- Quicken v4 Personal Finance Pack

Additional Business, Educational & Leisure Software

Included FREE for a limited period

- TurboCAD v2 for Windows CAD package
- Masterclips SE Clipart
- Picture This! Graphics Management Pack
- WinDelete windows un-install package
- Organize Your Way Organiser/Scheduler
- Play & Learn Educational CD
- Doom, Blake Stone, Pinball & Raptor Shareware Games
- EZ Language French, German and Spanish

The Multimedia Office Systems provide the latest technology ready to use at truly amazing prices. These systems feature fast 486 or Pentium processors, large fast hard drives, Quad speed CD drives and come with a suite of excellent CD titles from Microsoft. Take advantage of our Interest Free Credit Offer when you buy these systems with the Super Bundle 1 shown below.

Free for a limited period



Multimedia Office 1 486DX2-66

486DX2-66 with 540Mb hard drive, Quad CD, 4Mb RAM, 14" screen

£898

+VAT

Model 1B 486 DX2-80.....£948
Model 1C 486DX4-100.....£998

Multimedia Office 2 486DX4-100

486DX4-100 with 850Mb hard drive, Quad CD, 8Mb RAM, 15" screen

£1198

+VAT

15" to 17" Upgrade.....£250

Multimedia Office 3A Pentium 75

Pentium 75 with 540Mb hard drive, Quad CD, 8Mb RAM, 14" screen

£1248

+VAT

Multimedia Office 4 Pentium 75, 90 or 100

Pentium 75 with 850Mb hard drive, Quad CD, 8Mb RAM, 1 Mb S3 64-bit PCI Video RAM and 15" screen

£1398

+VAT

Pentium 90 Upgrade.....£99
Pentium 100 Upgrade.....£179

Multimedia Office 5

Pentium 90, 100, 120 or 133 Pentium 90 with massive 1.08Gb hard drive, Quad CD, 16Mb RAM, 2Mb S3 64-Bit PCI Video RAM, 15" screen

£1798

+VAT

Pentium 100 Upgrade.....£79
Pentium 120 Upgrade.....£299
Pentium 133 Upgrade.....£329
15" to 17" Upgrade.....£250

Popular Options - Popular options with special prices when purchased with Multimedia Office Systems.

1. Fax & Internet Pack 1



£99 Per Month

Super Bundle 1

The Super Bundle 1 contains all above 3 popular options and is available for only £299 +VAT extra saving you a further £25:-
Multimedia Office Systems are available

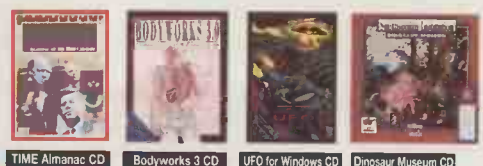
2. Lotus CD PowerStation Software Suite.

This includes Lotus 1-2-3, Ami Pro, Approach, Organizer, SmartPics, Lotus Training, Pressworks & Designworks, Pacioli 2000 Business Accounts -all on CD

£149 +VAT



3. Additional Multimedia CD Pack



£76 +VAT

APR

0%

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Texas Instruments TFT Colour Notebook

Mobile Comms Office

Time announce incredible deals on the top of the range Texas Instruments TFT Colour Multimedia Notebooks. These systems come complete with the best software applications including:- Lotus 1-2-3, Lotus Ami Pro, Lotus Organizer 2, Lotus Approach, Lotus SmartPics, Quicken v4 and AutoRoute Express.

All these systems also come with a complete Fax & Internet Pack including a

BABT Approved Intel PCMCIA modem with appropriate fax and comms software. Fax your documents to anyone and connect to your PC to your base and many other on-line services with ease. At just £59 per month on Interest Free Credit, these Mobile Comms Office Solutions are going fast. Hurry place your order today!

APPROVED FOR COMMERCIAL TELECOMMUNICATION systems specified in the conditions of use subject to the conditions set out in them

*APR

0%

INTEREST FREE CREDIT

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Lotus 1-2-3



Lotus Ami Pro



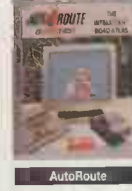
Lotus Approach



Lotus Organizer



Lotus Smartpics



AutoRoute



Quicken

NOTEBOOK SPECIFICATION

Texas instruments latest 4000M models with built-in Multimedia, Intel Modem and Preloaded Software. The Portable CD-ROM dock & Mega Bundle is also available as an option on Interest Free Credit.

- Intel 486DX2-50 processor
- 4Mb or 8Mb RAM
- 455Mb IDE hard disk
- Superb VGA TFT colour screen
- 1MB VESA video
- Built-in 16-bit Soundcard, Microphone and Speakers
- Built-in point mouse
- Adaptec fast SCSI-II port
- Optional CD-ROM drive clips on 1.44Mb floppy drive
- PCMCIA II/III and all standard ports
- MS DOS 6.2 and Windows 3.1
- Intel PCMCIA fax & data modem with Software

Business Software Suite**

- Lotus 1-2-3 v5 Spread sheet
- Lotus Ami Pro v3.1 Word processor
- Lotus Approach v3 Database
- Lotus Organizer v2
- Lotus SmartPics Graphics
- Intuit Quicken v4 Personal Finance Pack
- AutoRoute Express UK v3 for Windows

Portable CD ROM & Mega CD Bundle

This is available on IF credit at extra cost (£29 per month-see below) and includes the following:

- Double speed CD-ROM drive
- Larger speaker system with controls for volume, balance and mix
- Microsoft headphones and external microphone
- NiMH battery giving option of AC or battery power
- SCSI II connector and SCSI II bay option
- Additional Software on Mega CD:- GST Pressworks 2 and Designworks 2 TurboCAD for Windows Pajolli 2000 Business Accounts Computerworks, Bodyworks and Autoworks plus many more educational and leisure programs



TI COMMS OFFICE 3

486DX2-50 455Mb, 4Mb, TFT Colour

£59

Per Month

£259.15 deposit and 24 monthly payments of £88
OR £955.15 deposit and 24 monthly payments of
£59. Total price £1999 +VAT =£2371.15
inc. delivery & VAT. APR 0%*

8Mb Model £149 +VAT Extra

CD ROM Dock Bundle

£147.65 deposit and 24 monthly payments of
£29. Total price £699 +VAT =£843.65 inc
delivery & VAT. APR 0%



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Mobile Office

If you are looking for the ultimate notebook systems, take a look at our special deals on the incredible Colossus range of power notebooks. These systems come with fast 486DX4 processors, massive hard disks

and ample RAM and are pre-loaded with the best software applications including Lotus 1-2-3, Lotus Ami Pro, Lotus Organizer 2, Lotus Approach, Lotus SmartPics, Quicken v4 and AutoRoute Express.

* APR

0%

INTEREST FREE CREDIT

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Lotus 1-2-3



Lotus Ami Pro



Lotus Approach



Lotus Organizer



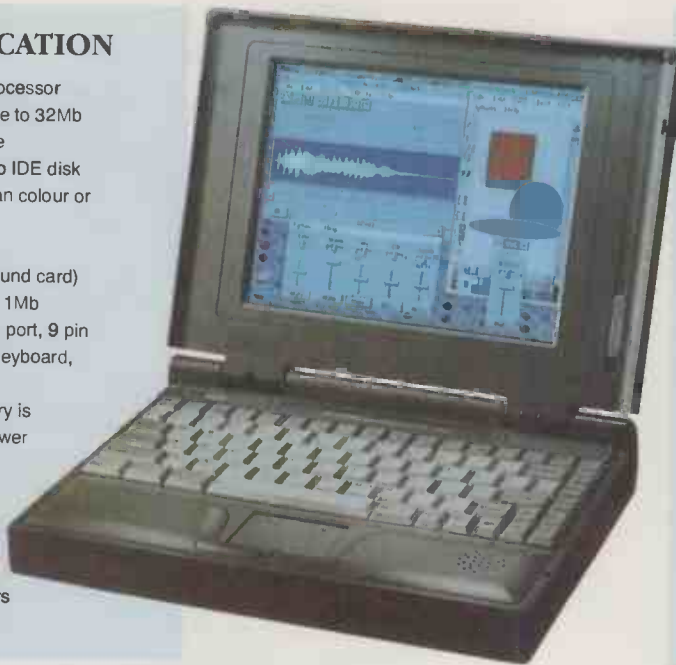
Lotus SmartPics



AutoRoute

NOTEBOOK SPECIFICATION

- Intel 100MHz or 75MHz 486DX4 processor
- 4Mb, 8Mb or 16Mb RAM expandable to 32Mb
- Removable 1.44Mb 3.5" floppy drive
- Removable 520Mb, 810Mb or 1.2Gb IDE disk
- 9.4" STN VGA mono, 10.4" dual scan colour or 9.4" TFT colour screens
- 2 PCMCIA Type II/1 Type III slot
- Built-in stereo speakers (optional sound card)
- 32-bit VESA local bus graphics with 1Mb
- One advanced bi-directional parallel port, 9 pin fast serial ports with 16550 UART, keyboard, external monitor, PS/2 mouse ports
- The latest NiMH rechargeable battery is removable. There is full advance power management
- Built-in TouchPad mouse - the best pointing device on any notebook
- LCD status display
- Dim: 287x200x47mm: Weigh 6.2lbs
- 1 Year warranty extendible to 3 years



PRE-LOADED SOFTWARE **

See Software Section for details

- DOS & MS Windows® 3.11
- Lotus 1-2-3 v5 spread sheet
- Lotus Ami Pro v3.1 word processor
- Lotus Approach v3 database
- Lotus Organizer v2
- Lotus SmartPics graphics
- Intuit Quicken v4 personal finance pack
- AutoRoute Express v3 road atlas

Mobile Office 1
Mono 486DX4-75,
520Mb / 4Mb

£39

Per Month

£199.65 deposit and 24 monthly payments of £66.00 OR
£847.65 deposit and 24 monthly payments of £39.00
Total price £1499.00+VAT = £1783.65
Inc delivery & VAT. APR 0%*

RAM Upgrade per 4Mb £140
Sound card module £80

Mobile Office 2
Dual scan colour 486DX4-100,
810Mb / 8Mb

£69

Per Month

£297.15 deposit and 24 monthly payments of £106.00 OR
£1185.15 deposit and 24 monthly payments of £69.00
Total price £2399.00+VAT = £2841.15
Inc delivery & VAT. APR 0%*

RAM Upgrade per 4Mb £140
Sound card module £80

Mobile Office 3
TFT colour 486DX4-100,
1.2Gb / 16Mb

£99

Per Month

£413.65 deposit and 24 monthly payments of £155.00 OR
£1757.65 deposit and 24 monthly payments of £99.00
Total price £3499.00+VAT = £4133.65
Inc delivery & VAT. APR 0%*

RAM Upgrade per 4Mb £140
Sound card module £80



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BUY NOW...

Pay only £119.67 deposit with nothing more to pay until 1996. APR 0%

PC SPECIFICATIONS

- 486 Models
 - 486DX2-66 or 486DX4-100 processor
 - 540Mb or 850Mb Fast IDE hard disks
 - 4Mb or 8Mb RAM (Max 64Mb)
 - 14" SVGA Colour screen.
(14" Digital SVGA on DX4 and Pentium® Model, 15" on Pentium® 90 Model)
 - 1.44Mb floppy drive
 - Local bus SVGA graphics with 1Mb
 - Desktop case with 4 bays and 7 slots
 - Double speed IDE CD-ROM drive (quad speed optional)
 - 16-bit high quality sound card
 - Twin stereo speaker system
 - PC joystick
 - 102 Keyboard and Microsoft® compatible mouse
 - DOS and Windows® 3.11
 - Made by Mitac in the UK
-
- Pentium Models
 - Include Pentium® 75 or 90 MHz processor with s3 64-bit PCI graphics with 1Mb Video RAM, 8Mb RAM, 850Mb or 1Gb hard drive. Rest of specification as above.



Play & Learn



Time Almanac



Bodyworks



UFO

PRE-LOADED SOFTWARE* (see software section for details)

Lotus Software Suite:
including Lotus 1-2-3, Ami Pro, Approach, Organizer 2, SmartPics and Lotus Training

Other Business Software:
GST Pressworks 2 and Designworks 2, TurboCAD for Windows, Organize Your Way, CV & Job Search Pro, Pacioli 2000 Accounts, Masterclips SE and Picture This!

Educational/Leisure Software:
Windows Training and WinDelete, Fun School 4, Fun School Maths, Typing Tutor, Computerworks, Bodyworks, Autoworks, EZ Language French, German and Spanish, PC Paintbrush, Arts & Letters Draw, Doom, Blake Stone, Pinball and Raptor Shareware Games.

CD Software:
Play and Learn Educational CD
Bodyworks CD
Time Almanac Reference CD
UFO for Windows CD
Dinosaur Museum CD

Software worth over £1000 is included



Dinosaurs

These high performance CD Multimedia Systems come complete with a powerful suite of the the best business, educational and leisure programs at truly amazing prices and provide the ideal solution for the home and business user. Whilst other companies charge you over 26% extra for buy now pay later credit, these systems are available on a truly incredible Interest Free Credit APR 0%. Offer for a limited period.

0%

Interest Free Credit
is available subject to status. Written quotations are available on request. Be sure you can afford the payments before entering into a credit agreement.

...PAY 1996

Time Machine A Example: Pay only £119.62 deposit with nothing more to pay until 1996 when the balance can be paid. Total price £999 +VAT = £1196.65 including delivery and VAT. APR 0%* Please call for details. Interest Free Credit is subject to status.

Multimedia Time Machine A	Multimedia Time Machine B	Multimedia Time Machine C	Multimedia Time Machine D
486DX2-66, 540Mb, 4Mb RAM	486DX4-100, 850Mb, 8Mb RAM	Pentium® 75, 850Mb, 8Mb RAM	Pentium® 90, 1.08Gb, 8Mb RAM and 15" screen
£999 +VAT	£1299 +VAT	£1499 +VAT	£1699 +VAT
(£119.67 deposit, pay rest in 1996. Total price £999 + VAT = £1196.65 inc. delivery and VAT. APR 0%*)	(£154.87 deposit, pay rest in 1996. Total price £1299 + VAT = £1548.65 inc. delivery and VAT. APR 0%*)	(£178.37 deposit, pay rest in 1996. Total price £1499 + VAT = £1783.65 inc. delivery and VAT. APR 0%*) P90 model £79 + VAT Extra P100 model £179 + VAT Extra	(£201.87 deposit, pay rest in 1996. Total price £1699 + VAT = £2081.65 inc. delivery and VAT. APR 0%*) P100 model £79 + VAT Extra P120 model £299 + VAT Extra P135 model £329 + VAT Extra

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Lotus General Business Applications

Educational And Leisure Software

The following pages describe the software applications which may be included with your PC system. Please refer to the individual system offer to see which applications are included. In most case software is pre-loaded with on-line help with an easy to use menu system enabling you to be productive instantly. Printed manuals and back-up disks are available as options.

We firmly believe that the Lotus Suite of products is the best you can buy at ANY price and we recommend this range for your general business applications.

Lotus Ami Pro for Windows

Lotus Ami v3.1 for Windows is the latest version of this superb easy to use and powerful wordprocessing package that lets you write letters, produce documents and even write books. It includes advanced features such as advanced spellchecker, Thesaurus, Grammar checker, Index/contents generation, 55 style sheets, compatibility with Wordperfect or Microsoft Word documents, outlining, drawing, charting, DTP like page layout plus much more.

Lotus 1-2-3 for Windows

Lotus 1-2-3 Release 5 for Windows (RRP £ 365 +VAT) multi-dimensional spreadsheet is one of the most flexible applications available and will enable you to do virtually anything with numerical information. Lotus 1-2-3 is the world's most widely used spreadsheet and includes database functions as well as a wide range of scientific and financial ones. Its' macro language will enable you to automate operations when performing complicated calculations and it can generate charts or graphs automatically, simply by highlighting an area of data.

Lotus Approach for Windows

New Lotus Approach v3 for Windows is basically a computerised filing cabinet but with very advanced features which allow you to handle any information with ease. You don't have to be a programmer to use Lotus Approach. Lotus Approach includes SmartMaster templates for popular database applications and Assistants to quickly build your reports, mailing labels, forms, crosstabs and charts. Now anyone can keep comprehensive records of products, customers, members etc.

Lotus Organizer for Windows

Manager that allows you to manage your time & work. It is effectively your own personal secretary with some very advanced features. The Calendar lets you arrange appointments and confirm meetings. The To Do List helps you keep track of every last detail. The Planner gives the broader picture, making it easier to plan and monitor long term projects. The Address book can store up to 65,000 names, addresses and telephone numbers - all available in an instant. The Notepad lets you jot down free-form ideas.

Lotus SmartPics for Windows

Lotus SmartPics Graphics consist of the finest Clipart, i.e. high quality images that can cover a wide range of topics and which can be easily incorporated into documents created by a wordprocessor, Spreadsheet, Desktop Publishing or Drawing package. Use these amazing colourful and versatile images when you need to add that extra sparkle to business presentations, or enhance memos, reports, overheads and handouts. Thirty general business categories include: realistic people, business symbols, international icons, computers, military, medical illustration, backgrounds and memorable cartoons - just to name a few.

Lotus Training for 1-2-3

Lotus Training for Ami Pro

Lotus Training for Approach

Individual Training Packages are provided for Lotus 1-2-3, Lotus Approach and Lotus AmiPro. The packages cover up to the previous version of each of the Lotus products. Lotus On-Line help and Smart-text online documentation covers the latest information on the new Lotus releases.

The PC is quickly becoming the ideal vehicle for education. The latest educational programs provide all the information needed by children and make learning fun. Preloaded software is shown here whilst the CD Multimedia educational and leisure titles are shown on page 15.

Bodyworks

Bodyworks v3 for Windows is the best selling interactive science adventure that lets you explore the human body. For all the fascinating "inside" information - how the eye sees, the inner workings of the heart, the different stages of pregnancy, experience Bodyworks and discover the miracle of the human machine. Includes colourful, photorealistic graphics and vast database lets you study different internal systems (skeletal, muscular, respiratory, reproductive etc). Text and graphics can be exported from this and most other applications to a wide range of printers for creation of customized reports for school and college.

Computerworks

Computers have revolutionised the way we work, learn and play. Now you can explore the universe of microchips and megabytes on your own computer. From hard disks to software, Computerworks is your high-tech tour guide. Colourful animated graphics and comprehensive information highlight each component of the computer system, including the inner workings of monitor, drives, printers, CD-ROM, mice and other peripherals.

Autoworks

Explore the world of spark plugs and pistons, fan belts and brakes, all without getting your hands greasy. Three-dimensional animated graphics bring to life the systems, structures and functions of your car with full-view displays, including top and side angles, show entire systems and how their parts interact. -Detailed sections cover Engine (pistons, timing chain, camshaft, engine block) Drive train (Automatic transmission, Manual transmission, clutch, differential); Steering/Suspension; Exhaust/Emissions control; Fuel system; Cooling system, brakes, Electrical System and much more.

Fun School for Windows

Fun School 4 for children aged 7 to 11, contains six of the best selling Fun School series which will delight, entertain and, most importantly, educate your children in a wide variety of skills. Each of these programs has been designed by a team of educationalists following guide-lines laid down by the National Curriculum. There are three areas covered by this pack, Mathematics, Geography and History.

Fun School Merlin Maths

Fun School Maths (Merlin's Maths) has been carefully designed to help children aged 7 and over with simple mathematical concepts and calculations whilst at the same time, having fun playing the six games. Each of the games has three difficulty levels and within each level the questions get harder the longer the child plays.

EZ Language

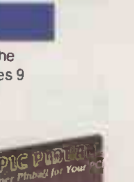
Preloaded suite covers French, German and Spanish. EZ Language is the fun and easy vocabulary and pronunciation tutor. In just minutes you'll be learning over 400 new words and phrases. It's like having your own personal language instructor available at your command. See pictures with the words and listen to native speakers' voices. This interactive program makes learning fun, fast and easy. Perfect for travelers, students, and others wishing to communicate in a new language.

Flying Fingers Typing Tutor

Flying Fingers is an interactive typing course which operates within Windows. It is designed to improve your keyboard skills with the minimum of effort. It's built in family of tutors will give advice, encouragement so that you can develop your word processing skills.

Arcade/Graphics Games

These leisure titles include some of the best shareware games available. Doom is the ultimate 3D adventure, bringing virtual reality action to your PC. This version includes 9 levels of 3D action and superb graphics. DOOM is the world's best selling graphics game! Also included are Blake Stone, Raptor and Epic Pinball.



Other Business Software Applications

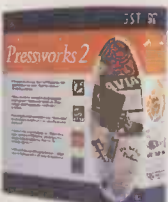
In addition to the main-line business application (such as Word-processing, Spreadsheet, Database etc.) there are other programs which are very useful for business and professional use. We have selected the best products to be included with some of our systems.



GST Designworks v2 for Windows

GST Designworks v2 for Windows (RRP £ 149 +VAT) is a powerful drawing package like CorelDRAW that allows you to create logos and other business graphics. Drawings created can also be used in other applications such as a Desktop Publisher or a Wordprocessor.

DesignWorks is the ideal design tool for adding flair and impact to your work. Whether you want to create a logo for your newsletter, add professional graphics to presentations and reports, or create a colourful poster or eye-catching invitation. DesignWorks gives you the power to do all of this quickly and easily.



GST Pressworks v2 for Windows

PressWorks v2 (RRP £ 149) is a full-feature Desktop Publishing Program (DTP) with a wealth of powerful features and lets you produce full colour reports, memos, presentations, advertisements, brochures and catalogues. In fact, just about any printed page where good presentation is important. PressWorks supports OLE2, text, graphics, colour, word processing, spell check with thesaurus, paragraph styles, powertext, typefaces, templates, language support, clip art, text run-around, typography, photo CD and screen snapshots.



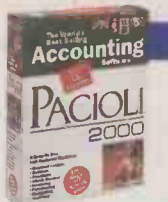
New! Quicken Uk 4.0 for windows

Quicken is the fastest, easiest way to organise your home and small business finances. It manages bank and credit card accounts, mortgages, loans and investments, in any currency. It calculates VAT automatically and provides detailed analysis with its customisable reports and graphs. Quicken is easy to use and quick to update. Standing orders are entered automatically and your transactions are memorised, ensuring you never have to type an entry twice. From the records you enter, Quicken gives you the 'big picture' view of your finances, using the indicators of your choice. And with this information at your fingertips, planning your financial future is easy!



AutoRoute Express UK v3 for Windows

Autoroute Express for Windows (RRP £ 99 +VAT) is a colourful, computerised road atlas, with simple-to-read maps and easy-to-follow directions. Forget fumbling with fold out maps or messing with mileage charts. Autoroute takes all the trouble out of travel. Just tell Autoroute when and where you're starting and where you're heading. Just set your driving style and speed. Autoroute takes it from there, showing the quickest routes, fastest routes, country routes, most economical routes - in fact, which ever route is right for you. So before you hit the road on business or head off on holiday, check the route with Autoroute.



Pacioli 2000 Business Accounts

Pacioli 2000 is a full featured accounting software package that combines ease-of-use with the power and features required by most businesses. Help is given so that people who are not fully fledged accountants, can use this program. Pacioli features eight fully featured modules including Nominal Ledger, Stock Control, Invoicing and Budgeting. This package outperforms many accounting systems costing over £500.



MSI TurboCAD v2 for Windows

TurboCAD v2 for Windows (RRP £99 +VAT) is a full-featured desktop drawing and drafting (CAD) software that will have you creating professional drafting, plans and drawing with ease and with incredible speed. It is very advanced and powerful yet very easy to use. Now everyone can do Home Designs (Kitchens, Bathrooms) Business Floorplans, Landscapes and much more. Optional extra libraries of drawings are available for specialist use. Unlike other CAD programs, a maths co-processor is NOT required to run this excellent CAD program.



Microsoft Office CD Bundle

Microsoft Office CD Bundle consists of excellent Microsoft applications on CD and is available with any system fitted with a CD drive for a small extra charge. Applications include Microsoft Excel, Microsoft Word, Microsoft Powerpoint, Microsoft cc:Mail Licence, Microsoft Works, Microsoft Encarta 95, Microsoft Dangerous Creatures, Microsoft Multimedia Beethoven and Microsoft Golf. Various bundles are available. Please call for details



MSI Masterclips SE

Masterclips SE Intro is not an application but a collection of drawings. It includes some of the highest quality and creative clip art available. This can be used to highlight and enhance presentations, reports, proposals newsletters and other materials. Images are provided for use with most graphics software applications. The images are full colour and vector art files which allows the graphics to be recoloured, rotated, manipulated, and resized without jagged lines.



MSI Windows Training

MSI Wind Ease allows you learn Windows in less than One Hour. Wind Ease is perfect for beginners, allows you to start with the basic lessons and move to advanced Windows features at your own pace. There are dozens of tips and techniques that even the experienced Windows user can learn from. You will find loads of information on features you may never have used before. You are shown how to install and use other applications, how to set up printers and fonts, how to create time saving macros, and how to set up and run a DOS application under Windows.



Arts & Letters Draw

Arts & Letters Draw for Windows is another drawing package that is remarkable easy to use and which has a complete set of drawing tools, allows curve editing, 300 clipart images, 8 True Type fonts, and symbol libraries. WinDelete



WinDelete

WinDelete is the safe and simple Windows Uninstaller. When windows applications are installed, files may be placed in several directories. WinDelete tracks and logs all the files placed on your hard disk and allows you to uninstall these programs easily thereby making room for new programs and speeding up Windows performance. Incorporates easy point and click options with context-sensitive help.



Picture This! for Windows

Picture This! is the complete professional image manager and editor for anyone working with any type of images. It is the fastest, easiest way to organize and enhance your images. This one package helps you keep track of your image files; organize them into albums; convert graphics files between popular formats (E.g. BMP, GIF, JPEG, PCX, TIFF and more); capture screen images on your computer; even do professional photo retouching (overlay, edge, sculpt, emboss and adjust colour and sharpness) and special effects. It supports Photo CDs and TWAIN scanners.



Organize your Way

Things to Do! Places to Go! & People to See!
Organize your Way v4 for Windows bridges the gap between personal information managers (e.g. Sidekick) and complex contact managers by combining both of these functions to produce an easy, yet powerful information and contact manager. It includes a database, calendar, to-do-list, and a contact manger that offers unmatched ease-of-use and flexibility.



PFS: CV & Job Search Pro

CV & Job Search Pro for Windows enables you to tackle those job interviews with confidence. Create Impressive CVs and cover letters that stand out. It incorporates a flexible CV Builder, a Job Search Manager as well as comprehensive wordprocessing features.
CV Builder automatically formats entire CV and includes templates for Business, Academics, Recent Graduates and more. Job Search Manager includes prospects database and allows scheduling of interviews and follow-ups.



PC Paintbrush for Windows

PC Paintbrush for Windows is the latest version of this classic professional painting package that includes very advanced features. This superb package is the ultimate in creativity and lets you create, edit, manipulate, colourize, texturize and Paint anything you can imagine! It ranks as No.6 on the IDC list of best selling software of all time. Other painting programs only give you a small taste of how much fun painting can be. PC Paintbrush is the ultimate and the art form of the future. Includes 87 painting tools; 14 kinds of paintbrushes, 5 kinds of air brushes, 4 sprayscans, 6 pens, 4 markers, 4 crayons and much more



Fax & Internet Packs Printer Packs ^{APR} 0%



Our Fax and Internet Packs will be very useful to all PC users and we strongly recommend this option to enable you to get the most out of your PC. We offer a choice of 4 packs. All are also available on Interest Free Credit (With IF Systems only). All packs contain:-

1. A FAX AND DATA MODEM

- Pack 1:** Includes a V.22 bis Data and Fax modem. This comes complete with powerful Fax and Comms software and provides all the facilities you need.
Pack 2: Includes a 14.4 V.32bis Internal Fax and Data Modem. This is faster and more suited to prolonged data communications.
Pack 3: Includes a 14.4 V.32bis Fax and Data Modem with Voice Facilities. In addition to the Fax and Comms software, this also comes with voice software with automatic switching between Data, Fax and Voice. Your PC can function as a powerful answering machine with multiple mailboxes, a mini-bulletin board as well as a Fax machine and Comms station.
Pack 4: Includes a 28.8 V.34bis Superfast Fax and Data Modem.

2. FAX SOFTWARE

Powerful fax software included with each modem will convert your PC into a full-feature advanced Fax machine. You can receive faxes from other modems and standard Fax machines. These faxes are saved as a file on your hard disk and the software informs you automatically which faxes have arrived. These can then be looked at, inserted into other documents, printed or deleted. You can also send faxes created on your PC to other modems and fax machines directly without printing out anything.

3. COMMUNICATIONS SOFTWARE

Comms software will allow you to communicate and exchange information and software with other modem users. It will also enable you to link to other computers with access to many on-line services such as CompuServe and also link to the Internet. The Internet is the name given to the Information Super-Highway which consists of many computers all over the world linked together via standard telephone lines. The Internet is essentially a public electronic mailing system but also includes other services. Worldwide communications over the Internet are very cost effective as you only pay local telephone rates.

4. MEMBERSHIP OF COMPUSERVE ON-LINE SERVICES WITH INTERNET MAILBOX

- CompuServe Introductory Membership for the first month
- Usage credit of £10 to explore the chargeable services available
- WinCIM Windows Software that allows linking to CompuServe and enables you to use the services easily.
- CompuServe user booklet (Membership Guide for Windows)

CompuServe is the leading commercial provider of on-line information for PC users and has more than 2 million users worldwide who can access a huge range of global & local services and electronic mail usually by a local phone call. The range of services is wide and as well as CompuServe commercial and support services, members can also access the InterNet (the world wide electronic mail system with mainly public domain services). Here are just some examples of the CompuServe services available:-

- Electronic Mail, Communications and Bulletin Board facilities
- Links to Internet with Internet mailbox
- CompuServe Support Forums with free support & updates provided by major software and hardware companies such as Lotus, Microsoft, IBM and Novell.
- News, Weather and Sports Services which is updated continually and access to Newspapers such as The Daily Telegraph, Guardian, Times etc.
- Travel services with updated information on Airline schedules and fares with flight booking option. Information also provided on world-wide hotel rates, Car hire, AA information on accommodation in UK, and advice on Visas, Immigration etc.
- Electronic shopping allows you to buy virtually anything
- Money matters, Markets and Information Services with data on stocks, commodities and Money Markets. CompuServe's on-line brokerage facility allows you to buy and sell!
- Entertainment and Games with access to many programs and multiplayer games
- Research, Reference and Health with access to over 900 databases including services such as MEDLINE, and the complete Grolier's Academic Encyclopaedia.

Pack 1	Pack 2	Pack 3	Pack 4
£4.29 Per Month	£6.50 Per Month	£8.75 Per Month	£13.00 Per Month
£13.36 deposit and 24 monthly payments of £4.29	£19.07 deposit and 24 monthly payments of £6.50	£23.83 deposit and 24 monthly payments of £8.75	£39.36 deposit and 24 monthly payments of £13.00
Total price £99 + VAT = £116.33 APR 0%*	Total price £149 + VAT = £175.06 APR 0%*	Total price £199 + VAT = £233.83 APR 0%*	Total price £299 + VAT = £351.33 APR 0%*

APPROVED for use on all file communication systems specified in the advertisement. For use subject to the conditions set out in them.

Scanners

A scanner allows you to input printed graphics and text into your applications. Logitech hand held scanners provide a convenient way to scan images as graphics files and text into word-processors via OCR software (Optical Character Recognition Software).



Scanman 256 Pack

£5.50/Mth

The Scanman 256 features 256 grey scales (mono) and Phototouch Windows software
£19.58 deposit and 24 monthly payments of **£5.50** Total **£151.58** + VAT with Interest Free systems only

Scanman Colour Pack

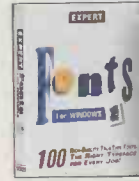
£13.00/Mth

Scanman Colour offers 24-bit true colour scanning as well as 256 grey scales, Phototouch Colour and AutoStitch software **£39.33** deposit and 24 monthly payments of **£13.00** Total **£351.33** + VAT

Printer packs include leading InkJet and laser printers and come ready to use complete with PC printer cable and 3 excellent software packages. These packs are available on interest free credit from as little as £13.50 per month*



SimCity for Windows
 The world's best windows game. As the Mayor and City Planner, you control the fate of countless cities where Sims move in and build hospitals, homes, stores & factories, or move out in search for something better. This great city simulator puts you in control and features superb animation and colour graphics.



100 Fonts for Windows
 Expert 100 fonts for windows contains a selection of 100 Serif, Sans Serif and Display fonts that are fully scalable and will work with all your Windows applications that support fonts and will enhance the output from these printers.



Labels for Windows
 Labels, envelopes and bar codes - all in one simple package that runs under windows and supports these Windows printers. Choose from over 120 label formats or create your own in any size. A program that will be useful for all users.

HP DeskJet 540 Pack

£13.50 MTH INTEREST FREE CREDIT

£44.95 deposit and 24 monthly payments of £13.50.
 Total price £299.00 + VAT = £368.95 Inc. Delivery & VAT. APR 0%*

The new HP DeskJet 540 600 x 300 dpi InkJet printer with flexibility of the option of upgrading to colour later on. Our Pack includes DeskJet 540 Printer with autosheet feeder, 3 year HP warranty, a shielded printer cable and the above software.

HP DeskJet 540 Colour Pack

As above but with Colour kit included. **£50.08** deposit and 24 monthly payments of **£15.00**
 Total price £334.00 + VAT = £410.08 inc Delivery & VAT. APR 0%.



HP DeskJet 660C Pack

£19.50 MTH INTEREST FREE CREDIT

£69 deposit and 24 monthly payments of £19.50.
 Total price £438 + VAT = £533 Inc Delivery & VAT. APR 0%*

The high quality Colour DeskJet with resident black and colour cartridges for convenience.

New HP DeskJet 850C Pack.....£564

£25.00 MTH INTEREST FREE CREDIT

£69.00 deposit and 24 monthly payments of £25.00 Total price £554.36 + VAT = £669 inc Delivery & VAT. APR 0%.

The Epson Stylus Colour is the only colour InkJet to offer an amazing true 720 x 720 dpi resolution. This colour printer is simply superb, producing crisp text in solid black or colour. If you are looking for the best quality from your printer, this is the printer for you. Our includes Printer with autosheet feeder, 3 year Epson warranty, a shielded printer cable and the above software.



NEC 610+ Pack - Details on request

Lexmark (IBM) Laser Pack

£18.00 MTH INTEREST FREE CREDIT

£54.45 deposit and 24 monthly payments of £18.00 Total price £399 + VAT = £486.45 inc delivery & VAT. APR 0%*.

Using the Microsoft At Work standard to guarantee ease of use and Windows '95 compatibility, the Lexmark WinWriter 200 is the laser printer with a certain future. 4 Pages per minute print speed, Laser quality 300dpi resolution, 12 months on-site maintenance, GDI and PCL4 language compatible, Windows and TrueType scalable fonts and 512Kb RAM standard, upgradeable to 4.5Mb. Easy to use print features totally controlled from PC (no printer buttons) 150 sheet paper tray, prints plain A4 paper, letter, legal, labels and envelopes.



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Multimedia Software & Hardware

CD ROM Multimedia Software

Bodyworks 3 for Windows CD

Explore the system, structures and functions of the body in fascinating detail. (see BodyWorks opposite). This CD Multimedia version includes 3-D rotating views with detailed animation and video clips and all the features of the Disk version.

UFO for Windows CD

UFO is the most complete guide to close encounters with over 1200 fully documented UFO sightings with actual photographs of the UFO sightings. Display, copy and print text and images through the Windows clipboard. A great tool for amateur or the expert sky watchers.

IMSI EZ Language (6 Pack) Multimedia CD

Using pictures, words, and sound you can learn French, German, Spanish, Italian, Russian and Japanese. EZ Language is a simple vocabulary and pronunciation tutor on CD. You actually hear the correct pronunciation of word using this multimedia language product. Perfect for travellers, students and others wishing to communicate in a new language. Simple tests at the end of each section let you gauge your success.

Zool 2 Multimedia CD

The latest CD version of this excellent platform game is better than ever. Zool 2 features the Ninja of the Nth dimension, a karate expert living on planet Loox, and his female partner Zool. Their mission is to defeat the evil Krool who wants to conquer the known universe.

World Atlas CD

This excellent educational encyclopaedia of the World allows you to access over 3000 topics including Geography, people, education, health, Government, crime, economy, agriculture, communication, travel and international organisations. Includes detailed maps, flags, anthems and much more.

ShareWare CD

The Shareware CD is packed with almost 100 of the best Shareware programs and games covering every topic. Simply install the programs you need onto your hard disk. These games are simply excellent and will provide years of entertainment. Amazing value for money.

Play & Learn Multimedia CD

Play and learn has been developed for children between the ages of four to ten. It contains many excellent programs including ten colourful animated games and a series of learning modules covering spelling and maths.

Software Toolworks Multimedia Encyclopaedia CD

The amazing power of multimedia CD-ROM technology has never been more evident than the Software Toolworks Grollier Multimedia Encyclopaedia. Forget printed encyclopaedias and get the best and most comprehensive multimedia encyclopaedia available. Based on the contents of a 21 volume encyclopaedia with over 33,000 articles. Five search and browse facilities enable you to source information quickly and easily.

Dinosaur Museum CD

Transform your computer into a Time Machine with vivid sound, lavish colours and interactive games. Visit the Museum Room and learn detailed facts about dinosaurs including size, classification, behaviour and more. The Conservatory features exhibits on the biology of the Mesozoic era, and the Game Room tests your dinosaur IQ in two educational games for 1 or more players. Includes hundreds of photos plus movie clips.

TIME Almanac of the 20th Century

Experience history as it happened with this unique multimedia CD reference title. Travel through the 20th century with full-motion video covering issues and events that shaped our time. Quickly retrieve maps and search through an archive of 4000 articles. Includes Newsquest quiz, every Time 'man of the year' story, 70 full-motion videos, 12 narrated essays and over 450 photographs.

Microsoft Encarta '95 CD

Microsoft Encarta 95' is another superb multimedia encyclopaedia based on the contents of a 28 volume encyclopaedia. It includes over interactive charts & tables, stunning animation, videos, maps, charts, sounds and pictures.

Microsoft Works CD

Microsoft Works 3 for Windows integrates easy to use word processor, spread sheet, database, drawing module and comms in one application on CD.

Microsoft Golf CD

Microsoft Golf for Windows allows you to tee off with upto eight golfing partners and move from driving range to practice green. It features unmatched photo-realistic scenery and stunning graphics, true golf ball flight, and easy accurate swing control.

Microsoft Dangerous Creatures CD

Microsoft Dangerous Creatures is a superb multimedia title featuring some of the most exciting living things. Complete with high quality graphics, motion video and superb stereo sound, it provides education and enjoyment for everyone.

Microsoft Multimedia Beethoven

This magnificent orchestral performance of masterworks by Beethoven lets you look closer into the composition in new ways highlighting the principal instruments, relates the piece to other works, and viewing the work in its social context.

Mega CD Bundles

This superb bundle includes all of the programs covered on pages 12, 13 and 14 (except Microsoft Office CD bundle and AutoRoute) plus many more programs and comes loaded on CD-ROM. This CD bundle is only available bundled in with your PC system. As many of our systems already come with some of this software preloaded, prices of the Mega bundle vary depending on the system with which it is purchased. As well as providing extra software programs, the CD also serves as a backup of your pre-installed software should you need to re-install any applications. Please call for details.

Multimedia Hardware

Multimedia systems come with some of the following hardware, all fitted and ready to use with a range of CD titles. These hardware items may also be added to other systems to build a system to your requirements.

- Double speed CD-ROM drive
- Quad speed CD-ROM drive
- 16-bit high quality sound card with sound software
- Standard speakers
- Large speakers
- PC joystick & microphone
- TV card with Teletext
- MPEG Video player card



Mitac Notebooks

This superb new range of high performance notebooks from Mitac feature superb 486DX2-66 or 486DX4-100 processors with low power consuming 3.3V technology, superb crisp sharp mono or dual scan STN colour screens, latest PCMCIA type II/III slots, upto 20Mb standard RAM and high performance hard disks with up to 1.2Gb capacity. They feature a full notebook

keyboard, integral 1.44Mb floppy drive, all standard ports a superb easy to use trackball and come complete with a range of excellent business software from Lotus, Quicken and AutoRoute.

Just compare the specifications with any other notebook in this price range and we are sure you will agree that these systems are unbeatable.

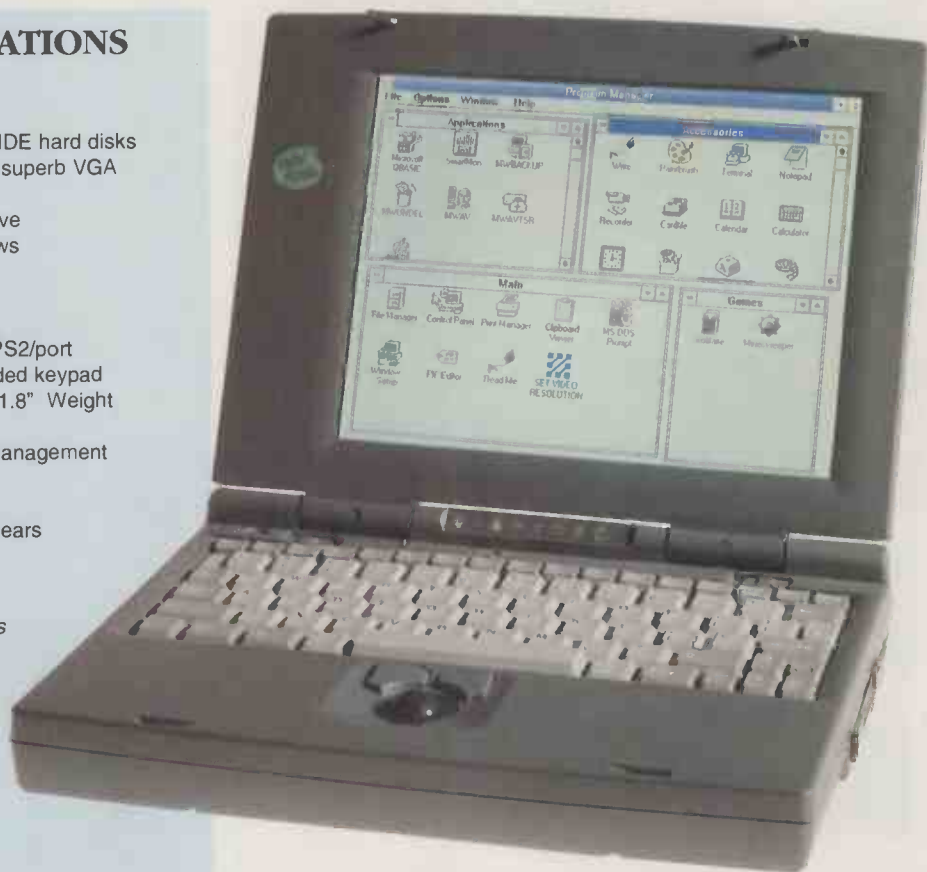
NOTEBOOK SPECIFICATIONS

- 486DX2-66 or 486DX4-100 processor
- 4Mb, 8Mb, 12Mb or 20Mb RAM
- 340Mb, 540Mb, 810Mb or 1.2Gb fast IDE hard disks
- High contrast 9.5" LCD VGA mono or superb VGA dual scan STN colour displays
- 3.5" removable 1.44Mb floppy disk drive
- VESA Local bus graphics with Windows acceleration
- PCMCIA type II or 1 type III slot
- Built in 25mm trackball
- Parallel port, serial port, VGA port & PS2/port
- Integral 79-key keyboard with embedded keypad
- Size 26.8 x 20.4 x 4.5cm. (10.5 x 8 x 1.8" Weight 4.4lbs (2Kg)
- Up to 3 hour battery life with Power Management
- Battery & AC pack included
- DOS and Microsoft Windows 3.11
- 12 months warranty extendable to 3 years

PRE-LOADED SOFTWARE*

See software section for software details

- Lotus 1-2-3 v5 Spread sheet
- Lotus Ami Pro v3.1 Word processor
- Lotus Approach v3 Database
- Lotus Organizer v2
- Lotus SmartPics Graphics
- AutoRoute Express UK Electronic Road Atlas
- Quicken v4 Personal Finance Pack



Lotus 1-2-3



Lotus Ami Pro



Lotus Approach



Lotus Organizer v2



Lotus SmartPics



AutoRoute Express



Quicken v4

Mitac Mobile Office 1
486DX2-66 Mono
With 340Mb Hard Drive

£899 +VAT

RAM Upgrade to 8Mb £150 Extra

Mitac Mobile Office 2
486DX4-100 Mono
With 540Mb Hard Drive

£1029 +VAT

RAM Upgrade to 8Mb £150 Extra

Mitac Mobile Office 3
486DX2-66 Colour
With 340Mb Hard Drive

£1269 +VAT

RAM Upgrade to 8Mb £150 Extra

Mitac Mobile Office 4
486DX4-100 Colour
With 540Mb Hard Drive

£1399 +VAT

RAM Upgrade to 8Mb £150 Extra
RAM Upgrade to 12Mb £300 Extra

Mitac Mobile Office 5
486DX4-100 Colour
With 810Mb Hard Drive
(1.2Gb drive £220 extra)

£1569 +VAT

RAM Upgrade to 8Mb £150 Extra
RAM Upgrade to 12Mb £300 Extra
RAM Upgrade to 20Mb £600 Extra

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66
MHz
DX2

AST MULTIMEDIA ADVANTAGE

Now you can enter the exciting world of Multimedia with a state-of-the-art AST MPC. This unbeatable P&P package contains everything you need to experience Multimedia at its very best.

- 486DX2 66MHz • 8MB RAM (expandable to 32MB) • 270MB Hard Disk
- 1.44MB 3.5" Floppy Drive • 3 Drive Bays • 2 ISA expansion slots
- 14" SVGA Monitor • AST keyboard and mouse • Double-speed CD-ROM Drive
- 16-bit Sound Card • Microphone and Speakers.
- MS-DOS 6.22. MS Windows 3.1 • Microsoft Works for Windows 3.0
- Intuit Quicken for Windows 3.0 • Lotus Organiser for Windows 1.1
- MS Encarta 95 CD-ROM. MS Entertainment Pack • AST Works.

P&P PRICE £899 (£1056.33 inc.VAT)
quote order no. **ASV627/PP831F**



66
MHz
DX2

AST ASCENTIA

A P&P exclusive, this feature-packed, lightweight Colour Notebook and Software package provides exceptional value for money at our specially reduced price.

- Cyrix 486DX2 66MHz • 4MB RAM • 8K Integrated Cache • 340MB Hard Disk
- 1.44MB 3.5" Floppy Disk • Dual-scan LCD Display • 16-bit hi-speed local bus graphics
- 1MB VRAM • Full-size keyboard with integrated trackball • NiMH battery pack
- MS-DOS 6.22. MS Windows 3.11 • Lotus Organiser
- SystemSoft PCMCIA Card and Socket Services • LapLink Remote Access • Compuserve Starter Kit • Dimensions: 264mm(w) x 224(d) x 460mm(h) • Wgt. 2.67kg.

P&P PRICE £1399 (£1643.83 inc. VAT)
quote order no. **ASV542/PP831F**



90
MHz
PENTIUM

AST BRAVO MS

Once again P&P have put together an unbeatable offer to include Software and Monitor specially selected by P&P along with this incredible Pentium powered machine.

- Intel Pentium 90MHz • 8MB RAM • 256K Secondary Cache
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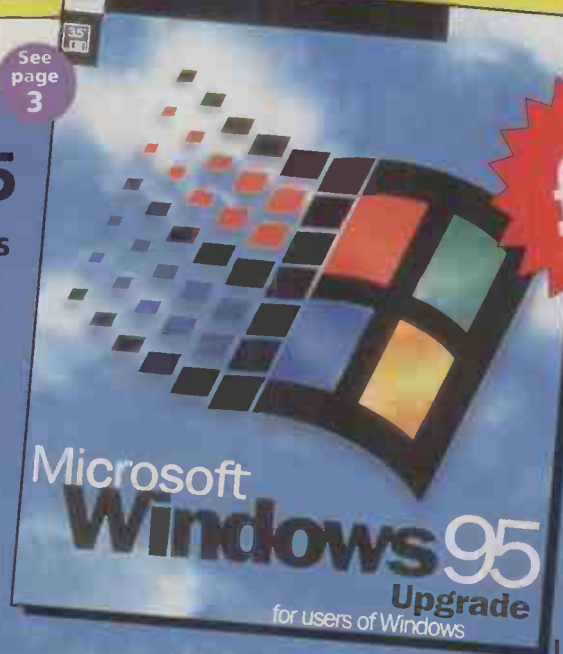
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Windows '95

When Windows '95 ships later this month there will be a huge initial demand. Order your copy from Software Warehouse now and guarantee yourself one of the first copies - and at a crazy low price!

Microsoft

See page 3



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I wish I'd known earlier that Software Warehouse sold memory upgrades - I'd have saved a fortune!



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See page 4



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This month 1000s of great offers and over 460 new products!

Welcome to the August issue of the new look Software Warehouse pages. We have boosted our product range by more than 460 products, lowered many of our prices and tried to give you as much information on each of the products as possible. However, we can't expect to get it right all the time, so if you do have any views or ideas please feel free to write or fax me on 01675 466 460.
Best regards
Steve Bennett
Managing Director

INTRODUCTION

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MICROSOFT OFFICE '95

The Essential Office Suite for Windows '95!

Microsoft Office for Windows '95 is the major new revision of Microsoft's best-selling Office software, designed specifically for Windows '95. Now includes Excel '95, Word '95, PowerPoint '95 and a new edition of Microsoft Schedule Plus.

MS Office Standard Version for '95 will be the first full 32-bit Office Suite, making it easier than ever to focus on your job instead of your software. Features include:

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- Share information easier with improved OfficeLinks, including the OfficeBinder feature that groups files automatically, so you can use them like a single file.
- Gain one-click access to files and programs with the Microsoft Office shortcut bar.
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Requires Windows '95, Min. 8Mb RAM and a 386DX processor



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Microsoft

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In addition to the support you receive from Software Warehouse we are now providing an Action Call Help Card with every order.

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- Miro SoundWave 16bit Wavetable Sound Card (see Computer Shopper rave review in July edition)
- Novell Perfect Office including Quattro Pro 6, WordPerfect 6.1, Envoy 1.0a, InfoCentral 1.1, GroupWise 4.1 and Presentations 3.0
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MICROSOFT™ WINDOWS '95

Unlock the potential of your PC with Windows '95!

The new ground-breaking upgrade to Microsoft Windows will replace Windows 3.1, Windows for Workgroups 3.11 and all versions of MS-DOS. It's robust, fast and features integrated multimedia, networking and a fantastic new interface!

The Upgrade of the Decade!



✓ New Interface

Smarter, easier to use interface features longer file names (up to 250 characters!), one click access to all programs and documents with the 'Start' button. Simpler file and document management.

✓ Bigger, Smoother Video

Windows '95 is a powerful 32 bit operating system and lets your computer process more data effectively making the quality of the video you see vastly better.

✓ Plug-and-Play Upgrades

Upgrading your PC is easier! With new Plug-and-Play technology Windows automatically recognises compatible sound cards, drives and more! No more complicated installation routines and struggling with AUTOEXEC.BAT and CONFIG.SYS.

✓ Plays all Your Music

Windows '95 plays all of the music CDs you currently own. When you place a CD in your computer, Windows automatically detects the disc so you can easily play music in the background as you work.

✓ True 32 bit Multitasking

Windows '95 allows you to run multiple 32 bit applications concurrently. Printing, faxing, communicating, redrawing, rendering and much more can all be done while you work in another application!

✓ Integrated Access to e-mail, Faxes and the Internet

Windows '95 features built-in access to the kinds of services that have been difficult to access before. Simply point and click your way to the information superhighway!

✓ No More DOS!

Windows '95 will completely replace MS-DOS. From boot up you will automatically be in Windows, but able to access DOS programs through the familiar DOS prompt window.

Do you need to upgrade to Windows '95?

It is almost certain that all future upgrades of your favourite applications and games will be written specifically to take advantage of Windows '95's unique features. Not upgrading could leave you out in the cold when it comes to the latest software releases. Don't forget that Windows '95 will run all your existing Windows applications. However, new 32-bit applications written for Windows '95 will NOT run on previous versions of Windows.

Call our dedicated Win '95 hotline
01675 46 59 95



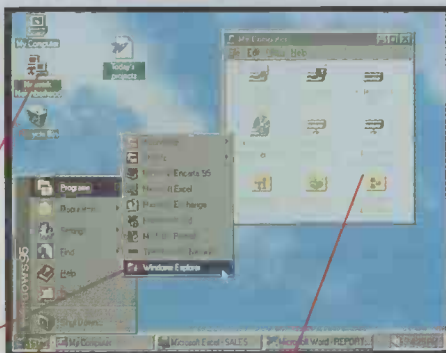
Upgrade questions? Our Corporate Team are ready to help on 01675 46 64 67

Windows '95 brings fun back to computing!

With Windows '95 different directories or 'folders' are accessible easily from the desktop. You can also access files from a fileserver or other PCs on the network as simply as double clicking an icon on your desktop.

Hierarchical menus make finding your way around Windows a snap. You can see here, the Program Manager directory is shown open and choosing applications couldn't be simpler.

The new interface gives you a Start button. It gives you instant access to programs, recently used documents and more.



The first thing you'll notice about Windows '95 is the elegant new interface. It uses icons and folders to help you keep track of your files and programs. You can now have file names up to 250 characters long! The new interface can also be customised with options menus, shortcuts and custom mouse clicks - All this and 32bit speed!

PLUS! FOR WINDOWS '95

Give Windows '95 even more utilities and style with Microsoft Plus!

This powerful companion to Windows '95 adds a whole new range of utilities like intelligent 'Agents', disk compression, exciting fonts and backgrounds, an enhanced Internet browser and much more - Just look at these features:

- **Intelligent System Agent** - makes your PC self maintaining.
- **Enhanced Drive Space™** - allows up to 50% more disk compression than Windows '95.
- **Themes** - 11 Colourful themes, each with new fonts, icons, backgrounds, sounds & screen savers.
- **Internet Browser** - Includes a more enhanced version of the Windows '95 Internet Browser.
- **Pinball** - A 3D game designed for Windows '95 that looks, sounds and plays just like the real thing!
- **Dial-up Networking** - Allows your small office or workgroup share data or send and receive mail remotely.

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Plus! for Windows '95 (3.5" or CD) **£29⁹⁵**

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MEMORY UPGRADES - The best way to improve your PC's performance!

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Our kits are all original manufacturer memory modules - all are 100% compatible with the PC specified. Each module is covered by a five year manufacturers warranty and has been tested for parity, voltage and speed compatibility with the intended PC.

Each kit includes a 3M anti-static wrist strap, easy-to-follow fitting instruction a 5 year warranty and full technical support.



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Microsoft recommends you have 8Mb of RAM to run Windows '95, however to take advantage of the sound, graphics and video capabilities of the new Win '95 applications you may need at least 16Mb RAM.



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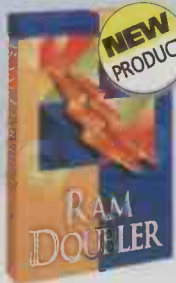
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RAM Doubler for Windows

The safe and cost-effective way to increase and optimise your system RAM.

RAM Doubler uses three primary methods to increase your memory. First, it increases System Resource space so that Windows has plenty of room to track your application's menus, icons, and other visual elements. Next, RAM Doubler cleans up the under one megabyte space where DOS, network software, and hardware drivers reside and often waste space. Finally, RAM Doubler takes memory that is in use but not likely to be used again and compresses it to keep Windows from triggering virtual (disk) page swaps that slow your system down. The result of these methods is a tremendous increase in the ability to run multiple applications simultaneously, usually with no appreciable effect on performance.



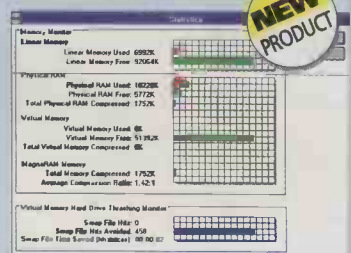
RAM020 RAM Doubler for Windows.....£59

MagnaRAM for Windows

Increases available memory for Windows using RAM compression and Virtual Memory.

Increasing the system memory available for Windows with MagnaRAM is a snap. It is easy to install, configure and use.

The utility sits between Windows and your physical memory and intercepts the data compressing it and decompressing it on demand, with no appreciable loss of functionality and speed. Featuring the latest in RAM compression technology, MagnaRAM from Landmark is designed to increase available system RAM and virtual memory using this advanced technology. It is compatible with Windows 3.1, 3.11 and Windows for Workgroups and has been tested with the current beta of Windows '95.



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MAX019	Maxtor 850Mb (12ms) IDE Kit.....	£199
MAX020	Maxtor 1.2Gb (12ms) IDE Kit.....	£289

If you are not a computer "techie", it's advisable to buy a hard drive kit, as opposed to a bare drive. You will have no worries, about how to physically connect your drive, as all cables, screws and packing rails are included. Also unless you already have the relevant utilities, your PC might not be able to access the whole drive under one drive name due to a limitation by DOS and some computer Bios. Maxtor and Western Digital kits include easy to install drivers that override these limitations.

Western Digital Drive Kits

The Western Digital range of hard drive kits offer, the highest level of quality backed by a three year warranty.

A major step forward in upgrading your PC - these drive kits contain everything you need to easily extend the storage capabilities of your PC; A Caviar 3.5" quick access time drive, rails, screws, 5 1/4" chassis, manuals and installation disk. The Western Digital installation disk will even get around the limitations on drive partition sizes, set by DOS, allowing your new drive to be configured as one large partition (no need for separate drive letters). The cost per megabyte of these new storage devices, is in fact now cheaper per megabyte than a floppy disk!



NEW PRODUCT

WE5006	Western Digital 540MB IDE Kit.....	£169
WE5007	Western Digital 850MB IDE Kit.....	£199
WE5008	Western Digital 1.2 GB IDE Kit.....	£269

Next-day delivery only £6⁹⁵ E&OE. All prices are plus VAT and delivery and are subject to change and availability.

Gear up for Windows '95 with storage from Software Warehouse...

With Microsoft Windows '95 fully installed you can expect to use anything up to 100Mb of disk space for the operating system alone! And today's software suites can use anything up to 300Mb! Do the smart thing - get a bigger drive from Software Warehouse.



STORAGE - BARE DRIVES

Please note: Before buying bare drives, please check you have the necessary cables and fixings, as they do not come with individual drives.

WE5001	IDE W' Digital AC2540A	540Mb.....	£154
WE5002	IDE W' Digital AC2700A	730Mb.....	£159
WE5003	IDE W' Digital AC2850A	850Mb.....	£175
WE5005	IDE W' Digital AC3312	1280Mb.....	£275
SEA002	IDE Seagate ST3660A	545Mb.....	£139
SEA003	IDE Seagate ST5850A	850Mb.....	£179
SEA004	IDE Seagate ST31220A	1080Mb.....	£239
MAX026	IDE Maxtor 7540A	540Mb.....	£139
MAX027	IDE Maxtor 7850A	850Mb.....	£235
MAX028	IDE Maxtor 71260A	1080Mb.....	£349
SEA005	SCSI Seagate ST5560N	520Mb.....	£179
SEA006	SCSI Seagate ST31230N	1000Mb.....	£369
SEA007	SCSI Seagate ST32430N	2100Mb.....	£679



NEW PRODUCT

Pictured above are the Western Digital Caviar drives (without top cases!). These high quality drives come with a 3 year manufacturers warranty.

HP COLORADO - TAPE BACKUP

The Colorado range of backup devices from Hewlett Packard, offer fast, secure, high capacity backup at an unbeatable low price. All models include full software for both Dos and Windows, and come with all the cables and instructions that you need to start backing up straight out of the box! The Jumbo 250,350 and 700, backup at 9.3Mb a minute internal and up to 8Mb a minute external. The Trakker 1400 internal backs-up at 15Mb a minute! The internal drives connect to a standard floppy controller (even if you have two floppy drives), all cables included and the external connects to the parallel port and has a pass through port so that you can still use your printer.

COL002	INT. Jumbo 250 (up to 250Mb)	.....	£89
COL006	INT. Jumbo 350 (up to 340Mb)	.....	£99
COL007	INT. Jumbo 700 (up to 680Mb)	.....	£179
COL008	INT. Trakker 1400 (up to 1.36Gb)	.....	£255
COL009	EXT. Trakker 250 (up to 250Mb)	.....	£179
COL010	EXT. Trakker 350 (up to 340Mb)	.....	£195
COL011	EXT. Trakker 700 (up to 680Mb)	.....	£249

COLORADO MEMORY SYSTEMS INC.

Storage Tapes!

The Jumbo / Trakker 250 and 350 use type QIC-80. The 700//1400 models use type QIC5010- MC

SEE PAGE 18 FOR TAPES



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STORAGE - PARALLEL PORT DRIVES

Factory Parallel Port Storage

The easiest way to increase your PC or notebook's storage capacity while gaining portability.

No messing with interface cards - just plug and play! If you need to transfer volumes of data around your company, need fast, secure data backup or just need to increase the storage capacity of your PC or notebook then Factory Parallel Port Storage is the answer. Includes all cables and software required and a pass-through printer port.



FAC025	540Mb Drive	£249⁹⁵
FAC040	850Mb Drive	£299⁹⁵
FAC025	1.2Gb Drive	£369⁹⁵

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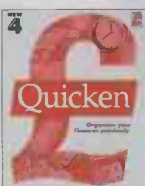
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TAS002	DOS Tas Books Multi User	£170
TAS004	DOS Tas Payroll v1.4	£85
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QUI016	WIN QuickBooks v3	£85
QUI012	WIN Quicken v4	£29
QUI020	WIN Quicken Home Inventory	£19
QUI004	DOS Quicken	£29
SAG023	WIN Sage Moneywise	£24
SAG015	WIN Sage Invoicing	£24
SAG018	WIN Sage Payroll	£135
STEO04	DOS Sage Payroll II	£98
SAG017	DOS Sage Payroll II LAN	£166

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This new version of Quicken is the fastest, easiest way to organise all your personal and small business finances.



QUI012 Quicken V4.0 £28⁹⁵

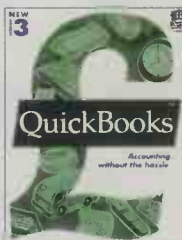
Quicken Deluxe UK Home Pack Includes Quicken for Windows Version 4, Quicken Home Inventory which allows you to check on your home contents insurance, & QuickTAX Planner '95.
QUI022 Deluxe UK HomePack £46⁹⁵

Quicken Deluxe UK Business Pack Includes Quicken for Windows V4, Quicken Invoice UK for Windows and QuickTAX Planner '95.
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HAR003 Harvard Graphics Version 3 £279

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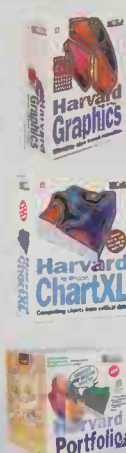
Turn your spreadsheet data into impressive, readable charts. Designed for fast, flexible charting and analysis of complex data, import data from Lotus 1-2-3, MS Excel etc. and then export completed charts to ALL Windows apps.

HAR016 Harvard Chart XL £69

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PEG001 Pegasus Solo (DOS) £67²⁰



Pegasus Solo Payroll

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PEG002 Pegasus Solo Payroll (DOS) £42⁹⁵

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Produced by the Consumers' Association, TaxCalc for Windows helps you to understand and complete your current tax return. TaxCalc quickly and accurately checks the tax you paid last year - you may be due a rebate - and advises you how to optimise your income and allowances for the current tax year. You can print out your Inland Revenue approved tax form and benefit from the extensive on-line help specially written by the Consumers' Association as well as relevant Inland Revenue leaflets and advice on how to deal with the revenue. You will require a 386, with four megabytes and Windows 3.x.

TAX001 TaxCalc for Windows £29⁹⁵



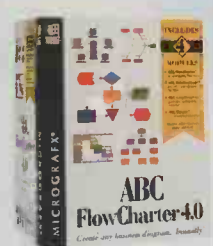
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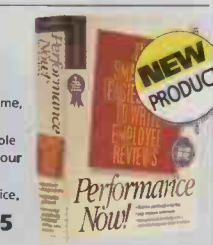


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PER022 Performance Now! £128⁹⁵



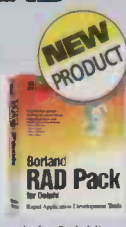
BUSINESS SOFTWARE - DEVELOPMENT LANGUAGES

Delphi RAD Pack

Rapid application development tools for Borland Delphi.

The Delphi RAD Pack, is a collection of companion products to enrich Delphi. The RAD Pack includes: VCL source Code The complete Object Pascal source code for Delphi's Visual Component Library. Developers can rapidly learn tips and techniques for building their own custom components. Delphi Language Reference-An in-depth guide to the language behind Delphi, Object Pascal. Turbo Debugger-Turbo Debugger is a set of tools designed to help you debug programs you write with Borland compilers. Visual Solutions Pack 1.1-Provides a comprehensive set of drop-in components. Also includes Resource Workshop and Resource Expert.

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TUR013 Turbo C++ V4.5 Win £73⁹⁵



Paradox 5.0

This new version combines a powerful relational database with an object language, PAL.

With OLE 2.0 client and server support, Paradox 5.0 is relational database power made easy. It's the natural database to use with any suite or other applications. In fact, it even integrates better with leading suites than the ones Included! Paradox for Windows is the database choice for end users, power users and developers, no other database offers so many powerful features, combined with ease of use.

PAR021 Paradox 5.0 £118⁹⁵



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LA002 Claris FileMaker Pro **£84⁹⁰**



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A database that holds all of the UK's 1.6million postcodes, covering all of Britain (including Northern Ireland).

With this unique program you simply input a postcode and it will tell you the road name, town, city or county with larger business addresses usually having their own postcode. In total the system covers 24million individual addresses across 1.6million postcodes. You can load the whole of the UK or one of ten regions. This Windows based program works with most Windows apps including Word, Excel, WordPerfect etc.

ADD004 Auto Addressing Sys.... **£129**



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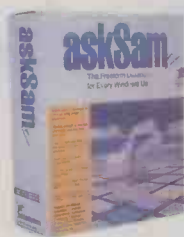
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CLA006 Claris Works V3.0 **£68⁹⁵**



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Microsoft Office

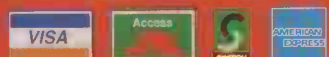
The number one-selling integrated suite.

The Microsoft Office suite of applications are designed to work tightly together, allowing you to focus on your work, instead of trying to learn complex computer jargon. Two versions are available:

- Microsoft Office Standard Version 4.2 which includes Word V6, Excel V5, PowerPoint V4 and MS Mail License.
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There are three ways to buy Microsoft Office:	Standard	Professional
If you currently use any application from within MS Office (including older or DOS versions) or MS Works, then you can buy the Upgrade Version, which will search your hard drive upon installation for the earlier version.	£159 MIC139	£249 MIC173
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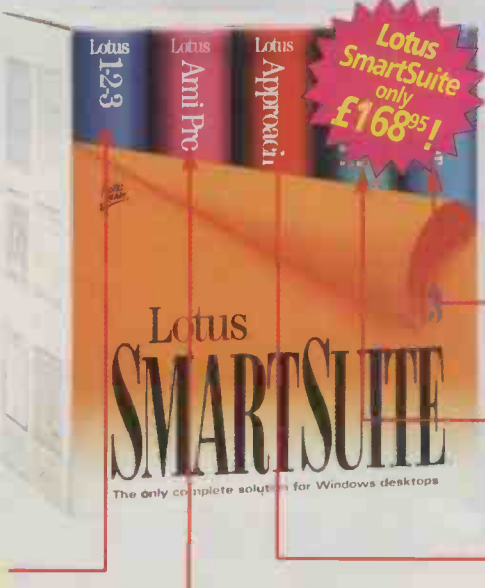
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Lotus SmartSuite V3 **£168⁹⁵**



Lotus SmartSuite only £168⁹⁵!

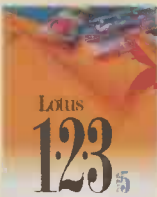
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Dramatically boost your productivity.

Lotus 1-2-3 V5 features new drag and drop to move or copy cells, ranges, formulas and more. It also now includes intelligent charting. Create a chart, complete with titles, labels and legends in a single step. New advanced spreadsheet publishing includes unlimited fonts, 256 colours, style gallery formats and the ability to preview styles before you apply them.



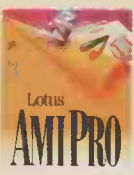
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The Best Windows Word Processor!

If you are looking for a word processor that's not only easy to use but packed with useful features, then look no further than Ami Pro. Using all the latest word processing features, Ami Pro is the obvious choice for individuals and workgroups.

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Lotus Approach V3 **£82⁹⁵**

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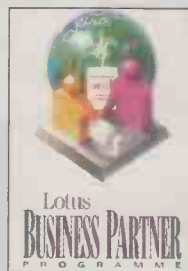
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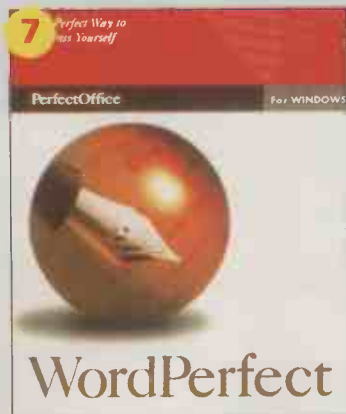
WordPerfect Version 6.1

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Notebook Tabs let you flip through quickly and easily. No other spreadsheet filing system keeps your data in better order.



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COR044 Corel Ventura CD..... **£59⁸⁵**

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The easiest way to create forms in seconds.

It takes all the guesswork out of designing professional-looking forms with the DelrinaExpert™, a help tool that designs forms to your specifications automatically. Perform helps you to produce forms by answering a few simple questions, selecting from dozens of pre-designed templates, and it even lets you customise the pre-designed forms with drag-and-drop simplicity or design your own forms from scratch.



PER021 Delrina Perform.. **£44⁹⁵**

KeyForm Designer for Windows

Design any form using graphics and data.

This form design/fill system has the creativity of a desktop publisher, the number-crunching power of a spreadsheet and the advanced data interchange capabilities of a database package. With pre-designed templates, easy-to-use layout features and the ability to import graphics and logos, you can design any form in seconds. Also features: automatic date, time and page numbering; auto-prompt for data fields; and, you can text importing from any word processor or spreadsheet.



KeyForm Designer..... **£28⁹⁵**

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Make your business look bigger!

Choose from 50 professionally designed forms, or use boxes, shading, text and Imported graphics to make your own, great-looking forms. Then simply fill-in and print them as you need, saving time and money. This British-developed package has sold 200,000 copies in America.

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Includes floating toolbars, drag-and-drop editing, radio buttons, check boxes, automatic word-wrap, OLE 2.0 support, draggable rulers, definable grids, fountain fills, zoom, preview and much more. New Wizards create reports and mailing labels after a few simple questions.

4 EASY STEPS TO FORMS AUTOMATION...

Step 1: Design and edit any form with ease

Whether you are modifying one of the pre-designed forms or creating one from scratch, FormTool Gold's powerful design and edit tools make it easy for you every step of the way. Import bitmap or vector images, insert text fields, create tables with the cmd duplicator and much more.



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Step 2: Automate your data in one step

At your option, FormTool Gold will create a database associated with your form, which then becomes a "window" to your data. Sort, search, or query the data. Different forms can access the same data, letting you see exactly what you want in the form you want. Every time you complete a form, it is added to the database.



Step 4: Get professional results fast

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FOR018 FormTool Gold..... **£49⁹⁵**

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Using Timex and the Microsoft personal time manager software (included), you enter and store information on your PC. Then select the entries you want to send to your watch. There's also a direct link with Microsoft Schedule Plus for Windows. In addition to telling the time and offering a programmable link to your PC, the Timex Data Link watch features day/date, three year battery life, Indiglo™ night light and its also water resistant to 100 meters.



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No wires, No cables - Just point the watch at your screen!
Downloading information with the Timex Data Link communications technology is as easy as pointing your watch at the screen. The watch sensor reads flashing bars of light - that's the data. In seconds, the watch loads up to 70 different entries, then update as often as you like.

A little black book on your wrist!

Think of your Timex Data Link watch as a little black book on your wrist. It holds:
Telephone numbers - Need a number fast? No problem, just punch it up on your watch!
Appointments - The watch will beep to let you know it's time to leave for an appointment or event. It will even show you who you're meeting with and where;
Anniversaries - Never forget another Birthday or anniversary again! A friendly reminder icon appears a week before an event, and then flashes on the day;
To-Do Lists - A great memo log that prioritises tasks to be completed. It can hold everything from locker combinations to frequent flyer numbers.
Time Settings - Set the watch times directly from your PC. Two time zones can be entered along with worldwide city code abbreviations.
Alarms - Pre-set up to five alarms a day.

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Accent makes it easy to use different alphabets and characters in the same document. Select the language you wish to write in and a keyboard template appears in the corner of your screen, to help you find the corresponding key on your UK keyboard. With your mouse, you can even click the template rather than depressing the actual key. Accent is full of all the standard word processing features, including style sheets, word count, auto save, import, export etc. All Accent word processors cover over 30 languages including all European languages, plus Russian, Polish, Serbian, Hebrew, Greek, Turkish and many more.



Accent Express

Over thirty languages supported. 30 Truetype fonts in 5 language groups: Western Europe, Eastern Europe, Cyrillic, Greek and Turkish.

ACC002 **Accent Express** **£38⁴⁹**

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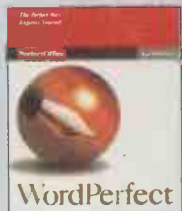
WOR077 **WordStar 2.0** **£27⁹⁹**



WordPerfect 6.1

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WOR117	WP 6.1 Comp. U/G	£79
WOR118	WP 6.1 Upgrade	£62



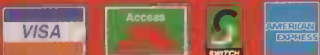
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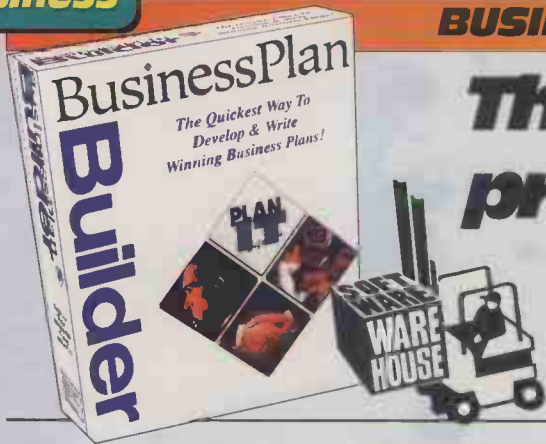
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- ✓ 3 Year projected financial forecasts.

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Business Plan Builder

Business Plan Builder is an easy to use package that creates structured business plans for any size of company. It provides users with relevant questions and sample answers from which to create a business plan. It automatically formats it with headlines and subheads, even inserting your company details throughout. Simply answer the questions and fill in the blanks - Business Plan Builder does the rest!

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Business Plan Builder helps you identify opportunities and threats to your business through an in-depth analysis of your company, products, competition and industry.

Sales and Marketing

Business Plan Builder helps you to develop effective sales and marketing strategies and present them in a coherent manner, which both potential

investors and employees will easily grasp. Business Plan Builder will provide the right marketing plan and information for you to cross check as your business starts to grow.

On-Line Information

Much valuable time is wasted collecting and collating information when developing and writing business plans. Business Plan Builder has done this work for you, providing information in a number of ways, namely:

- On-Line Help & Advice
- Contact Database
- On-Line Business Forum

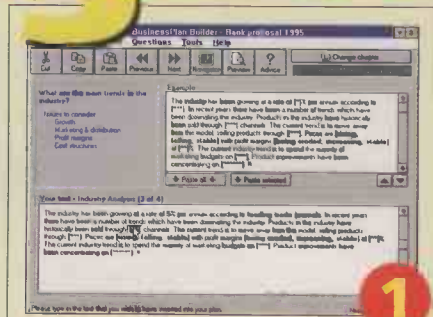
Over 70 Sources of UK Funding

With over 70 sources and methods of gaining funding, Business Plan Builder is an invaluable source of information, advising you on how to effectively secure vital

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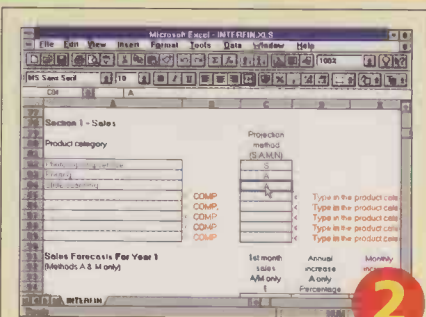
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5 EASY STEPS TO PRODUCING EFFECTIVE BUSINESS



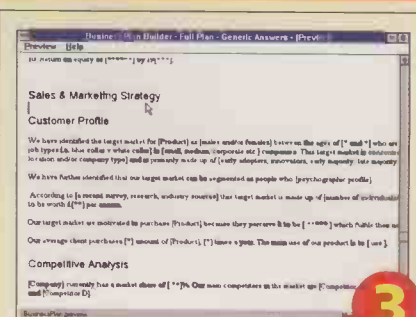
Business Plan Builder

Provides relevant questions and sample answers from which to create a business plan. Automatically formats your business plan with headlines, subheadings, and company details. Plus, QuickText allows you to insert recurring phrases, names and dates.



Projected Financials

Pre-structured financial templates are ready to use - simply type in your company income and expenditure details and Business Plan Builder will calculate totals, percentages and ratios, creating your projected financials for three years ahead.



Print Preview

View your plan at any time in Print Preview mode. Your plan is automatically formatted with all the headers and sub-headers in place. You can print directly from Business Plan Builder or use your favourite Word Processing package.

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Business

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If you own your own business, you'll have had plenty of ideas for expanding and diversifying your company. Business Plan Builder will enable you to find out how your ideas will do in a real-life context. You can test out the options available to you to help you decide which areas to expand into, plus you can prepare professional reports and charts to help you explain your idea to others in your business.

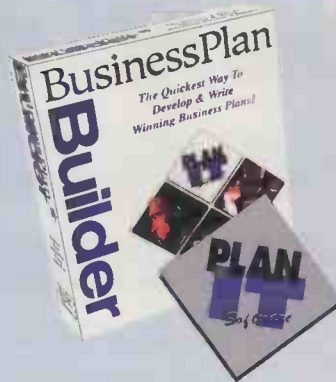
Also included are over 70 sources of funding to help you get the backing to expand your business.

details can be copied and pasted into other packages.

Business Information Forum (BIF)

Users of Business Plan Builder are entitled to 90 days to free access to Plan-IT's on-line business forum, B.I.F., which contains extensive information on business subjects. B.I.F. covers topics such as:

- Funding & Debt Collection
- Exporting
- Tax, Law & Accountancy
- Marketing Research & P.R.
- Direct Marketing & Advertising
- Employment & Health & Safety



What users say about Business Plan Builder

"This is an excellent example of business productivity software which will make the user's life easier as well as the intended recipient of the business plan, for example, bank managers like myself!"

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"I found this an intuitive package that lead me through the process of writing a business plan in an easy to follow, step by step process."

Graham Love,
MD, India Ocean Trading Co.

"This package will save me hours of time when developing business plans for my clients!"

Richard Wall
Management Consultant

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funds necessary for any successful business. Sources include venture capital, factoring, private financing, government and EC grants, and many more.

3 Year Business Plans Instantly!

Business Plan Builder financials include:

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- 1-3 Year Projected Profit & Loss
- 1-3 Year Projected Cash Flows
- Break-even Analysis
- Ratios

percentages and ratios, creating your projected financials for 3 years. Numbers flow from one financial statement to another and you can use your spreadsheet application to graph any item in your financials.

Business Plan Builder - 100% BRITISH business information.

You can be sure of Business Plan Builder's relevance to your business ideas because it is a 100% British development. All funding information is British and all the database information relates specifically to UK business needs. Over 2,500 names and addresses you need. Everything from the DTI, Health & Safety to MPs and Trade Unions!

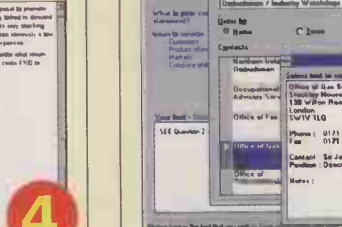
Reference Database

Business Plan Builder features an on-line database containing thousands of useful names and addresses - including MPs, ombudsmen, research institutes, trade and consumer associations, institutes and societies. These

Information provided on the B.I.F. is compiled by a panel of experts from a range of industries. Users will be kept abreast of current developments.

On-Line Help

Extensive on-line expert advice is available on the subject of writing business plans. Context-sensitive help ensures that all business reference information is available with a single mouse click, and comprehensive search options make it all easy.

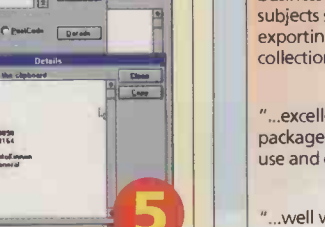


Reference Database

On-line database of thousands of useful names and addresses. Includes MPs, ombudsmen, research institutes, trade and consumer associations, institutes and societies, and health & safety organisations. All information can be copied into other packages.

On-Line Help

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What the press say about Business Plan Builder

"...all the information necessary to write a winning business plan... extensive information on business subjects such as accountancy, more funding, tax, law, exporting, advertising, direct marketing, debt collection, health and safety, employment and PR..."

Computer Shopper, June '95

"...excellent coaching and contacts list... a very effective package for putting together business plans... easy to use and can be applied to almost any type of business"

Home Run Magazine, May '95

"...well worth the money... the package conducts an excellent interview covering business strategies and financial details which leads to an impressive looking plan, ready to be printed out..."

Sunday Times, May '95

R. BUSINESS PLAN BUILDER IS ANOTHER GREAT PRODUCT FROM RODERICK MANHATTAN

Page 13

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Computer Shopper, June '95

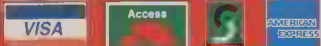
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Home Run Magazine, May '95

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Sunday Times, May '95

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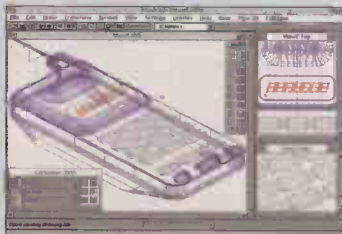
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XCAD 3.0 - The new generation of 2D/3D CAD software for Windows!

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More Tools for Drawing

Version 3.0 rounds out an already strong set of drawing tools with several notable additions. 3D Cube provides an ultra-fast method for creating a cube of any dimension with only one command, while Extrude Surface gives you a powerful method for transforming 2D shapes into 3D surfaces. Surface Fillet, Chamfer, and Offset extend these useful tools from the 2D to the 3D world.



High quality schematic 2D drawings

Improved functionality and performance

In general, XCAD 3.0 is a more powerful and easier to use CAD product. Xitron has surveyed its customers and implemented the features they have asked for.

XCAD Development System

XCAD Development System (XDS) is a comprehensive development tool that adds a whole new level of power and flexibility to XCAD. It enables you to:

- create your own commands in the full-featured XCAD Development Language,
- add your commands to the Pull-down menus,
- create icons for your commands and add them to the Toolbox,
- incorporate your C programs into XCAD. XDS is simple to use, you don't have to be an accomplished programmer to learn how to create your own commands.

Advanced CAD for Windows

XCAD is a revolutionary CAD software application that makes the most of the simplicity and flexibility offered within the Windows working environment.

More File Types

Now you can use XCAD files in conjunction with a much wider variety of third party products, including renderers, modellers, and CAM systems. DWG Read/Write and IGES Import/Export complement DXF as the major file standards throughout the CAD world.

Extended Functionality for the Professional

The XCAD Development System gives programmers the power to build sophisticated, customised CAD applications. Similarly, 3D Symbols Libraries provide high-quality 2D and 3D symbols that cut drafting time for the architectural and mechanical designer.

Enhanced Usability

Industry experts have called XCAD "simplicity itself to use" and Version 3.0 raises usability to new heights. Command Manager allows users familiar with AutoCAD, GenericCADD, or MicroStation to use keyboard commands from these programs to create XCAD drawings. Customisable Toolbox and Menu let you tailor the XCAD interface to your specific requirements, and new Macro capabilities streamline often-repeated tasks.



Highly realistic rendering of 3D graphics

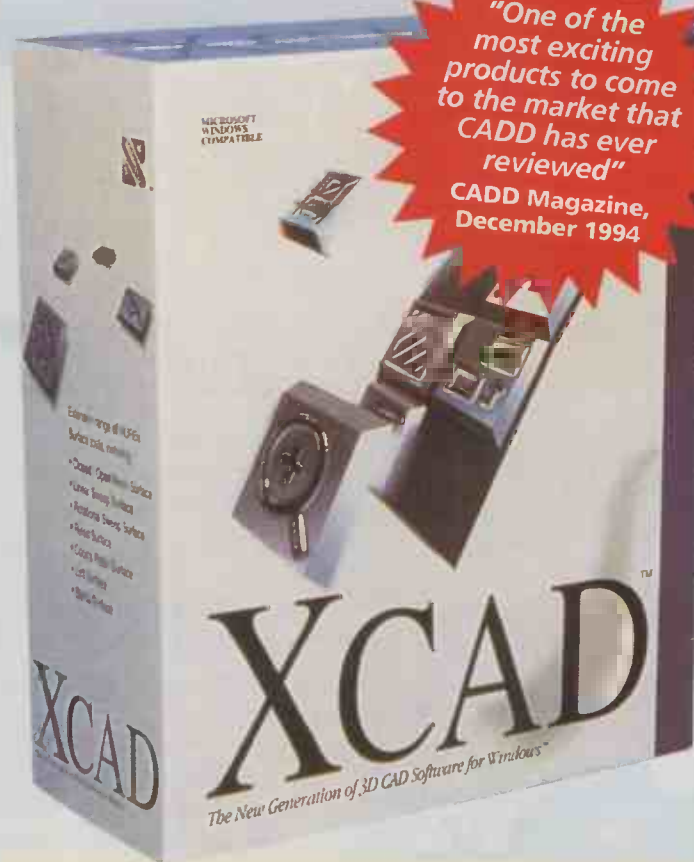
Powerful 3D Surface Drawing Facilities

The facilities available in XCAD allow you to create complex entities with little effort. Use lines, arcs, circles, ellipses and NURBS (Non-Uniform Rational B-Spline) curves as basic entities, and advanced surfacing features like planes, cylinders, cones, spheres, toroidal and NURBS surfaces, help in creating complex geometric entities with little effort.

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If you need to see what your design will look like in real life, XCAD enables you to shade and view objects at any viewpoint. Convenient commands like Pan, Zoom, Redraw and Hidden Line Removal are available.

XCAD01 XCAD V3.0 for Windows.....**£368⁹⁵**



Just look how XCAD compares!

	XCAD 3.0	AutoCAD LT	AutoCAD R13
SYSTEM ARCHITECTURE	32-BIT	16-BIT	32-BIT
AUTOCAD DWG FORMAT	R12	R12	R13
ADVANCED 2D	YES	YES	YES
ADVANCED 3D	YES	NO	YES
ADVANCED SURFACING OPTION	YES	NO	YES
PHOTO-REALISM OPTION	YES	NO	YES
IGES OPTION	YES	NO	YES
PROGRAMMING ENVIRONMENT	YES	NO	YES
MEMORY REQUIREMENTS	4/8MB	4/8MB	20/32MB
HARD DISK REQUIREMENT	20MB	40MB	250MB
PRICE	£369	£375	£3150

What the Experts Say About XCAD!

- "XCAD - the new low-cost surfacing product everyone was talking about [at the AIEIC '94 Show]." Cadence
- "One fantastic feature of XCAD - is its full stable of NURBS software tools, not commonly found in such an inexpensive package." Computer Graphics World
- "I was able to create 3D drawings, rotate, invert and change them, and I didn't have to go out for coffee between screen redrawings." PC Week
- "Best New CAD Software, XCAD, from Xitron." CADD Times
- "What makes XCAD special is its ability to create complex 3D entities with surfaces." Computer Aided Engineering

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- MAT006 MathCAD Personal **£55**
- MAT004 MathCAD Standard **£169**
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Enter the world of animation with Autodesk Animator Studio.

Animator Studio is the ultimate Windows based creation tool for animated presentation, multimedia content or stand alone multimedia information delivery systems.

By reading, manipulating and creating industry standard multimedia file formats, Animator Studio allows creativity to blossom while making maximum use of existing multimedia files, digital video or computer graphics. Delivery of audiovisual output is in formats which can be used in all multimedia communication tools, giving a wide range of potential uses: business presentations, multimedia content creation, standalone PC-based information systems, digital video editing or integration with computer graphics, games content, CD-ROM content, training applications, and general 2D animations.



ANI006 Animator Studio **£395**

10,000 CAD Symbols

From the makers of TurboCAD (IMSI) comes the ultimate collection of symbols for use with ANY CAD package.

IMSI Cad symbols CD-ROM for Windows is a comprehensive, versatile and easily accessible symbols library containing more than 10,000 professional quality and international standards symbols, designed for easy use with all popular CAD and drafting programs. They can be used in AutoCAD, AutoSketch, Corel DesignCAD, TurboCAD and other popular CAD packages that support DWG, DXF or SLW file formats. You can even import these symbols into Microsoft Word!



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All these libraries are included on the CD, or available separately for TurboCAD users.

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- TCL001 DOS TCL Basic Home Design **£18**
- TCL039 WIN TCL Bathrooms **£18**
- TCL031 WIN TCL Business Flowcharting **£18**
- TCL033 WIN TCL CMOS Library **£18**
- TCL008 DOS TCL Electrical Wiring **£18**
- TCL072 WIN TCL Electric Motors **£18**
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- TCL007 WIN TCL Furnishings 2 **£18**
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EasyCAD for Windows

Turn your PC into a precision drafting tool with the original low-cost CAD software.

Fast, easy and amazing value, new EasyCAD for Windows gives you the capabilities you need to complete professional, quality drawings without spending a fortune. Powerful drawing commands - including double lines, chained arcs and donuts - let you create even complex drawings quickly and with a minimum of knowledge. You can customise the icons, and menus too, in order to create the correct environment for your type of drawings.



EAS004 EasyCAD for Win. **£88⁹⁵**

FloorPlan Plus 3D

Now you can design and plan your home, office or garden quickly and easily.

Everything you need is here: large libraries of furniture, fixtures, fittings, landscaping and so on, definable wall types that break when windows and doors are inserted, floor coverings, wiring, plumbing - the lot. With this 3D version, you can now see your design in 3D, walking around in "virtual reality" style making it ideal for exhibition stands, kitchens, bathrooms, and even planning new building extensions!



THR002 FloorPlan Plus 3D **£63⁹⁰**

AutoCAD LT Rel. 2 for Windows

Fully-featured and easy to use, it's ideal for architects, engineers, designers and contractors.

AutoCAD LT Release 2 for Windows is a 2D design and drafting package that offers extensive 2D drawing and editing tools, associative hatching, Aerial View, OLE and Clipboard support. Use 3D CAD tools such as 3D extrusions, hidden line removal and shading to create or view 3D drawings. OLE and Clipboard support lets you copy and paste drawings into other Windows programs for higher quality reports and presentations.

AUT025 AutoCAD LT Release 2 for Win... **£379**

AutoSketch 2 for Windows

AutoSketch for Windows combines CAD precision, drawing flexibility and Windows simplicity in one value-packed program.

Produce concept sketches, technical diagrams, architectural layouts, electrical drawings, patterns, illustrations, presentations, and information graphics. Freehand curve tools and line options give you the versatility to meet any need.

Easy view features let you choose drawings, symbols and fonts with simple icons, allowing you to create professional illustrations quickly. Other features include: over 600 symbols, TrueType fonts support, DWG Write 4 upward compatibility with AutoCAD and DXF Import/export.

AUT027 AutoSketch 2 Win **Call for new low pricing £87**

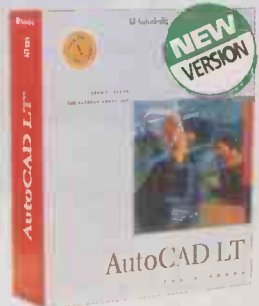
AUT019 AutoSketch 3 DOS **£87**

AutoSketch Libraries

AutoDesk have introduced two specific libraries for AutoSketch for Windows to aid designers, architects and electrical engineers to produce high quality drawings and diagrams as quickly and accurately as possible. Both libraries contain industry standard drawings and symbols.

AUT013 AutoSketch Electrical Library **£65**

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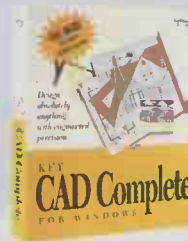
GCG001 Graphics Converter Gold **£29**

KeyCAD for Windows

High performance CAD at your fingertips.

You can produce drawings, plans and layouts to perfect scale and accuracy.

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KEY002 KeyCAD Complete **£29⁴⁵**

Drafix QuickCAD

A new CAD concept.

It is designed to give any Windows user the ability to create precision technical drawings. QuickCAD is unlike other CAD, which require drafting skills. Based on the award-winning Drafix CAD Professional program, QuickCAD is not only easy for the new user, but grows as user experience and confidence increases to include a full set of professional features. Includes: FREE CD-ROM with over 500 symbols; background redraw for the fastest Windows CAD; three-level interface with customisable toolset that matches your experience; and, directly reads/writes to AutoCAD files, DWG, DXF or IGES formats.



DRA006 QuickCAD **£49**

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ZOOM Fax/Modems

An award winning V34 modem for only £148!

Sporting advanced features like remote configuration and callback security the ZOOM fax / modem offers unbeatable value for money. No wonder Personal Computer World have awarded ZOOM Editor's Choice 2 years in a row. ZOOM offer either internal or external versions with a choice of either 14,400bps or 28,800bps speeds. Each modem comes with a five year manufacturers warranty, while the external versions' front panel has a 15 light monitoring display to help you understand the current communication status.



ZOO005 ZOOM 28.8 Internal Fax / Modem **£148**

US Robotics Sportster

The best-selling V.34 modem with fast 28.8bps throughput

The Sportster 28,800 fax / modem provides connection speeds of up to 28,000bps, and with the use of data compression, a throughput of up to 115,000bps can be achieved. Features include fax speeds from 300bps to 14,000bps, Class 1, II and Group 3 fax compatibility, DOS and Windows Datafax software is also included free. As with all US Robotics modems, you will receive a five year warranty and free lifetime technical support with this BAVT approved modem.



USR012 US Robotics Sportster 28.8 External Modem **£189**

MODEM COMPARISON CHART

Modem	V.21	V.22	V.22Bis	V.23	V.32	V.32Bis	V.34	V.42	V.42Bis	V.17	Stock Code	Price
Andest Roadrunner Rocket	●	●	●	●	●	●	●	●	●	●	ANO006	£119
DataFlex HyperGem Internal	●	●	●	●	●	●	●	●	●	●	DAT020	£179
DataFlex HyperGem External	●	●	●	●	●	●	●	●	●	●	DAT021	£179
DataFlex HyperGem Pocket	●	●	●	●	●	●	●	●	●	●	DAT022	£185
DataFlex Comms Office External	●	●	●	●	●	●	●	●	●	●	DAT023	£169
Motorola 3400 Pro External	●	●	●	●	●	●	●	●	●	●	MOT002	£179
US Robotics Sportster 14.4 Ext.	●	●	●	●	●	●	●	●	●	●	USR001	£125
US Robotics Sportster 14.4 Int.	●	●	●	●	●	●	●	●	●	●	USR002	£129
US Robotics Sportster 28.8 Ext.	●	●	●	●	●	●	●	●	●	●	USR012	£189
US Robotics Sportster 28.8 Int.	●	●	●	●	●	●	●	●	●	●	USR014	£196
ZOOM 14.4 External	●	●	●	●	●	●	●	●	●	●	ZOO004	£95
ZOOM 14.4 Internal	●	●	●	●	●	●	●	●	●	●	ZOO003	£88
ZOOM 28.8 External	●	●	●	●	●	●	●	●	●	●	ZOO006	£168
ZOOM 28.8 Internal	●	●	●	●	●	●	●	●	●	●	ZOO005	£148

NEW Dataflex Modems

DataFlex, the leading UK modem manufacturer, has recently been acquired by one of Britain's largest electronics companies. This mix of quality British manufacturing, backed by full BT support and a five year warranty, make the DataFlex range of modems the best value in the market today.

Dataflex 28,800bps HyperGem

A quality, British-built V.34 fax / modem with 5 year warranty at an unbelievable price of only £179!

DataFlex's new HyperGem is available in either internal, portable or desktop versions. They conform to the new V34 standard, and using data compression transfer speeds of up to 115,200bps are achievable. As with all dataFlex products, the HyperGems work straight out of the box - power supplies, all telephone and computer cables, plus free Windows and DOS, comms and fax software are included.



DAT020 DataFlex HyperGem Internal **£179**

Dataflex Comms Office

The DataFlex SuperGem Comms Office is a 14,400bps voice / fax / data modem, bundled with SuperVoice. The ideal home/office modem!

This unique modem combines sophisticated answering machine technology, send and receive fax facilities and full Internet access and data transfer capabilities. The Comms Office comes with the user-friendly, Windows voice software, SuperVoice and Windows fax and data software. SuperVoice uniquely allows other comms software packages to be used concurrently so that switching between the different Comms Office function wouldn't be easier. It allows you to save and remotely retrieve voice mail, screen calls, and even has Pager notification and voice broadcasting.



DAT023 DataFlex Comms Office **£169**

The Ultimate Internet Fax / Modem Bundle!

The lowest priced 14,400 portable BABT modem on the market, and for a limited period includes free Internet Starter Kit!

Now you can get the top-selling, BABT-approved portable modem from Andest, the Road Runner Rocket and the ultimate Internet access package, worth £50, for only £119!

Road Runner Rocket and Internet Kit Features:

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- FREE serial cable, 9V battery and power supply unit
- High speed V32 bis modem
- V42, V42bis MNP1-5
- 14,400 data, with throughput up to 57,600bps
- Group III (Class 2) Fax to 9600bps
- Free subscription to Internet Magazine
- Free access to CompuServe
- Free worldwide access to the Internet for up to 80 hours via CityScape.



ANO008 Roadrunner Rocket **£119**

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The NEW Internet Solution from Motorola - It'll blow your mind!

Motorola 3400 28.8 Data / Fax Modem

Everything you need to connect to the Internet and other on-line services in one box.

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 - Fastest standard modulation protocol
 - Data error correction and data compression
 - Fax error correction feature for clearer faxes
 - Motorola RISC technology
 - Automatically selects the fastest possible line speed
 - A physical phone number directory for frequently called numbers
 - Robust performance over standard telephone lines
 - Fully BABT approved
 - Fax rates of 14,400bps to 2400bps with ITU-T Group 3
 - Light weight of only 298 grams
 - Hayes™ AT compatible command set
 - Comes complete with 2 year warranty
 - Includes Delrina WinComm Lite communications software and Delrina Fax Lite software
 - Easy install animated instruction disk
 - One month free online access to CompuServe.

About the Motorola Online Bundle

Internet software includes protocol software, file transfer software (FTP), Motorola's World Wide Web browser software

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- Newsgroup software
- VOCALTEC Internet phone software license
- One month free access to CompuServe including premium services usage credit
- Special offer for CoSession Remote Control Software
- Heretic online Interactive game.

ONL001 Motorola 3400 Internet Solution (with On-line Bundle) ... **£195**

MOT002 Motorola 3400 (without On-line Bundle) **£179**



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 - Approx. £16 of usage credit to explore pay-as-you-go services
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COM003 CompuServe Starter.....**£14⁹⁹**

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The fastest way to get on the Internet.

EZ Internet is not just another Internet product - it's the best on the market with full Multimedia tutorials and all the communications software you need to get connected - fast and painlessly. Designed for "non-techies" so there's no more guessing what to do next - EZ Internet will show you how, and then provide an easy path through all those complicated options.

Learn all about the new revolution of the Information Superhighway - all at your own pace. Simple! Within minutes you can do everything from visiting World Wide Web sites, to downloading software - even send email to the President of the USA! It's like having a friend show and tell you everything you need, from how to install the communications software and get onto the Internet, to the etiquette for participating in newsgroups. There are even tutorials for promoting your business. Visit Kids Net, check out the latest breaking news or simply get an update on share prices. Log onto a new world, surf the Net and join millions of Internet users worldwide. Includes 80 hours of FREE access time on the Net via a local UK information provider.

EZ001 EZ Internet for Windows**£29⁹⁹**

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The first and only Internet kit you'll ever need.

Internet In A Box is the original, best-selling solution for Windows users who want to get on the Internet. From getting connected to navigating the information, Internet In A Box features easy Internet access, the easiest Windows Interface, and the best-selling Whole Internet User's Guide. Plus, you get a complete set of software: the improved Mosaic browser, the Global Network Navigator on-line guide, Electronic Mail, News, File Transfer, the Gopher search tool and Telnet lets you log onto libraries, Interactive games and other resources.

"For those who need the very best tools to connect to the Internet, Internet In A Box is the box to buy." (Best Products of 1994, PC Magazine, Jan '95). Also recommended by Byte, LAN Times and PC Computing.

INT011 Internet In A Box.....**£98⁴⁵**

CAR001	Dos Carbon Copy Plus v6.1	£74
CRO002	Dos Cross Talk v3.1	£67
DEL001	Dos Delrina DosFax v2	£45
LOT055	Win Lotus CC-Mail Mobile Release 2	£115
LOT051	Win Lotus CC-Mail 10-User License	£259
NOR016	Win Norton PC Anywhere v2	£92
NOR023	Win Norton PC Anywhere Host v2	£58
NOR024	Win Norton PC Anywhere Remote v2	£59
NOR026	Dos Norton PC Anywhere v5	£94
PCA001	DOS Norton PC Anywhere v5 Remote	£89
PRO004	Dos Procomm Plus EC v2.10	£54
PRO015	Dos Procomm Plus 5-User LAN	£269
REA004	Win ReachOut View	£59
REA003	Win ReachOut Host	£69
SMA001	Win Smart Term 340 Emulator	£159
TER001	Win Termite v3 Asynch	£159
DEL017	Win WinComm Pro by Delrina	£54
WIN036	Win WinFax Comms Suite	£79
WIN040	Win Winfax v4 Upgrade	£33
WIN022	Win WinFax Server v4	£99
WIN049	Win WinFax LAN Starter Kit	£176
DEL005	Win WinFax Pro 10-user license	£409
DEL004	Win WinFax Pro 25-user license	£927
WIN037	Win WinFax Pro 50-user license	£1789

Procomm Plus for Win 2.1 I.E

Data comms and fax software in one value pack.

Procomm for Windows has long been the No.1 selling Comms. package. This latest edition now includes fax software and many new features: Full support for Prestel and other terminal emulations; Dialling directories including group support; Fax from within applications; Fax mode supports standard & fine resolution and includes host mode for 'fax on demand'. The new easy-to-use interface makes Procomm the ideal package for all PC users!

PRO003 Procomm Plus 2.1.....**£56⁹⁵**

New! ReachOut Version 5.0

The fastest way to remotely access your office PC.

ReachOut 5.0 lets you work with your home or office PC - and even access your corporate network - from any other computer, across town or around the world! You can pull up any program and work with any file, from any remote PC. All you need is a computer, a modem and a phone line - ReachOut gives you everything else you need in one package.

The Perfect Productivity Tool
ReachOut 5.0 is the perfect productivity tool for telecommuters who need office resources, mobile executives who need instant access to data, and everyone who needs to take work home, move files from PC to PC, or access technical support from outside the office. With ReachOut 5.0, you can edit documents, update spreadsheets, access E-Mail and on-line services. Transfer files, chat with remote users, share CD-ROMs and print documents. You can even use applications that don't fit on your home PC or laptop - ReachOut 5.0 puts all the resources of your office PC at your fingertips. It gives you the power to be more productive - from any place that you choose.

The Number One For Speed
ReachOut Version 5.0 is the number one for both remote control speed and file transfer speed. ReachOut's Stac LZ5 compression technology lets you communicate up to 42% faster than pcAnywhere (depending upon the application you use). The new SmartSend reduces file transfer times by up to 90% by sending only the parts of the file that have changed since the last transfer. Plus, transferring files is as easy as a mouse click with drag and drop operation. Plus, installation is so easy that you'll be up and running in minutes.

More great features!
ReachOut 5.0 gives you extensive file synchronisation, automatically keeping copies of files up-to-date on all your PCs. IntruderGuard is the complete solution for data security, with features like password protection, call-back, keyboard disabling, screen blanking, and more. ReachOut now supports WinSock (TCP/IP), which means you can access another PC across the Internet or any TCP/IP network.

REA002 ReachOut Remote Control Version 5.0.....**£79⁹⁵**

Network Version
You can give support to any other user running DOS or Windows on the network. View and edit their Windows and System files, or diagnose workstation problems. No more time-consuming journeys to other offices! You can use ReachOut's built-in gateway to provide worldwide access to your LAN, providing a cost-effective modem sharing option.

REA005 ReachOut Remote Control 4-User LAN.....**£129⁸⁵**

Andest Comms Add-Ons

High-speed serial cards and superior fax switches.

The Andest Rocket Board high-speed serial card allows you to take full advantage of high speed modems. If your modem works at over 14,400bps you may find that your older serial cards are unable to process data at higher speeds.

AND011 Andest Serial Card**£39⁹⁹**

The Andest Fax Switches allows you to connect your fax, answerphone, telephone and PC to one telephone line. The Fax Switch automatically detects what the nature of the call, passing it through to the right device.

AND006 Andest MSL 3-Port.....**£98**

AND007 Andest MSL 8-Port.....**£139**

Communications Suite from Delrina

Get Delrina's popular WinFax PRO 4.0 and WinComm PRO 1.1 in one package.

Delrina WinFax PRO 4.0 is the best way to send, receive and manage faxes in a Windows environment, it's the easiest way to go on-line. Delrina WinComm PRO 1.1 is perfect for accessing on-line services and transferring files and it now features easy access to Internet e-mail. Together these packages set a new standard for ease of use and integration.

WIN036 Delrina Communications Suite**£78⁹⁵**

WinFax PRO 4.0

Delrina WinFax PRO 4.0 is the best way to send, receive and manage your faxes in Windows. Marking up faxes is simple using the on-screen text and graphic tools and, Optical Character Recognition (OCR) lets you convert your received faxes into editable text in your favourite word processing or spreadsheet software for printing or forwarding.

WIN039 Delrina WinFax PRO 4.0.....**£54⁹⁵**

WinComm PRO 1.1

WinComm PRO 1.1 makes accessing on-line services and transferring files easier than ever. WinComm PRO's friendly graphical interface, intuitive icons and fully customisable button bar and phonebook make all your on-line comms push-button simple. WinComm PRO also lets you compose messages easily with an integrated BackScroll Buffer and Scratch Pad text editor.

DEL017 Delrina WinComm PRO 1.1.....**£54⁹⁵**

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CONSUMABLES

Everything for your PC - Next-day!

FREE Windows '95 Diagnostics and Demo with every 10 Verbatim disks!

Get 11 formatted high quality disks for less than the price of 10!!

For a limited time get a free floppy with every box of 10, containing an exclusive demo of Windows'95 and free diagnostics! If you're still not sure of Windows' 95's capability to improve your productivity, then get this interactive demonstration absolutely free! The diagnostics included on this floppy will check the state of your hard drive and memory, as well as your processor, to see what extras or upgrades your PC will need to efficiently run Windows '95. This offer is limited - so hurry!

Each Verbatim diskette is individually certified 100% error free. All floppies are pre-formatted to save you time and 100% data accuracy. A typical Datalife diskette will perform an average of 30 million revolutions - almost ten times the industry standard. Verbatim operates a highly developed burnishing process to produce an optimum surface finish. This makes for perfect contact between your floppy drives' read head and the floppy, reducing wear and adding to data safety, no wonder Microsoft use Verbatim disks exclusively for their products!

Disks (Pack of 10) *Inc. Windows Disk	Capacity	Stock Code	Price
MF2 - HD IBM Format*	1.44Mb	VER001	£4
MF2 - HD Apple Format	1.44Mb	VER002	£5 ⁹⁵

£4⁴⁵



Verbatim

LASER PRINTER TONER CARTRIDGES

Verbatim Laser Toner cartridges

Compatible with all major laser printers, Verbatim's Laser Toner Cartridges are manufactured to stringent quality standards ensuring your printed output is of the best possible quality. These cartridges are designed to exceed the performance of the original - not just match it.

Each cartridge comes with a full 1 year warranty, and a free CD through Verbatim's unique Cartridge Return Program, helping to support the environment.



For use with:	Model No.	Stock Code	Price
HP LaserJet II, IID, III, IIID Apple LaserWriter IIF, IIG, IINT, IINTX, IISC Canon LBP-8 II/R/T, LBP-8 III/T, LBP-RX/SX/TX	6,000 pages EPS/95A	VER020	£43
HP LaserJet IIIsi, Mac IIIsi /PS QMS 1700, 1725, PS 1700, PS 1725 Canon LBP NX III si	8,000 pages EPN/91A	VER021	£65
HP LaserJet 4, 4M Apple LaserWriter Pro 600, Pro 630 Brother HL 81V, Canon LBP 81V	6,000 pages EPE/98A	VER022	£49
HP LaserJet IIP, IIPc, IIP/t, II plus, IIip, IIlps Apple Personal LaserWriter, LS, NT, NTR, SC Canon EP-L, LBP4, LBP4-LTE, LBP4-Plus, LBP-LX	3,500 pages EPL/75A	VER023	£44

OPTICAL DISKS

Quality Verbatim 3.5" and 5.25" optical disks

Disks	Bytes / sector	Stock Code	Price
5.25" Rewritable 1.3Gb	1024	VER003	£65
5.25" Rewritable 1.2Gb	512	VER004	£65
5.25" Rewritable 650Mb	1024	VER005	£48
5.25" Rewritable 600Mb	512	VER006	£48
3.5" Rewritable 230Mb	512	VER007	£28
3.5" Rewritable 128Mb	512	VER008	£28



With super-reliable optical technology head crashes are eliminated and data integrity is assured. With archival life in excess of 40 years, you can always rely upon Verbatim disks!

DATA CARTRIDGES

Verbatim data cartridges

These are high-quality, number one-selling QIC (quarter-inch compatibility) cartridges. The minimum storage capacities are listed below - but remember, actual storage capacity is drive dependent and is normally increased with compression.



Mini Data Cartridges	Capacity	Stock Code	Price
DC 2120	120/250Mb	VER011	£8
DC 2120 - formatted	120/250Mb	VER012	£10
DC 2120 XL - formatted	170/350Mb	VER013	£13
MC 3000	700Mb	VER014	£14
MC 3000	700Mb	VER015	£15
MC 3010 XL - formatted	700Mb	VER016	£20

Helical Scan technology offers users a vast range of capacities and a convenient storage method.

Helical Scan Cartridges	Capacity	Stock Code	Price
90m DAT DL90	2/4Gb	VER017	£8
80m DAT DL60	1.3Gb	VER018	£7

SCREEN FILTERS

Verbatim anti-glare filters

Improve productivity and reduce fatigue with anti-glare filters.

If you have sat in front of a computer screen for a few hours a day then you will have almost certainly experienced the effects of Computer Vision Syndrome (CVS). Maybe it's eyestrain or a feeling of excessive tiredness - at worst it could be double vision, headaches or temporary near sightedness. In each of these cases a Verbatim glass glare / radiation filter will significantly improve conditions.



With Verbatim filters you'll get maximum protection from CVS, eliminate screen flicker and get enhanced colour and contrast on your screen, making your display easier to work on. All Verbatim filters are made from glass, not mesh, and are fingerprint resistant. There are also universal fixing systems so no matter what type of VDU you have, installation is a breeze. Many of the large corporates in the UK are starting to use anti-glare filters in an attempt to reduce repetitive strain injuries (RSI).

Type of Filter	Size	Model	ELF/VLF	Anti static	Stock Code	Price
Hinged Filter	14-15"	95	95%	NO	VER009	£23 ⁹⁵
Hinged Filter	14-15"	99ASR (31)	95%	YES	VER010	£27 ⁹⁵

RECORDABLE CDS

CD-Recordable Verbatim Optical Disks

In addition to the mastering of CD prototypes, CD-R has become the perfect solution for error-free desktop archiving, because of its incredible cost-effectiveness. For example, for archiving data it only costs 1.25p/Mb, making it by far the cheapest and easiest backup medium.

Verbatim disks feature a 74 minute run length (640Mb) different record time and storage capacities.

VER019 74-min CD-R Disk.....**£8**

Verbatim

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Graphics

GRAPHICS & VIDEO CARDS

WESTERN DIGITAL **Paradise Cards**

The Ball 32 Graphics Accelerator Card - PCI or VESA

The Paradise Bali 32 is an affordable 32-bit, DRAM-based accelerated graphics board that provides high resolution and true colour capabilities for your PC. It is available in both PCI and VESA Local Bus configurations. It is designed for users of Windows, CAD applications and other graphical user interfaces. Features include: superior graphics acceleration, resolutions up to 1280 x 1024, supports up to 16.8million colours, refresh rate up to 75Hz, VESA Super VGA support with acceleration, power management, 1MB on-board expandable to 2MB, five-year warranty and manufacturer's technical support hotline, driver support for Windows 3.1, Windows NT, AutoCAD, OS/2, and other GUI-based applications, electronic bulletin board for fast driver updates.

The Barbados 64 Graphics Accelerator Card - PCI

The Paradise Barbados 64 PCI is an ultra-high performance, 64-bit accelerated graphics board. This VRAM-based board provides extended resolutions and true colour capabilities for your PC. For quick and easy installation, the Paradise Barbados 64 PCI comes with an advanced and simple to use Installation program, and a comprehensive set of utilities. Features include: 2MB on-board (VRAM), resolutions up to 1600 x 1200 Non-interlaced, supports up to 16.8million colours, advanced graphics acceleration using hardware cursor and BitBLT, refresh rates up to 75Hz, pixel bandwidth up to 240MB per second, support for Green PC Display Power Management systems, VESA Super VGA support with acceleration, fully compatible with PCI bus, VGA, EGA, CGA, HGC and MDA interlaced or non-interlaced monitors, five-year warranty and manufacturer's technical support hotline.

BAH001 Bahamas PCI 64-bit 1MB DRAM.....	£109	BAL001 Bali PCI 32-bit 1MB DRAM.....	£79
BAH003 Bahamas PCI 64-bit 2MB DRAM.....	£149	BAL002 Bali VESA 32-bit 1MB DRAM.....	£79
BAH002 Bahamas VLB 64-bit 1MB DRAM.....	£109	BAR001 Barbados PCI 64-bit 2MB VRAM.....	£229



NEW PRODUCT



Hauppauge TV Cards

The Hauppauge Prisma

The new WinTV Prisma is a 16-bit multimedia card with built-in TV and Teletext features. Watch real-time TV/video and Teletext in any resizable window while running other Windows applications. This product offers the lowest cost Multimedia video solution, allowing you to connect a video camera and grab images in 16.7m colours. You can also freeze and save images in BMP, TIFF and GIF formats and retouch them in Corel Draw, etc. Never buy another TV Guide again - just download the teletext pages to your PC and then print them out to your printer! You can also grab stocks and shares straight from Teletext and import them into your spreadsheet.

The Hauppauge Celebrity

The Hauppauge Celebrity supports VGA 1280 x 1024 and also features AVI clip capture 25fps in full screen mode. Supports colour keying, titling and special effects.

HAP002 Prisma	£149
HAP001 Celebrity	£269

LOWEST PRICED TV CARD

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GrafixStar from VideoLogic

A new generation of leading price/performance 64-bit Windows accelerators.

GrafixStar 300
Entry level, 64-bit S3 Trio64 graphics card. 85+ million Winmarks. Displays up to 1280x1024 resolution. Expandable with GrafixStar VMC multimedia options.

GRA014 GrafixStar 300.....	£99
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GrafixStar 500
Best all-round 64-bit, S3 Vision868 graphics card. 95+ million Winmarks. Displays up to 1280x1024 resolution. Expandable with GrafixStar VMC multimedia options. Built-in AVI with advanced DCI drivers. Free Xing software.

GRA015 GrafixStar 500.....	£129
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GRA014 GrafixStar 300 VLB/PCI 1MB.....	£99
GRA015 GrafixStar 500 VLB/PCI 1MB.....	£129
GRA016 GrafixStar 700 VLB/PCI 1MB.....	£249
GRA017 GrafixStar 300/500 1MB Upgrade.....	£49
GRA018 GrafixStar 300/500/700 VMC Controller.....	£39



GrafixStar 700
Fastest performance 64-bit, S3 Vision968 graphics card. 110+ million Winmarks. Displays up to 1600x1200 res. Expandable with GrafixStar VMC multimedia options. Built-in AVI with advanced DCI drivers. Free Xing software.

GRA016 GrafixStar 700.....	£249
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GRA019 GrafixStar 700 2MB Upgrade & VMC Controller.....	£149
MPF001 MPEG Player.....	£229
CAP001 Captivator Pro.....	£179
CAP002 Captivator Pro TV.....	£229
928003 928 Movie 1MB Upgrade.....	£75

Miro Video 12 PD

An Incredibly low-cost graphics accelerator and AVI movie board!

The Miro Video 12 PD is a unique graphics card and the only one of its kind on the market today. With full-screen AVI and MPEG playback, it can display up to 32-bit resolution and 16.7 million colours

making it the ideal graphics card for CD-ROM users. It comes bundled with U-Lead Video Studio software and is available as a 1MB or 2MB card. This is a plug-and-play card - there are no jumpers or dip switches to set - and it comes with a two year warranty. Compatible with VL and PCI buses, it's the only all-in-one graphics and multimedia accelerator.

MIR002 Miro Video 12 PD 1MB.....	£115
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MIR007 Miro Video 12 PD 2MB.....	£165
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VideoLogic

928D04 928Movie ISA.....	£195
928D01 928Movie VLB.....	£195
928B02 928Movie and sound card ISA.....	£245
928B09 928Movie and sound card VLB.....	£245

Diamond

DIA003 Diamond Stealth 24 ISA.....	£127
DIA004 Diamond Stealth Pro 1MB ISA.....	£196
DIA005 Diamond Stealth Pro 2MB ISA.....	£269
DIA006 Diamond Stealth 32 2MB ISA.....	£169

Orchid

ORC008 Orchid Fahrenheit 1MB.....	£99
ORC009 Orchid Fahrenheit VA 1MB.....	£129
ORC010 Orchid Fahrenheit VLB 1MB.....	£122
ORC011 Orchid Fahrenheit VLB 2MB.....	£156
ORC012 Orchid Fahrenheit 64 VLB 1MB.....	£139
ORC014 Orchid Kelvin 64 VLB 1MB.....	£109
ORC015 Orchid Kelvin 64 VLB 2MB.....	£149
ORC026 Orchid Kelvin 64 ISA 1MB.....	£119

Fast Movie

FAS011 Fast Movie Machine Pro.....	£289
FAS012 Fast MPEG Bundle.....	£289

STB

STB010 STB Power Graphics PCI-64 2MB.....	£149
STB011 STB Power Graphics VLB-64 2MB.....	£149
STB012 STB Velocity PCI-64V MPEG 2MB.....	£245
STB013 STB Velocity VLB-64V MPEG 2MB.....	£245
STB014 STB Velocity PCI-64V MPEG 4MB.....	£392
STB015 STB Velocity VLB-64V MPEG 4MB.....	£392

Matrox

MAT010 Matrox Impression Plus PCI 2MB.....	£279
MAT011 Matrox Impression Plus ISA 2MB.....	£299

Miro

MIR005 Miro Video DC1 + Video Studio.....	£429
MIR004 Miro Video DC1 + Adobe Premiere.....	£569

Hercules

HER010 Graphite Terminator VLB-64 2MB.....	£265
HER011 Graphite Terminator PCI-64 2MB.....	£265
HER012 Graphite Terminator VLB-64 4MB.....	£379
HER013 Graphite Terminator PCI-64 4MB.....	£379

Miro Video 20 TD Live

Integrated graphics accelerator, video overlay and TV reception - all on one board!

Watch any TV or cable channel on your PC and then capture, store and edit any TV clip or edit video from any external sources. Play back AVI movies or TV images in full-screen size and at full speed. The 20 TD Live comes with 2MB of DRAM and is supplied with U-Lead video studio - the leading video editing software. This card is also one of the fastest graphics accelerators available - it's the only graphics card that you'll need. There are no jumpers or dip switches to set and you get a two-year warranty. It's compatible with the VL and PCI buses and delivers 16.7m true colours.



MIR003 Video 20 TD Live.....	£299
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NEW OFFER

GRAPHICS INPUT DEVICES

Wacom Professional Graphics Tablets

Professional graphics tablets for designers, illustrators and Graphic Artists.

The Wacom range of graphics tablets are designed to enhance the creativity of graphics professionals, artists and designers. Wacom electro-magnetic "give-and-take system" is the unique passive technology employed in all Wacom graphics tablets, eliminating the need for magnets and batteries and allowing for a cordless pen and cursor (puck). It is the realisation of an input device, comfortable to use and sensitive to hand pressure, which can tackle every challenge in painting and drawing.

Just as a conventional pen needs paper, Ultra-Pen needs a tablet - tablets are available in a 6" x 8" version, through to a 35" x 47". The Ultra-Pen is extremely rugged and has a lifetime of at least ten million cycles.

The UC-420 is a cordless and battery-free four-button Cursor that's precise, versatile and ergonomic. It has a cross-hair thickness of 0.1mm and is perfect for designing, constructing and manipulating graphics. The four buttons are user-programmable, it has a switch activation pressure of 150g and switch reliability of ten million operations.

All Tablets come complete with accessories, cables, handbook and software (available in several languages), plus you get are covered by a two-year warranty.

WAC001 Wacom ArtPad.....	£149⁹⁵
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WAC004 Wacom ArtPad + Dabblor.....	£179⁹⁵
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WAC003 Wacom ArtPad + Painter 3.0.....	£389⁹⁵
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WACOM

WAC002 Wacom A5 Tablet.....	£349
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WAC005 Wacom A5 Tablet + Painter 3.....	£499
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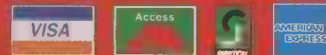
WAC006 Wacom A4 Tablet.....	£469
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WAC007 Wacom A3 Tablet with Menu Overlay.....	£599
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WAC008 Wacom A3 Tablet with Electrostatic.....	£689
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Tablets up to 35" x 47"!



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Graphics

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GRAPHICS

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Visio Version 3

If you can move a mouse, you can draw with Visio. Just drag and connect pre-drawn stencils - Visio does the rest.

Visio is the drag and drop drawing tool for people who can't draw. The 22 job-specific stencils and 750 SmartShapes™ that come with Visio allow you to create a multitude of diagram types, from flowcharts and organisation charts to electrical diagrams, maps and office floor plans.

In addition to the SmartShapes™ included in Visio, you can select one or more of 15 Add-On SmartShape products for your own particular diagramming tasks or projects. Visio SmartShapes™ are more than static clip art or symbol libraries, because they anticipate how you'll use them and then behave in a useful way. SmartShapes™ resize without distorting, connecting lines stay glued and reroute automatically, and text goes where it should in a format that makes sense. There are more than 3,000 shapes to choose from. Simply add the shapes you need, when you need them!



£87⁹⁵

vis033 Visio 3

Extra Visio Shapes & Ideas

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More than 260 shapes for flowcharting
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Design and model detailed data networks
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- Mechanical Engineering **£39**
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- Petroleum Engineering **£39**
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- Insurance/Law **£39**
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- Home Planning **£39**
Plan your dream home or your next remodel
- Kids **£39**
A wealth of fun illustrations & shapes for kids
- Landscape Planning **£39**
Landscape your garden & create planting charts
- Visio Express for SmartSuite **£39**
Adds Visio to SmartSuite Control centre
- Visio Express for MS Office **£39**
Adds Visio to Microsoft Office Control Panel

PC Clip Art Library

The ultimate colour clipart collection.

Introducing PC Paintbrush Clip Art Library - the ultimate collection of 12000 hand drawn colour clipart masterpieces. These stunning royalty-free images are ready-to-use in any Windows application. PowerAlbum is bundled absolutely free to help you organise and work with any existing clipart/images you may already have.

- sof018 ClipArt Library (Floppy - 3003 images) **£14⁹⁹**
- cl1007 ClipArt Library (CD - 12000 images) **£24⁹⁹**



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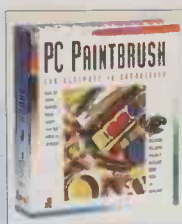
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PC Paintbrush

The popular drawing and painting package with simulation of natural painting techniques.

A fully featured drawing program that lets you export your artwork to most popular Windows programs. It also allows users to simulate natural painting techniques without being a professional artist, and lets users become instantly productive via its easy-to-use interface.

PAI002 PC Paintbrush **£26⁹⁵**



Designer Powerpack

Includes Picture Publisher 5.0 and Designer V4.1TE.

This powerful value-added pack includes 15,000 clip art, 300 stock photos and 250 fonts, as well as the best publishing and design packages on the market. Now MicroGrafix offer the ultimate package for graphics power! Combining the precision illustration capability of Designer with the "sky's the limit" image editing power of Picture Publisher, you can create anything you can imagine! Then you can enhance it to a level of realism that few graphics packages can match.

DES012 Designer Power Pack **£168⁷⁰**



Ultimate Image Bundle

Only we could offer you so many great products for less than the price of one!

Includes MasterClips 3000 (3000 clips, RRP £79), Corel ArtShow 3 (1000s of images, RRP £39), KeyFonts Plus (1250 fonts, RRP £42) and SoftKey Photos (2100 photos, RRP £39). In promotional packaging.



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Great graphics effects from Ray Dream!

Ray Dream Designer 3.0

Create amazing graphic effects!

Imagine Instant mastery over light, with razor-sharp reflections, coloured gels, surfaces from polished glass to hammered metals, imagine creating scenes in 3D - placing objects, setting light sources, trying adventurous camera angles - and much more. Ray Dream Designer puts all these effects at your fingertips - without specialised hardware or software. Sketch with the familiar drawing tools or let the Modelling Wizards assist with the creation of your 3D object, or start with 3D clip art from our selection.

RAY001 Ray Dream Designer **£189⁹⁵**

addDepth

Add stunning 3D effects to your graphics!

The Ideal way to let your ideas take off! Whether you produce memos, presentations, illustrations or reports, addDepth lets you add the powerful impact of three-dimensional depth and perspective to your type and lineart. Draw directly in addDepth or Import graphics from other Windows packages. Just start typing with any font and you'll soon be discovering unique 3D aspects.

ADD003 addDepth **£89⁹⁵**

JAG II

Removes jagged edges from your graphics and text!

Low resolution bitmap images can have annoying and unattractive jagged edges - with JAG II you can remove these in an instant! JAG II sets the standard for smoothing colour images for print or display. JAG II's new resolution-boosting technology also smooths the "jaggies" in black and white or colour artwork. JAG II can actually boost the resolution from 72dpi to 300dpi!

JAG001 JAG II **£89⁹⁵**

KAI Power Tools

Award-winning image manipulation software!

Explore new worlds with this awesome digital imaging combo! The five star Kai Power Tools delivers the creative and productive tools that you need to produce graphics or images with flair. Watch your creativity sky-rocket with fantastic effects and filters that bring your work to life.

KAJ001 KAI Power Tools **£109⁹⁵**

KPT Convolver

The ultimate effects palette for imaging professionals!

Instant access to blurs, sharpens, embosses, tinting, colour, contrast, unsharp masking, and Gaussian blurring with a single, 24-bit graphical interface unlike any other. Mix and match with breath-taking speeds to bring your Imported graphics to life!

CON002 KPT Convolver **£109⁹⁵**

Serif Draw Plus 2.0

The easiest to use drawing package available!

DrawPlus 2.0 by Serif is an easy to use drawing package, which can be used to create original artwork and edit existing clipart. For ease of use there are two user levels - Intro and Designer - a Hint Line, Tool Hints, and QuickHelp. Serif DrawPlus 2.0 also has QuickShapes for instant creativity and total flexibility to colour, stretch, slant, rotate, mask or envelope any object - including text! It's an excellent add-on to Serif's PagePlus, however, it has been designed to be equally effective as a standalone application, and having OLE support, it works with any Windows application.

Key features:

- QuickShapes lets you instantly draw starbursts, rectangles, circles, polygons, arrow heads etc.
- Convert text into curves - complete customisation of text.
- Masks let you combine objects to create complex graphic fills using one object as a background to another.
- Envelopes allow you to distort objects to "fill" pre-defined shapes.
- Alignment tools including rulers, guides, alignment grid and snapping to create precise drawings quickly.

DRA007 Serif Draw Plus V2.0 **£49⁹⁵**

Paintshop Pro V3

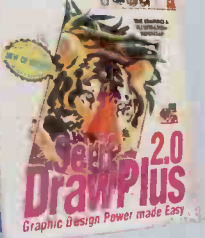
Includes Picture Publisher 5.0 and Designer V4.1TE.

Fast and fully-featured photo-editing plus graphics format conversion in one program! Tools include clone brush, crayon, chalk and user-definable brushes. Special effects and filters include Contrast, Emboss, Wind, Perspective, plus support for Adobe plug-ins. Paintshop Pro offers the features of packages many times its price!

Supports TWAIN scanners, and includes free browser and sample photos.

PAI003 Paintshop Pro V3.0 **£49⁹⁵**

Get all 3 for only **£299**

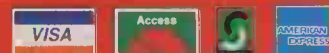


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SOFTWARE WAREHOUSE



GRAPHICS

Corel Gallery on CD

Add flair to your word processing and presentations with Corel Gallery clip art libraries.

Corel gallery is the easy to use visual clip-art manager on CD-ROM that allows Windows users to drag-and-drop images into any OLE 2.0-enabled application or export images into a number of industry standard formats. Version 1 includes over 10,000 professionally drawn clip art images (over 6000 in colour) with a full colour reference manual. Version 2 includes 15,000 clipart images (10,000 from Gallery 1), and also it includes all of the components required to create stunning multimedia presentations and documents: a state of the art visual multimedia file manager, 500 royalty free photos, 500 fonts, 75 sound clips, and 10 video clips.



Corel Gallery for Windows will work with all the leading word processing, presentation and DTP packages like Ami Pro, WordPerfect, Word, PageMaker, Microsoft Publisher, PagePlus, PowerPoint, Freelance and Harvard Graphics

COR017	Corel Gallery V.1	£25 ⁹⁵
COR056	Corel Gallery V.2	£46 ⁹⁵

Simply 3D

A complete set of multimedia 3D graphics tools.

Simply 3D enhances Corel Draw! and other 2D draw and paint applications so that you can quickly and easily add 3D effects to your work. Included is a complete set of multimedia 3D graphics tools, 70 seamless textures which allow you to render your objects as though they were brick, wood metal or glass etc. Use these scalable textures to create real-world surfaces for your objects or design your own. Simply 3D also includes 100 3D objects - choose from interiors, cars, furniture, silverware and more! All objects are ready to render and include in any scene. 3 animation players are also included as well as a step-by-step tutorial.



SIM008	Simply 3D	£49 ⁵⁰
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Visual Reality

VISUAL SOFTWARE

The professional 3D graphics software.

Visual Reality includes 'Renderize Live', an award-winning rendering and camera animation tool. Create 3 dimensional wire frame models in an easy and intuitive environment. Also includes 'Visual Image', a powerful object-based image editing and processing tool, over 500 3D clip art images and the ability to playback animations in FLI, FLC or AVI formats.



VIS037	Visual Reality	£149 ⁵⁰
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CorelDraw! 3

The ideal entry-level graphics package.

This award winning software offers excellent type manipulation and drawing features in addition to CorelChart, Corel PhotoPaint and CorelSHOW all in one value-packed box. Also includes over 14,000 clip-art images / symbols, and 250 fonts.



COR038	CorelDRAW! 3	£45
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CorelDraw! 4

The ideal Desktop Publishing Tool!

Features comprehensive page layout, type editing and illustration tools as well as CorelMOVE animation software. Also includes 18,000 clip art images and symbols, colour separation, OCR software, Corel PhotoPaint, CorelSHOW, CorelChart and hundreds of other features.

COR012	CorelDRAW! 4	£86
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CorelDraw! 5

Includes the all-new Corel VENTURA 5.

Includes all the packages available in CorelDraw! V.4 but with 825 fonts, 22,000 clip art images, advanced 3D dimensioning, 100 royalty-free photos on CD-ROM, and Internal PostScript interpreter, CorelTRACE, Corel M/OSAIC 5, ARES Font Minder, Adobe Acrobat Reader, CorelQUERY, CorelCAPTURE and Zandar TagWrite. Unbeatable value for money!

COR031	CorelDRAW! 5 (3 to 5)	£199
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CAL002	WIN Calendar Creator	£29
LAB001	DOS Labels Unlimited	£29
FOR004	DOS Form Tool Gold	£29
PER003	WIN Form Flow Designer	£119
PER004	WIN Form Flow Filler	£75
PER005	WIN Form Flow Filler 10Pk	£499
HAR016	WIN Harvard Chart XL	£89
ADO008	WIN Adobe Illustrator	£389
ALD004	WIN Aldus FreeHand	£190
ANI001	WIN Animation Works	£88
ART001	WIN Arts & Letters Apprentice	£49
COR002	WIN CorelDraw 3	£87
COR038	CorelDraw 3	£45
COR003	WIN CorelDraw 4	£119
COR012	CorelDraw 4	£86
COR018	WIN CorelDraw 5	£399
COR030	CorelDraw 5	£349
COR019	WIN CorelDraw 3 to 5 Upgrade	£269
COR019	CorelDraw 3 to 5 Upgrade	£199
COR032	WIN CorelDraw 4 to 5 Upgrade	£159
COR033	CorelDraw 4 to 5 Upgrade	£129
125001	WIN 1250 Fonts on CD	£19
ART001	WIN Arts & Letters Apprentice	£49
CLU018	WIN Click Art Studio All 5 Titles	£39
CLU016	WIN Click Art Cartoons Parties & Events	£14
CLU017	WIN Click Art Cartoons On The Job	£14
HAR008	WIN Harvard Clip Art Collection CD	£29
HAR009	WIN Harvard Clip Art Cartoons	£19
HAR017	WIN Harvard Clip Art Christmas	£10
HAR010	WIN Harvard Clip Art Business	£19
LOT000	WIN Lotus SmartPics for Freelance	£79
MAS001	WIN MasterClips 3.5"	£119
MAS001	MasterClips CD	£49
MON003	WIN 50 PostScript MonoType Fonts	£14
ADO006	WIN Adobe Photoshop	£469
COR041	Corel ArtShow v3 CD & Book	£24
COR041	Corel ArtShow v5 CD & Book	£24
MIC023	WIN Micrographix PhotoMagic	£69
MIT005	Kodak Photo CD	£15

Graphics: Presentations

AST001	WIN Astound	£85
ALP003	WIN Alpha Bravo Presentations	£45
ASY001	WIN Asymedia	£93
HAR013	WIN Harvard Graphics v3 CU	£129
HAR000	WIN Harvard Presenters' Pack	£189
HAR012	WIN Harvard Spotlight	£49
LOT034	WIN Lotus Freelance U/G	£95
MIC155	WIN MS PowerPoint MLP	£199
MIC156	WIN MS PowerPoint U/G CCP	£90

trueSpace - The reality of affordable 3D!

Caligari trueSpace for Windows is an award-winning, revolutionary package that integrates professional 3D modelling, rendering and broadcast quality animation within an easy-to-use, "natural" interface. With trueSpace you can produce photo-realistic images as used on the front cover of Time magazine, or video animations, professional enough for the evening news. Shape objects in clay and use real-time preview to direct your 3D characters like actors on a film set.

Until now, 3D modelling, rendering and animation was really 2D, enhanced with orthogonal views. Unlike other programs using direct manipulation, trueSpace actually mirrors the real world. Working in full 3D perspective you can manipulate 3D objects directly and interactively in real time.

- Model, Render and Animate!**
3D design couldn't be easier, painting and drawing expand into 3D modelling. Draw 3D, paint on 3D, shape objects like clay and use real-time preview to direct your 3D characters like actors on a film set. Render final slides or video animation at workstation speed with the touch of a button.
- Seamless Integration**
Most 3D formats such as DWG, 3D Studio, Wavefront, Lightwave, Image and others are supported. Import standard image formats like BMP, TGA or TIF for texture and bump mapping. Output BMP, TGA or AVI/Video for Windows with alpha channel.
- Welcome to the 3rd Dimension**
trueSpace is the first PC-based animation package that makes adding materials to your objects enjoyable, rather than something to be dreaded! In other programs, painting an object with colours and textures is a stab-in-the-dark process. With trueSpace simply grab a paintbrush, touch the areas you want to colour and watch as they are instantly rendered with the combination of colour, bump and texture mapping you selected.
- Simply The Best!**
Whether you are a Graphic Artist, Multimedia Designer, Video Professional or simply want to expand into 3D, Caligari trueSpace will break barriers to free your expression without breaking your budget. trueSpace is the only 3D graphics package with a natural user interface, fully integrated modelling, broadcast-quality animation and photorealistic rendering that also won't blow a hole in your pocket!

OUR PRICE £149⁹⁵



trueSpace - The award-winning 3D software!

"Excellent, a blueprint for other renderers to follow"
PC Pro, Recommended Award, December 1994

"The most impressive piece of software we have seen in a long, long time. Buy it, use it, enjoy it." PC Format

"This is a truly innovative and well-designed piece of software, its speed and impressive array of features should appeal to professional users and its excellent interface and ease of use should attract novices" PC User

"trueSpace's friendly Interface goes a long way towards realising sophisticated yet useable PC-based graphics" PC Magazine



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Everything for your PC - Next-day!

Compton's Encyclopedia Windows CD

Compton's Interactive Encyclopedia is the ideal reference tool for anyone, from the age of 8 to adult!

From the wisdom of the ages to the latest discoveries, the keys to unlimited knowledge are now as close as your personal computer. Turn it on and watch as the look of wonder in a child's eyes become a spark of comprehension. See a teenager discover the fascination of science, and revive your thirst for knowledge. Complex ideas are made simple with dynamic text, illustrations, even full-motion video and animations.

You'll also explore the infinite possibilities of this 1995 edition with two new exciting features. Journey on a fascinating guided tour through the encyclopedia with TV star Patrick Stewart. Then create your own multimedia presentations with the exclusive Editing Room - a built-in production studio that makes it easy to combine articles, videos, pictures, sounds, even your own voice, and cast them in your own original multimedia shows.

Features include: over 100 full-motion videos; 3D animations and presentations; the complete content of Compton's 26 volume encyclopedia; over 35,000 articles, 7,000 photographs and illustrations and over 14 hours of sound; fast, easy printing and copying of all pictures and articles; up-to-date Interactive world atlas and on-line dictionary.



£46⁹⁵

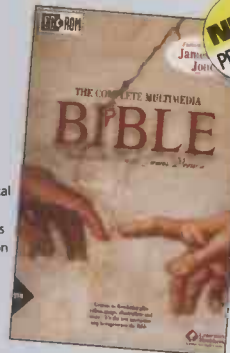
COM009 Compton's Interactive Encyclopedia for Windows.....

The Complete Multimedia Bible Windows CD

A whole new way to experience the Bible, based on the King James Version, ideal for religious education students and the whole family.

The Bible comes to life on this interactive CD-ROM filled with biblical children from the age of twelve onwards, and for refreshing the memory of adults.

The Bible comes to life on this interactive CD-ROM filled with biblical maps and inspirational video footage, plus characters, stories, and parables. Hear your favourite passage and the Ten Commandments read by actor James Earl Jones. This multimedia format takes you on an enlightened spiritual path as you read the bible for inspiration, pleasure or study. Imagine having the complete King James Bible fully cross-referenced so that you can search by topic, idea, definition, or history from Genesis to Revelation. Awaken to renewed spiritual health as you interact with the Bible in a whole new way. Features include; Maps, guides, characters, stories and much more.



NEW PRODUCT

£23⁹⁵

COM013 Compton's Complete Multimedia Bible for Windows.....

Explorapedia™ Windows CD

Microsoft's new interactive nature encyclopedia - the ultimate reference library for children.

Children will discover through animation, sound, and interactive learning, a wealth of information about the World of Nature. The Exploratron™ knowledge discovery gadget is your child's window to knowledge, encouraging continued discovery of each topic and including more than 20 engaging InterActivities that help to reinforce learning. It's easy to use and full of facts and fun.

This is a special UK edition with all the content narrated by children so early readers can fully enjoy and understand it.

It covers more than 200 topics with more than 50 videos, over an hour of intriguing animation, original songs, more than 400 sounds and hundreds of colour photographs and illustrations.



NEW PRODUCT

£23⁹⁵

MIC261 Explorapedia World of Nature.....

Wine Guide Windows CD

A comprehensive guide to wines, hosted by Food & Drink's Oz Clarke.

Microsoft Wine Guide (UK edition) is a guide to wines, the wine-making process and the vineyards of the world. It's hosted by Oz Clarke, who is renowned worldwide for his virtually infallible palate and his unstuffy wine criticism. Microsoft Wine Guide provides nearly 1,800 full encyclopedic entries on wines, wine regions and producers, plus tasting notes on nearly 6,000 individual wines.

The intuitive Wine Selector recommends the perfect wine based on criteria such as meal choice, star rating, region, grape variety and more. Eighteen specially-commissioned videos filled with Oz's personal tips help you discover nuances in tasting and evaluating wines. There are nearly 60 interactive, scrolling maps in the Atlas that takes you around the world's great wine regions.



NEW PRODUCT

£32⁹⁵

MIC262 Wine Guide.....

Microsoft Dogs Windows CD

Important information on 250 different breeds from around the world.

Microsoft Dogs is ideal for dog owners and dog lovers. It features more than 700 detailed multimedia articles, so you'll have everything you need to choose, train, and care for a new dog. Explore hands-on articles that let you experience the difference between your dog's keen hearing and your own, or see a dog's eye view of the world.

It features beautiful photos, narrated videos, breed characteristics, origins and habits for 250 of the world's most popular breeds of dogs. Choose from a dozen narrated guided tours and learn about the myths, legends and history of your pet's wild ancestors, from North American wolves and African hunting dogs to the Australian Dingo.



NEW PRODUCT

£32⁹⁵

MIC263 Microsoft Dogs.....

MS Encarta 1995

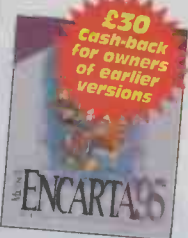
MS Encarta is based on the content of a 28 volume encyclopedia.

MS Encarta gives you access to a vast amount of knowledge for you and your family. It includes over nine million words,

8000 photographs, over 15,000 multimedia elements with over 100 minutes of video and animation, 26,000 articles and 300,000 links. Stunning animations, videos, maps, charts, sounds and pictures bring information to life.

New forty-country fact boxes covering climate, geography, economy, religion, musical styles and more.

If you currently own MS Encarta 1994, when purchasing this 1995 version simply send back proof of ownership to Microsoft and they will send, by return, a cheque for £30!



£30 cash-back for owners of earlier versions

£54⁹⁵

MIC115 Microsoft Encarta CD.....

500 Nations Windows CD

Microsoft's new interactive exploration of the North American Indian experience.

Microsoft's 500 Nations explores in beautiful detail the untold story of the North American Indian experience. Join host Kevin Costner on an epic journey, and discover the people, places and cultures of Indian nations from the Aztec empire to wounded Knee. You'll see ancient cities come to life before your eyes. You can experience 3D video fly-through - including an exciting look at the sophisticated Mayan city of Palenque.

500 Nations lets you learn at your own pace with over 2,000 vivid images of North American people, dozens of animated sequences (including many recreations of ancient Indian cities), listen to authentic music, songs and stories from dozens of tribes, experience Indian customs and cultures through their art and architecture.



NEW PRODUCT

£32⁹⁵

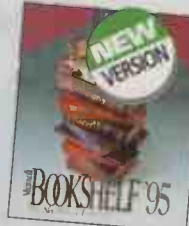
MIC265 500 Nations.....

Bookshelf '95 Windows CD

A world of reference at your fingertips.

Microsoft Bookshelf '95 is a multimedia reference library that puts a world of reference at your fingertips. It does more than simply making getting the facts easier, Bookshelf enhances understanding by bringing information to life through sound, animation and video.

You can hear the national anthem of a country that you're studying, see a caterpillar metamorphose into a butterfly, or watch land masses move and tear along a fault line. With 500 new images, 150 new audio clips, 40 new video clips, more than 80,000 spoken words, many colourful maps from around the world, more than 230 flags, the latest editions of Roget's Thesaurus, World Almanac of Facts, Concise Columbia Encyclopedia, Columbia Dictionary of Quotations, The People's Chronology, Hammond Intermediate World Atlas and The American Heritage Dictionary, it's a true wealth of knowledge.



NEW VERSION

£58⁹⁵

MIC264 Bookshelf '95.....

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Bodyworks 4.0 on CD

Version 4 now includes full multimedia features.

This new version includes actual video footage of various operations and includes a three-minute movie of actual childbirth and more than 50,000 new text entries. BodyWorks 4 is exclusive on CD-ROM and its text content is now in excess of 300,000 words - and, in addition, there is now a glossary of 1,000 entries. Two new major sections include nursing and diseases. Users can now make use of an on-line medical database for storing all of their medical records, and a phonetic SmartSearch which can direct you to any part of the body.



NEW VERSION

£32⁹⁵

BOD009 BodyWorks 4.0 CD.....

History of the World

Travel through 12 different time periods to uncover fascinating facts and stories.

Watch a medieval archer loading and firing his longbow, hear the passion in the actual spoken words of Martin Luther King, and share in the joy of German crowds as they tear down the Berlin Wall. The Eyewitness History of the World allows you to investigate historical stories, facts and artefacts from around the world with a simple mouse click.



NEW OFFER

£49⁹⁵

DOR007 History of World CD.....

Nature Encyclopedia

The fascinating stories behind over 250 species of plants and animals.

Watch the behaviour of animals in their natural habitat, hear bird calls and understand complex environmental systems as microscopic life, the effects of climate and the prehistoric world. Features over 50 stunning video sequences, 60 original animations, 700 photos and illustrations, and two hours of exclusive sound clips.



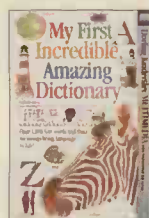
£49⁹⁵

DOR009 Encyclopedia of Nature.....

Amazing, Incredible Dictionary

A breakthrough in early learning!

Introduces children to over 20,000 words and their meanings through spoken words, clear text, pictures, sounds and animation. This invaluable reference tool is perfect for children from 4 to 7 years of age - including those who cannot yet read or have never used a computer.



DOR002 Incred. Dictionary CD. £29⁹⁵

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Ready Set Grow

Parenting made easy(er)!

Ready Set Grow is a fun, interactive and informative guide to pregnancy, childbirth and the first five years of parenthood. Created by a highly successful physician who is also a veteran mother of four, Ready Set Grow is complete with detailed illustrations, animation, music, sound effects and knowledgeable text. It covers all development aspects of your child's early years, including age-appropriate toys and activities, and parents concerns for each of nine different development stages. Also includes information on topics such as Playing it Safe in Pregnancy, Pre and Post Natal Nutrition and Fitness, Safety and Travel Resources, CPR instructions and a glossary. Detailed illustrations show your unborn baby's growth monthly and how it's development is proceeding. Ready Set Grow will even predict your due date! Store vital dates, events and information in the address and information book, stores and maintains emergency numbers, babysitter details and much more. This is the ultimate "handbook" for any couple expecting, or who have young children.



NEW PRODUCT

RS5010 Ready Set Grow **£28⁹⁵**

Eyewitness Science Encyclopedia

A highly interactive tour of the sciences for children aged 10 and up.

More than 1700 entries, 66 animations and 1000 screens and pop-ups are organised into 5 major categories: Chemistry, Maths, Physics, Life sciences and a who's who of science.



See left page for more DK titles!

DOR005 Eyewitness Science Encyclopedia CD **£49⁹⁵**

Morph Movies

Combines sophisticated software technology with ease of use and entertainment.

Morph Movies is a multi-faceted program that teaches the user to create their own morphs and it contains a still image library, that the user can select from, to morph. You can also import your own pictures, giving you endless possibilities for morphed images. It also includes a collection of fantastic morphs in movie formats, edited together with sound and music tools to allow you to use your morphs as screen savers. Also included are 100 photographs for use in your own morphs.



RMG010 Morph Movies **£36⁹⁵**

Family Tree Maker

Trace your family tree history.

Family Tree Maker is quick and easy to use. Just enter information about parents, children and marriages to create a great-looking family tree in just minutes. Record birth dates, occupation, medical history and any other information that you wish to print. You can save up to 15 pages per person and also automatically create ancestor, descendant and photo trees, or view your tree in any one of the many different styles.



FAM001 Family Tree Maker **£39⁹⁵**

Multimedia Cats or Dogs

Two great CDs that offer professional video and photography together with ingenious animations and sound, bringing animals to life.

These two CDs will tell you all you need to know about man's favourite two pets. Watch stunning video footage and scan the database to learn more about your favourite breeds and the lifestyle of these animals. The interactive CatScan or DogFetch helps you find the ideal pet for you!



Get both for just £49!

RMG011 Multimedia Cats **£28⁹⁵**

RMG012 Multimedia Dogs **£28⁹⁵**

Ten Top-Selling CD-ROMs for £29!

This selected pack represents the very best CD-ROM products chosen from literally hundreds of submissions, many of which are currently selling as individual packages in retail stores!

- Reunion - The greatest voyage of all has begun. (Ages 14+)
- Dune II - Inspired by the best-selling Science Fiction of all time. (For ages 9+)
- Fighter Wing - The ultimate modern combat jet flight experience. (Ages 16+)
- Wayne's World - Party time... Excellent!!! No-hurl guaranteed! (10+)
- Singalong Kids' Classics - Sing children's musical theatre. (Ages 3-9)
- The Internet For Everybody - An easy to understand 2-hour video. (12+)
- Tom Landry Strategy Football - All the excitement of Pro American Football. (12+)
- Grandmaster Chess - Unmatched levels, graphics, sound & 3D perspective. (11+)
- Lemmings & Oh No! More Lemmings - The award-winning, puzzle. (Ages 8+)

NEW OFFER

PUB010 Publishers' Pick 10 CDs **£29⁰⁰**

A massive 25,000 items in stock across 3000 different product lines. Nobody delivers faster!

These CDs are the ideal learning tools for children aged 2-10 - both educational and great fun!

Thinkin' Things

Helps to develop thinking skills for children aged 4-8.

Good thinkers learn quickly, adapt to change easily and can accomplish amazing things! Thinkin' Things offers six thought-provoking activities to help with creativity, memory and problem solving. Parents Magazine commented: "Entertainment, education and innovation rolled into one. Five stars."



THI005 Thinkin' Things **£24⁹⁵**

Bailey's Book House

Five fun-filled activities that encourage reading skills for children aged 2-6.

Encourage your child's reading skills with rhyming words, stories and letter sounds. What PC? commented: "An excellent product, put together by educationalists who clearly know what they're doing."



BAI001 Bailey's Book House **£24⁹⁵**

Millie's Math House

The fundamentals of numbers for children aged 2-6.

Makes learning the fundamentals of numbers, counting, size, shapes and patterns great fun for your children. CD-ROM Now commented: "Millie's Math House is a must-buy for young children, an excellent introduction to Maths." And it scored nine out of ten.

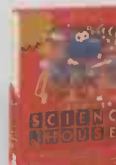


MIL001 Millie's Math House **£24⁹⁵**

Sammy's Science House

An exciting tool to the wonders of science for children aged 2-10.

Including plants, animals, seasons, weather, construction and problem solving. The Mac commented: "Brilliant educational tool, children will love the music, animation and responsive interactivity. Top marks."



SAM003 Sammy's Science House **£24⁹⁵**

Kid Desk

An essential tool for any parent who lets their children use their home computer.

With this utility parents can limit the applications that their children can use, protecting their valuable data and allowing children to use the computer freely to gain self-confidence. PC Review commented: "If you're looking for a safe, well-presented way to let your children play with your PC unsupervised, this is it."



KID005 Kid Desk **£23⁹⁵**

Leisure & Games

CHE006	WIN	Chessmaster 4000	£22
CHE004	CD	Chessmaster	£19
DAY002	CD	Day of The Tentacle	£29
DEE001	CD	Deep Voyage	£19
D00003	CD	Doom v2	£34
DUN004	CD	Dune & 7th Guest	£29
ELI001	CD	Elite 2	£24
FAL002	CD	Falcon Gold	£29
FIF002	CD	FIFA International Soccer	£29
GUN001	DOS	Gunship 2000	£24
HAN001	WIN	Hanna Barbera Animation Works	£29
INT009	CD	International Tennis Open	£29
LOR001	CD	Lord Of The Rings	£27
MIC102	WIN	M5 Arcade	£15
MIC047	WIN	M5 Entertainment PK Vol 1, 2, 3, 4	£15
MIC180	WIN	M5 Entertainment Pack Best	£15
MIC270	DOS	M5 Flight Simulator v5.1 3.5"	£24
MIC271	CD	M5 Flight Simulator v5.1	£24
MIC142	DOS	M5 F5im New York or Paris	£15
MIC169	WIN	M5 Golf	£24
MIC109	CD	M5 Golf	£32
MIC171	WIN	M5 Golf Course Banff	£14
MY5001	CD	Myst	£39
PGA002	CD	PGA Golf 486	£29
PRIO03	CD	Privateer + SAP	£29
RET001	CD	Return To Zork	£29
MIND001	WIN	Sensible Soccer	£22
SIM005	WIN	Sim City 2000	£24
SIM007	CD	Sim City Enhanced	£29
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CHE007	WIN	Chemistry Works	£34
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FUN002	DOS	Fun School 4 Ages 5-7 or 7-11	£15
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FUN012	DOS	Fun School 5 In Space 6-7	£20
FUN013	DOS	Fun School 5 In Time 8-11	£20
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Successfully organise every step of your job search with PFS CV and Job Search

Start tackling those job interviews with confidence. Use this great Windows application to create impressive CVs and cover letters that stand out from the pack.

Includes 10 professional CV templates and 70 pre-set layouts. Also included is a full WYSIWYG word processor and 12 sample cover letters. A built-in database and mail-merge allows you to quickly distribute your professional CV.



PFS009 PFS Job Search **£29⁹⁵**

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Everything for your PC - Next-day!

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NEC040 NEC 4X E-IDE Quad Speed	£139
NEC041 NEC 4X E-IDE 4X & Encarta 95	£159
NEC045 NEC 6X Internal	£269
NEC046 NEC 6X External	£445
PAN001 Panasonic CR562 Dual	£95
PAN006 Panasonic Interface Card	£15
CDR002 Sony CD33A Internal Dual	£98
CDR006 Sony CD7305 External Dual	£275
CDR017 Toshiba Internal Quad Drive	£249

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These drives represent a huge step forward in CD-ROM Drive technology. Six-spin SCSI-2, massive 900KB/sec data transfer, 150ms access time, MPC, XA, DA, caddy-loading, 1-year warranty.

NEC045 NEC 6X Internal	£269
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GoldStar CD Drives

Lightning fast CD-ROM drives!

Full PhotoCD, MPC Level 2 support, CD-i, Video CD, CD-DA, CD-ROM/XZ, compatibility with Windows 3.1 and 95, making them probably the most compatible drives for both today's and tomorrow's standards.

GOL002 R520B 2X E-IDE ...	£86 ⁹⁵	GOL003 R540B 4X E-IDE ...	£128 ⁹⁵
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CD952 2X PCMCIA CD

The easiest solution for multimedia on your notebook!

The CD952 runs off your notebook's motherboard via the PCMCIA interface card you don't need an external power supply. Plus, because it runs off the PCMCIA interface, you enjoy faster access times and greater data transfer rates than with parallel port CD-ROM drives. The CD952 features everything you need in one package: CD-ROM drive, PCMCIA card and cable. Features include: Compliant with PCMCIA 2.1 standard; Easy to install device driver software; No external power supply required; Weight: 1.3Kg; Double speed data transfer rate: 307.2KB/sec; Average access time: 350 ms (1/3 stroke); 64KB memory buffer



PCM011 IC CD592	£259 ⁹⁵
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MULTIMEDIA SOUND

Creative Labs Sound Cards

This month Creative Labs introduce five new sound cards and kits.

All SoundBlaster cards feature a built-in CD-ROM Interface, midi interface, enhanced stereo synthesiser and speech synthesis software. Plus Creative DOS Utilities: Creative Record, Mix & Play Utilities, Creative Mixer, Creative Quick CD, Creative FM Intelligent Organ. Includes microphone port, line-in & line-out jacks, speaker connectors, microphone and MIDI / Joystick ports.

SOU013 SoundBlaster V2 Value	£32
SOU014 SoundBlaster Pro Value	£52
SOU015 SoundBlaster 16 Value IDE	£66
SOU007 SoundBlaster 16 Pro IDE	£89
SOU101 SoundBlaster 16 Pro AdSP IDE	£110
SOU009 SoundBlaster Pro16 SCSI-2	£114
SOU017 SoundBlaster Pro16 SCSI-2 AdSP	£134

The cheapest prices on Creative... and choose a FREE CD! See page 2!



SOU102 SoundBlaster AWE 32 Value	£129
SOU018 SoundBlaster AWE 32 AdSP	£165
MIC196 MS Office Multimedia Kit	£399

SoundBlaster Multimedia Home CD Kit

This month Creative Labs also introduce what we believe to be the first ever complete Multimedia kit. This high quality kit was designed specifically for your home and office, and it allows you to work, learn and play. The kit includes a Quad Speed CD-ROM drive, 16-bit sound card with AdSP, stereo speakers and a complete range of 11 Microsoft and 4 leisure titles that make this kit invaluable.

Hardware: Quad Speed CD-ROM drive, SoundBlaster 16 AdSP and Stereo speakers.

Productivity software: MS Works, MS Publisher and MS Design Pack. Education software: MS Encarta 95, MS Bookshelf 94, MS Ancient Lands, MS Dangerous Creatures, MS Musical Instruments, MS Cinemania 95 and MS Scenes. Entertainment software: MS Golf, Syndicate, Pagan Ultima, Strike Commander & Wing Commander.



SOU100 Multimedia Home CD Kit	£294 ⁹⁵
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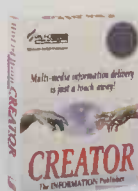
MULTIMEDIA SOFTWARE

Creator

Create your own multimedia presentations!

Microvitec's Creator is a multimedia authoring package that enables PC users with no programming experience to put together sophisticated interactive information systems, incorporating complex graphics, moving video images and sound. It's extremely simple to use - anyone who is familiar with Windows will soon be creating applications such as product catalogues or complex presentations. Once you've created your application you can distribute them on floppy disk or CD - royalty free!

CRE020 Microvitec Creator	£94 ⁹⁵
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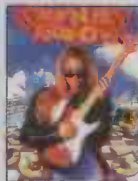


Rock 'n' Roll Your Own

Turn your computer into a music-making playground!

Fun for the whole family for ages 8 and up. Rock 'n' Roll Your Own lets you enter a wildly creative world where there's a special studio for each song, complete with outrageous graphics, complete with full-motion video and the hottest music tracks imaginable. You don't need any special musical ability or technical know-how - In minutes you can arrange, record and play back chart-busting tunes of your own!

COM020 Rock 'n' Roll Your Own	£24 ⁹⁵
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Video Director 2

The complete videotape editing system.

Everything you need is included! The SmartCable connects your 8mm camcorder, VCR and computer. Editing is easy: just point and click to pick the shots that you want, press 'Make Tape' and VideoDirector makes a new tape of just your favourite moments. Editing is quick and easy, and you can add sound, titles and special effects such as animations and graphics. For full editing facilities an image grabbing card is required.

VID038 Video Director 2	£74 ⁹⁰
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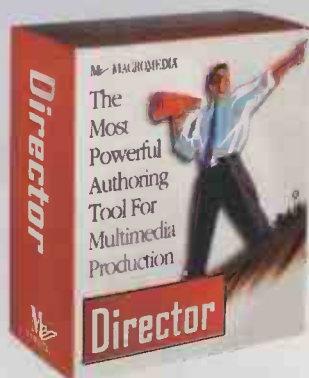


Macromedia Director V4

The most powerful authoring tool for multimedia production.

Director 4 for Windows is the tool of choice for all your multimedia needs. This popular program includes powerful features that let you easily combine, text, graphics, animations, sounds, digital video and interactivity to create dynamic multimedia productions. Use Director to create entertainment and education CD-ROMs, simulations, visualisations, digital publications, multimedia corporate presentations, electronic reference materials, software demonstration disks and more! The uses of Director are virtually unlimited. Artists, Creative Directors, Corporate Presentation Specialists, students and publishers - in fact, more than 100,000 people currently use Director. Director gives you precise control of virtually every element in your multimedia production. Import elements from digital video (AVI), sound files, graphic files (BMP, DIB, WMF, EPS, PIC, PCT, PNT, GIF, TIF), and much much more. Use these imported elements to cast, paint and score Windows to create and sequence your production and then use Lingo to add interactivity to your multimedia production.

MAC009 Director	£697 ⁹⁵
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NETWORKING SOFTWARE

Easily Integrate E-Mail Into Your Business With WinMail!

If you're looking for an easy to use and affordable Windows E-mail package to run across your Novell network, take a look at WinMail - it offers the complete electronic messaging solution with everything you need for reliable communication amongst your office network users, remote or mobile users, and users of other messaging systems. WinMail is the only E-mail software specifically designed to take full advantage of the Novell and Windows environment, it is also the easiest to implement and use.



WinMail
Intelligent Communications
FROM ONLY **£49⁹⁰**
per user (10-pack)

5-User Pack only... £299⁹⁵

Easy to install and manage
Ease of installation and administration crucially affect the cost-effectiveness and productivity of any E-mail system. WinMail's total integration into the Novell Network environment gives it the simplest and fastest installation of any E-mail system - it only takes about five minutes. Creating and adding users to your system is simply a matter of scanning the Novell Network operating system and creating mail boxes for each LAN user. It couldn't be easier!

Easy to use
WinMail has been designed to make life as simple as possible when preparing, sending, receiving and managing your electronic messages. WinMail hides all the complexity of traditional E-mail systems behind a simple to use, award-winning Windows graphical user Interface which is straightforward, even to the least experienced user. But ease of use does not mean a compromise on functionality, WinMail comes with every advanced feature to make you more productive. It's easy to send multiple file attachments, organise messages into folders, create personal address lists, and much more.

Integration
As befits the most open E-Mail software available, WinMail powerful messaging functions can be completely integrated into all your favourite Windows applications. From within any Windows word processor, spreadsheet, database etc., you can E-Mail your document simply by clicking the 'Send Mail' menu option.

WinMail - The Most Feature-Packed Comms Software

- ✓ COST-EFFECTIVE WINDOWS E-MAIL FOR NOVELL NETWORKS
- ✓ FIVE MINUTE INSTALLATION
- ✓ CONFIGURABLE & FLEXIBLE
- ✓ FROM 2 TO 20,000 USERS
- ✓ GROWS WITH YOUR NEEDS
- ✓ ON-LINE HELP
- ✓ GRAPHICAL FOLDERS & BUTTONS
- ✓ DRAG-AND-DROP MAIL
- ✓ INTELLIGENT POP-UPS
- ✓ FILE VIEWERS
- ✓ MAILING LISTS
- ✓ EFFECTIVE SECURITY

Connect to any E-Mail system
With WinMail you can exchange information quickly, reliably and easily with any PC on your LAN. However, as WinMail fully supports the Novell industry-standard message handling, you'll be able to send and receive E-mail across over 160 gateways. This includes CompuServe, the Internet and a host of other E-mail environments.

Keep in touch with your mail while on the road or at home
Remote WinMail is a fully mobile E-mail system which allows any remote PC to access via a modem their LAN WinMail box, allowing you to keep in touch with your office while travelling or at home.

- EMA001 WinMail 5-User Pack ...**£299⁹⁵**
- EMA002 WinMail 10-User Pack ...**£499⁹⁵**
- EMA003 Remote WinMail**£139⁹⁵**

What the press say about WinMail!

"Win Mail is an excellent product. It is easy to Install, has excellent manuals and is easy to use..."
Computer Buyer Editor's Choice

"In comparison with the competition, WinMail seems to come up with a winning package"
PC Direct, Ziff-Davis Best UK Product

"This is the Novell Network/Windows e-mail system. Great value for money, easy and fast to install, user-configurable, lucid manuals, client/server address book synchronisation, Intelligent e-mail filtering, highly user-friendly..."
What Micro

LANtastic Starter Kit

Everything you need to connect 2 PCs in 1 box!

Artisoft, the world leader in networking for small and medium sized businesses, brings you the simplest, most affordable way to network your PCs. Because the networks are peer to peer, you can grow at your own pace and not get into the expense of single or multiple file servers. Available for DOS, OS/2, Mac and TCP/IP LANtastic is the easy answer to your network needs.



- ART003 LANtastic 2-User Kit**£182**
- ART011 LANtastic v6.1 1-User S/W...**£59**
- NOV031 3.5" Novell Network 3.12 5-User**£415**
- NOV032 3.5" Novell Network 3.12 10-User**£972**
- NOV003 3.5" Novell Network 3.12 25-User**£1491**
- NOV037 3.5" Novell Network 3.12 50-User**£1942**
- NOV035 3.5" Novell Network 3.12 100-User**£2595**
- NOV033 3.5" Novell Network 3.12 250-User**£4560**

LANtastic for Warp

Networking OS/2-based PCs just got easier!

LANtastic for OS/2 takes full advantage of Warp's outstanding features and enables PCs to share files and printers and true multitasking becomes available to everyone on the network. With LANtastic, OS/2, Windows and DOS machines seamlessly share resources on the LANtastic network. Up to 500 PCs can connect to a server or run in true peer-to-peer mode, available as single user or 5, 10, 25, 50, 100 user packs. This first class networking software comes with a full money back guarantee and a five year warranty.



- ART014 LANtastic OS/2 1-User**£69**
- ART015 LANtastic OS/2 5-User**£179**
- NOV005 CD Novell Network 4.1 5 User**£445**
- NOV006 CD Novell Network 4.1 10 User**£1015**
- NOV038 CD Novell Network 4.1 25 User**£1505**
- NOV039 CD Novell Network 4.1 50 User**£2035**
- NOV040 CD Novell Network 4.1 100 User**£2865**
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NETWORKING CARDS

Warehouse Network Cards

Robust and reliable networking cards at an affordable price.

NEW PRODUCT

yes it runs with NetWare

All Warehouse networking cards are 16-bit, NE2000-compatible, fully Novell Lab YES tested and approved, and have both BNC and UTP connectors. They support software settings, and intelligently default these settings. They come complete with full software drivers and T-piece connector.

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- WNC002 NE-2000 Combo 95 Plug & Play...**£49**
- WNC003 PCMCIA Type II Combo**£89**
- WNC004 Pocket Ethernet Combo**£72**
- WNC005 8-Port Hub Auto-detection.....**£115**
- WNC006 16-Bit Hub (1xExpansion Port) .**£219**

- CeLAN
- wnc001 CeLAN C-2000 Combo**£29**
- wnc002 CeLAN-2000 Combo 95 P&P**£56**
- wnc003 CeLAN PCMCIA Type II Combo**£96**
- wnc004 CeLAN Pocket Ethernet Combo**£87**
- Genius
- GEN010 Genius GE-2000 II-2 Combo**£32**
- GEN011 Genius GE-2500 PCI-bus Combo ...**£79**
- GEN012 Genius Pocket Combo**£75**
- GEN013 Genius PCMCIA Combo**£110**
- GEN014 Genius GH-4080 8-Port Hub**£125**
- Kingston
- KIN018 Kingston NE-2000 ISA Combo**£35**
- KIN015 Kingston NE-2000 10B-T**£29**
- KIN020 Kingston Pocket LAN Combo**£159**
- KIN021 Kingston PCMCIA 10B-T**£129**

Software Warehouse only sell Novell Network-approved cards to guarantee you true compatibility. That's why we've chosen CeLAN, Genius, Kingston and our own brand.

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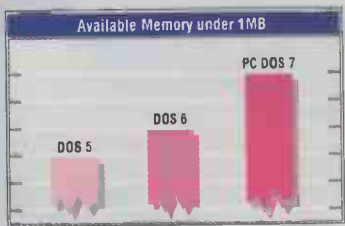
OPERATING SYSTEMS - DOS

Everything for your PC - Next-day!

PC DOS 7 - More memory and complete compatibility!

IBM PC DOS 7 gives you more memory for your DOS and Windows games and applications, plus a robust set of DOS and Windows utilities.

IBM's PC DOS is generally regarded as the best DOS in the computer industry. Version 7 provides more memory for your DOS and Windows games and applications, and upgrading all DOS/Windows systems is easy. It includes Stac Electronic's complete Stacker 4.0 disk compression technology, a dynamic



PC DOS gives you more free memory to run your applications!

memory optimiser to give you maximum memory. Plus, you can access on-line help for ease-of-use, a program scheduler so you can go to sleep while your PC does the work, REXX programming language, and the latest in PCMCIA and much more.

Why choose PC DOS 7?

- **Free-up more conventional memory!**
Free up to 60KB more memory than PC DOS 6.x or MS-DOS 6.xx to improve your PC's performance with Windows, games etc.
- **More hard disk space!**
Comes with integrated STACKER 4.0 compression software - the industry leader!
- **Protect your system or network!**
PC DOS 7 includes Anti-Virus, the best integrated virus detection software available - it can detect over 2100 viruses!
- **More hardware support!**
Take advantage of the latest hardware support for docking stations, PCMCIA, pen, CD-ROM and more.
- **FREE, fully-featured Windows and DOS utilities!**
Save money with fully-featured, fully-functioning utilities available with both DOS and Windows interfaces. PC-DOS 7 comes with: Stacker compression, Anti-Virus, Central Point (PC Tools) Backup - diskette, tape, disk; Central Point Undelete; and much more.
- **Synchronise files and design powerful programs!**
With PC DOS 7 you'll be able to automatically synchronise files between two computers and design powerful REXX programs that you can run with other operating systems - Including IBM OS/2 Warp (see below).
- **Refined over 14 releases!**
PC DOS 7 is IBM's 14th release of the classic DOS operating system. Each new release is tested and refined with users' feedback to make it work better for you.



IBM004 PC-DOS V7.....**£29.99**

OPERATING SYSTEMS - OS/2

Turn your PC into a true multi-tasking Windows PC with IBM's OS/2 Warp!

Turn your PC into a true multi-tasking Windows PC. Have all the power, flexibility and features of future versions of Windows today!

Your Windows desktop can look and work the same as it does now, or you can make use of the easy-to-use OS/2 Workplace Shell and discover the productivity of true drag-and-drop computing. Run multiple Windows applications right alongside your DOS favourites and the new ultra-fast 32-bit OS/2 programs. And don't forget OS/2's multitasking capabilities allow you to run many different applications at the same time and not just have them open simultaneously.

This new version of IBM OS/2 now works in only 4Mb of RAM and on any 386SX or above. OS/2 now supports Windows 3.1 or 3.11, so why settle for just Windows when you can use IBM OS/2 Warp to add extra power to your system.

FREE Bonus Pack!

OS/2 comes with a Bonus Pack of full 32-Bit applications which would collectively retail at over £1000. IBM Works, a mini-suite of 32-Bit applications including word processing, spreadsheet, charting, data filing and report writing. IBM's Internet Connection Package, lets you seamlessly navigate through the Internet with easy-to-use graphical interfaces. IBM CompuServe Access software is included. Fax Works, with this application you can fax documents from within your existing programs.

World's most popular 32-bit PC operating system

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New!
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BonusPak
INTERNET, FAX,
IBM WORKS,
MULTIMEDIA & MORE

OS/2 WARP CD
£47.99

OS/2 Warp

Version 3 Enhances Your Existing DOS and Windows

OS2004 OS/2 Warp CD**£47.99** OS2003 OS/2 Warp Floppy**£57.99**

OS/2 is the world's most popular 32-bit PC operating system. In fact, it is more than just the best operating system. Sure, it supports and runs Windows, DOS and OS/2 applications, but that is just the start of it.

- True Multi-tasking - no more waiting for the hour glass! Run your programs when and how you want to!
- Crash Protection - each application is

protected, so no more worries about your PC crashing.

- Drag and Drop icons and save time on routine tasks, the easiest way to work!
- Bonus Pack - £1000 of 32-bit applications already in the box to help you exploit the real power behind OS/2 Warp.

What are you waiting for? Get your copy from Software Warehouse today.

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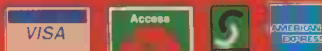
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SOFTWARE WAREHOUSE plc



PIMs

PERSONAL INFORMATION MANAGEMENT (PIMs)

How millions of people simplify their lives!

More than ten million people already use Sidekick, making it the best-selling personal organiser ever. It's so simple and straightforward, you can start getting organised today. And it's so slim and compact you can keep it running all the time. Don't complicate, simplify - with Sidekick for Windows.

Who uses Sidekick?

✓ The business and home office professional

Fast, friendly and flexible, Sidekick offers all the calendar, address book and notepad features every overloaded professional needs. Change your schedule in the blink of an eye; keep track of clients and vendors with multiple address books; manage all your important lists - from sales prospects to customer records.

✓ The mobile professional

Sidekick is the perfect portable companion - it's so compact, it won't fill up your hard disk or slow down your computer. It instantly updates your files from your desktop PC to your portable and then back again.

✓ The home PC and family PC

Sidekick can keep track of everyone in the family - all in one place. From the kids' activities to personal errands, you'll always be in the right place at the right time. Even more, Sidekick can organise your household inventory, auto maintenance records - even your CD collection!

✓ You!

If you've ever used a paper-based organiser or address book, then you already know how to use Sidekick. Imagine your current personal organiser, but with the timesaving power of your PC. Let Sidekick forward unfinished tasks to the next day, sound alarms to remind you of critical appointments, help you manage important contacts, and automatically enter your recurring meetings.

NEW VERSION



Sidekick

Sidekick

for Windows



The simplest way to stay organized.

FREE GIFT WITH EVERY ORDER! SEE PAGE 2!

Version 2.0 NEW! 101 New & Improved Features

New Sidekick 2.0 - 101 New and Improved Features

- NEW!** Keep multiple cardfiles active at once.
- NEW!** Drag-and-drop to move or copy, or merge information between cardfiles.
- NEW!** A turbo-charged calendar lets you set overlapping appointments, any time, any place.
- NEW!** Great new label, address book and envelope printing features gets you started with more than 70 templates.
- NEW!** Alarms work all the time - whether or not Sidekick is running.
- NEW!** Find and replace feature.

- NEW!** Password protection keeps your private information safe.
- NEW!** Now you can move your appointments, notes, and to-do items from one time to another with drag-and-drop simplicity.
- NEW!** If you get stuck, just position your mouse over an item for quick balloon help.
- NEW!** WYSIWYG print preview saves you time and paper.
- NEW!** Multiple, customisable cardfiles.
- NEW!** Alarms with snooze feature.
- NEW!** Drag-and-drop to move or copy, or merge information between cardfiles.

only £28⁹⁵ STOCK CODE: SID002

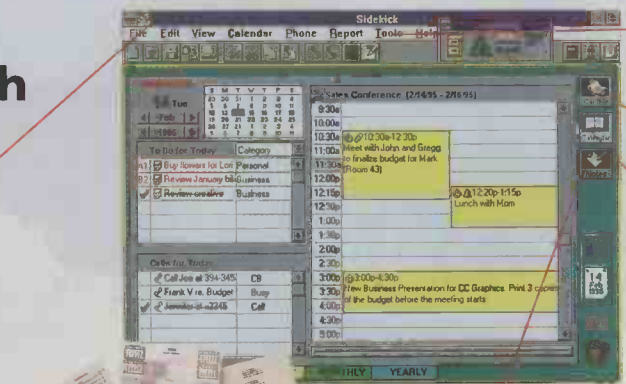
- IMPROVED!** Import/Export your data.
- IMPROVED!** Instant search feature.
- IMPROVED!** Daily/weekly/monthly calendar.
- IMPROVED!** To-do list.
- IMPROVED!** Recurring events.
- IMPROVED!** Note filing and retrieval.
- IMPROVED!** Note and mail merge.
- IMPROVED!** Customisable desktop.
- IMPROVED!** Application launch bar.
- IMPROVED!** Automated activity log.
- IMPROVED!** Password protection.
- IMPROVED!** Contact Manager.
- IMPROVED!** Smart phone dialler.
- IMPROVED!** Autosave and auto-recovery.
- IMPROVED!** Drag-and-drop operation.

... AND MUCH, MUCH MORE!

Sidekick 2.0 - It's packed with time-saving features!

Sidekick is always ready to go. Sidekick is so quick and compact, it even comes on a single disk. And with QuickMenu, your information is always just one click away.

Just print and go. Need to take your schedule with you? Print pages for popular paper organisers, including Day-Timer, DayRunner, Franklin, Filofax and others. You can even print Avery labels and standard envelopes.

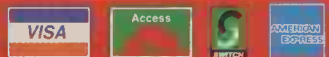


- Import and export in a snap. No more rekeying! Sidekick imports and exports addresses and phone numbers seamlessly - from ASCII text and popular databases like dBASE.
- Keep your contacts at your fingertips. You need that number, and you need it now. Sidekick gets it fast. Open several cardfiles at a time to access personal addresses, business contacts - even your CD collection.
- Seize the day. Sidekick's calendar puts you in command of your day. The to-do list alarms, and appointment record keeps you focussed. Three schedule views keep you organised. Plans change? Just drag-and-drop to reschedule.

Never lose another note. How often do you jot down a note, then forget where you put it? With Sidekick, it's all in one place. Make a note, then file it in a waiting folder. It's there when you need it, instantly.

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Scanning

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SCANNING

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Everything for your PC - Next-day!

Genius- 800dpi handheld scanners!

Genius was founded in 1983 and have been awarded ISO-9002. This year alone, they have already won Computer Shopper and What PC?'s Best Handheld Scanner awards.

Genius ScanMate 256

This high resolution handheld scanner scans up to 800dpi, giving you the best image quality available. As it is fully TWAIN compatible, you'll be able to use the scanner with all Windows TWAIN-compatible programs. ScanMate 256 comes complete with PhotoFinish V3 (see our separate feature) and also includes SmartPage Direct, a powerful OCR package.



Includes: interface card, TWAIN drivers and users manual.

GEN020 Genius ScanMate 256**£68⁹⁹**

ScanMate Colour

The ScanMate Colour is a true 24-bit colour scanner for use with Windows-based DTP and presentations software. It scans at a resolution of 800dpi, making it one of the most powerful and accurate handheld scanners on the market today. It comes complete with PhotoFinish 3.0, which includes auto-enhancement and provides 87 tools to satisfy your creativity. Also included is SmartPage, a powerful OCR software which means you'll never have to copy another document again.



Includes: interface card, TWAIN drivers and users manual.

GEN021 Genius ScanMate Colour..**£157⁹⁹**

Primax - The leaders in scanners!

Primax are the largest mouse and scanner supplier that you've probably never heard of.



Primax have chosen Software Warehouse as its first business partner to market the Primax range in the UK. This month we feature the revolutionary range of Primax scanners and the unique Primax DataPen.

Primax are also one of the world's leading manufacturers in mice, game pads, sound cards, speakers, flatbed scanners, cables, printer-share devices, and communications hardware. All Primax products are supplied with a two-year warranty and are backed by years of intensive research and development. Software Warehouse will be stocking the leading products from the Primax range in both our retail outlets and through our mail-order operation.

Primax Scanners

This exciting new range of Primax scanners are ALL supplied with Finishing Touch photo-styling software and ReadIRIS text recognition software (OCR). ALL are TWAIN compatible and come with UK support and warranty.

Primax Greyscale Hand Scanners

The Primax greyscale scanners scan at 100/200/300 and 400 dpi and have a wider than normal scan width of 105mm. The 32 greyscale scanner will actually scan up to 256 using software emulation. The 256 greyscale scanner scans at true 256 greyscales via its hardware.

PR1101 Primax 32 Greyscale**£44⁹⁵**
PR1102 Primax 256 Greyscale**£54⁹⁵**

Primax Colour Mobile Scanners

The mobile version includes all the features as above, but also includes motorised rollers. This unique feature allows a hand scanner to perform at the same accuracy as a flatbed scanner. You simply place the scanner on the image to be scanned and press the start button on-screen, and the scanner automatically moves itself across the original image. It determines the speed of scanning with reference to computer speed and image complexity. This is absolutely essential for a perfect scan of colour or greyscale images. It also connects to your parallel port, making it ideal for use with portables or in offices where more than one person needs to scan images and documents.



PR1104 Primax Colour Mobile.....**£149⁹⁵**

Primax Colour Hand Scanners

The Primax Colour Hand Scanners scan at up to 400dpi resolution. They are able to scan black and white, greyscales and 24-bit true colour (16.8 million colours). They come with a high-speed, 16-bit interface card.



PR1103 Primax Colour**£99⁹⁵**

Primax DataPen

The Primax DataPen is simply the fastest way of entering text and is, on average, 20-30 times faster than using the keyboard. You simply run the DataPen over text. It will input text where the cursor lies. The OmniFont OCR software runs in the background and allows it to recognise any font between 8 and 22pt text size. It can be used in all applications software running under MS Windows. There is even a spell checking facility in eleven languages. The DataPen is easy to install and connects to the standard parallel port.

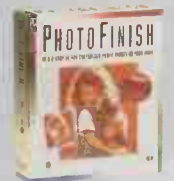


PR1105 Primax DataPen (Win)**£199⁹⁹**

Scanners are ideal for OCR & Image Manipulation. Here's two of the best software for those tasks!

PhotoFinish 3

Produce and edit photographic quality images.



Scan, crop, straighten and enhance images all in one easy step. It also features automatic retouching filters (adjust brightness, contrast, hue and saturation, remove spots and moire patterns). Automatic effects let you emboss, detect edges, diffuse, twist, pixelate, crystallise, add motion blur, etc. Includes PhotoLibrary Vol. 1 and ImageViewer.

PHO001 PhotoFinish**£31⁹⁵**

XEROX TextBridge

Windows-based OCR that redefines the industry standard.



Textbridge lets you convert paper documents to electronic files on your PC. You can then edit, store and distribute the text within Windows applications. It features the highest level of accuracy, and at a fraction of the cost of other OCR. Requires scanner.

TEX002 TextBridge**£67⁹⁵**
TEX003 TextBridge Prof.**£274⁹⁵**

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Until the end of the Summer, if you buy any Logitech product you'll receive a FREE Mitsubishi Mobile Phone. The terms and conditions are simple: Send a copy of your receipt and registration card to Logitech before 31st October; Only one mobile phone per person; Must be over 18; Call for full terms and conditions. (Not available with MouseMan Sensor.)

ScanMan Colour

Scan every colour the human eye can see.



Ideal for designers who want to scan large colour pages or odd-sized originals. It's the most versatile handscanner ever! Its 24-bit hardware captures 400dpi images in 16.8million colours with 256 greyscales or linart. It is one of the few colour handheld scanners that require no warming-up time.

LOG007 Logitech ScanMan Colour**£168⁹⁵**

Logitech EasyTouch

Parallel port scanning at a low, low price.



The ScanMan EasyTouch scans 256 greyscales at up to 400dpi and plugs directly into your parallel port. When scanning text you may use the bundled OCR or the EasyTouch comes with a unique utility that lets you scan directly into your Windows applications or word processor.

LOG013 Logitech EasyTouch**£108⁹⁵**

ScanMan PowerPage

The all-in-one personal office solution for scanning, copying, faxing and OCR.



Designed for personal use from the desktop, it has all the power of flatbed with a full page scanning width of 21.6cm. Its plug and go Installation means that it runs directly off the parallel port and it scans directly into Windows applications or the software provided.

LOG016 Logitech ScanMan PowerPage.....**£299⁹⁹**

UMAX Vista T630 Colour Scanner

Colour scanners from the world's largest digital imaging manufacturer.

An outstanding specification at an incredible price! The UMAX T630 gives you 600x300dpi optical scan resolution for up to 4800dpi output, via a triple pass scanning mechanism. Comes with Photoshop LE software, SCSI interface and all cables.

vis050 UMAX Vista T630**£399**

Single pass, 600x300dpi, upto 4800dpi with interpolation. Includes Photoshop LE. PC Pro Recommend this unique scanner.

vis051 UMAX Vista S6**£499**

800x400dpi. Max resolution with interpolation 6400dpi. Includes Photoshop LE.

vis052 UMAX Vista S8**£549**

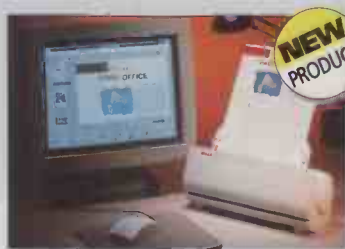


UMAX PageOffice

PageOffice provides a single solution for transforming piles of paper into useful information on your PC.

The PageOffice hardware/software combination is capable of importing printed documents whether text or graphics, into your computer - processing them and then delivering each to its appropriate location. This great value bundle comes complete with all the software you need for scanning text, graphics and all the utilities you need to file your documents, E-mail your documents, fax them, print them or even edit them. In addition, you can use your existing software to add that extra finishing touch.

The PageOffice is an easy to use input device that acts as the electronic equivalent of an in-tray for your personal computer. The PageOffice comes complete with SCSI interface and cable, a ten-sheet automatic document feeder and scans at 300dpi. This revolutionary scanner scans a full A4 page in just 6.4 seconds. Simply click on the start button with your mouse, and the PageOffice will do the rest. It will automatically re-route your scanned images to either the OCR or the graphics editor, or you can choose to E-mail, fax, or store your document.



PAG030 UMAX PageOffice**£288⁹⁵**

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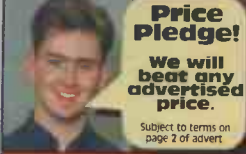
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Each CD is packed with video and audio clips to steer you through the course and to help make learning quick and enjoyable. And because all BVG CD-ROM tutorials don't have to have the full application running, you can take the tutorial to any machine.

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An exciting new approach to learning CorelDraw!

All of JIT's products are designed to run in a parallel window to CorelDraw or Corel PhotoPaint. In that way the learner is able to work right along with the instructions, using either the graphics provided on the CD, or directly within their own application. A complete set of 'VCR-type' controls to pause, repeat and skip forward or backward within the relevant training make this the easiest way to learn Corel Draw.



JIT CorelDraw 3,4 or 5 **£29⁹⁵**

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EZ Language

Popular vocabulary & pronunciation tutor in Spanish, French, German, Italian, Russian and Japanese.

This CD is the fun and easy vocabulary and pronunciation tutor. In just minutes, you'll be learning new words and phrases in six foreign languages. See pictures with the words and listen to native speakers' voices. It's like having your own personal language instructor available at your command. This full multimedia approach makes learning fun, fast and it's perfect for travellers, students and anyone else who wants to communicate in a new language.

Words and phrases appear in both English and the foreign language to help you learn quickly. You can even search for a specific word to find its translation. If you have a sound card you'll be able to hear a foreign speaker pronounce the words properly and if you have a microphone, you will even be able to record your own voice to monitor your improvements.



EZL001 EZ Language **£33⁹⁵**

The Lingua Series

The comprehensive, interactive learning laboratory.

Developed in-line with the UK's national curriculum, The Lingua Series is encouraging whist fun to learn. It is not a quiz program, but structured exercises in your chosen language. There are six different modules with exercises. Languages are available in two separate editions - 'Standard' which takes you from beginner to GCSE standard and 'Advanced' which will take you to GCSE to A-Level standard. Lingua provides six hundred different exercises and approximately fifteen thousand words.

The Authoring system allows extra exercises to be added and the facility to record your own voice. Software Warehouse stocks the entire Lingua series at both Standard and Advanced levels which includes the following languages: English, French, German, Italian, Spanish, Russian, Greek, Irish, Welsh, Japanese.



Lingua Series **£14⁹⁵**

Let Bubble Help take you through Windows the easy way!

Bubble Help for Windows 3.1

What could be easier? Simply point at the area you don't understand and - at the touch of a button - a bubble will appear!

No more need for frustrating manuals or videos! Save hours of wasted time and money with the quickest way to learn Windows! What could be easier? Simply point at the area that you do not understand and help arrives! Bubble Help for Windows is a fully interactive help system that is with you constantly throughout Windows 3.1, explaining it's functions from the basics through to the finer points. Bubble Help's simplified text makes it ideal for beginners and existing users alike and makes learning Windows both productive and enjoyable with instant explanations at the touch of a button!

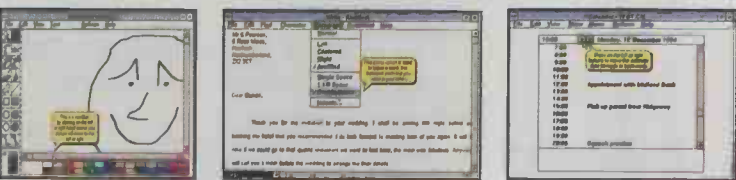
Why should you have Bubble Help?

- Instant help at the touch of a button.
- The quickest way to learn Windows.
- Save on hours of wasted time and money.
- Simplified text - no jargon.
- No need for frustrating manuals.
- No need for videos.
- Learn in the same media you work in.
- Ideal for beginner's and existing users.
- Proves that Windows can be user friendly

ONLY £16⁹⁵



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Learn Windows as you use it! Bubble Help pops up onto your screen to explain simply what you do not understand.

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GameRunner

The game player's acceleration pack!

With GameRunner, Quarterdeck have released a powerful new "games edition" of their best-selling memory utility, QEMM 7.5, which automatically configures systems to free up to 634KB. GameRunners comes with Cache 86, which boosts hard disk and CD-ROM performance to eliminate slow downs when playing leisure titles. Also included is GameCheater which is the secret of the top-scoring players - add extra ammunition, extra levels and extra lives, etc. to most of the popular games!



NEW VERSION

GAM002 GameRunner **£45⁹⁰**

Screen Savers from Delrina

Off-beat humour from the famous Gary Larson and the Delrina Far Side Screen Saver!

Gary Larson has been saving your day with humour for years - now he's going to save your monitor! The Far Side Screen saver brings to life the off-beat humour through 14 full-colour, incredibly detailed screen saver animations. Essential therapy for every stressed executive!



FAR002 The Far Side **£26**
 OPU001 Opus 'n' Bill **£26**
 OPU020 Opus 'n' Bill Hit The Road ... **£26**
 FLI010 The Flintstones **£26**

WinDelete V2

No other un-installer is safer or more thorough!

New WinDelete Version 2 is the latest version of this award winning Un-Installer program. This release offers new features and enhancements that it easier and safer to use, with a lot more power.

Market research shows that todays users want a product that is safe and simple, without accidentally deleting files it shouldn't. WinDelete stands out in It's ability to meet these needs.

Application installations are monitored to enable better removal, covering every type of application and system support file. Comprehensive installation logs are maintained to ensure thorough removals. Changes are previewed before being executed, and the new range of tools facilitates better system management.

It's Green-Yellow-Red "traffic light" colour coding helps prevent accidental deletion of vital files, but allows all the dross to be removed, with an Undo/Restore option when you change your mind.

Features include:

- Intelligent un-installing of virtually every file type including Windows and DOS applications, CD-ROM and display device drivers, unused system support files, fonts, temporary files, backup files, duplicate files, orphan files etc;
- Direct access to INI files with View, Edit, Backup, and Save;
- System Consultant that analyses your system and suggests changes to improve performance,
- System Tuner with hundreds of tips for optimizing Windows performance
- and much more.

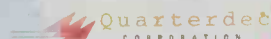


NEW VERSION

Simple to use interface

WIN050 WinDelete Version 2 **£26⁹⁵**

QEMM v7.5



The World's No.1 selling utility!

The most powerful memory manager for Windows, DOS and games! QEMM gets your programs more memory, so you get fewer out-of memory errors and better performance. The gains are amazing: up to 634k of conventional memory. The new version 7.5 includes special support for Dos, Windows, Stacker and for DoubleSpace users, QEMM can add up to 40k of base memory.



QEM003 QEMM 7.5 **£45⁶⁰**

CleanSweep



Removes all unwanted or redundant files!

Windows applications create many files - both small and large - that end up scattered throughout the hard drive. When it's time to uninstall applications, these files need to be located, verified and removed to free up valuable hard drive space. CleanSweep actively seeks out, cleans up and clears out duplicate, obsolete or unused files.



CLE009 CleanSweep **£31⁷⁵**

SuperPrint V3

You won't want to print without it!

The fastest, highest quality way to print from Windows. SuperPrint virtually eliminates waiting on the hour glass when you print. Click on "Print" and then get back to work immediately, up to 19 times faster than Windows. SuperPrint automatically adjusts for the unique characteristics of your printer, so you get the sharpest graphics every time. Supports HP LaserJet and compatibles, Epson 9 and 24 pin compatibles, Canon BubbleJet, PintJet and more!



NEW OFFER

SUP015 SuperPrint **£39⁹⁵**

The World's Most Installed Word Processor Just Got Better!

SpellWrite Version 1.5

SpellWrite enables you to spell check any Windows application. Now you can spell-check your databases, DTP and graphics documents, spreadsheets and even your accounts!

Once installed, this clever utility works in the background of Windows and is accessed by highlighting a piece of text and then pressing a hot key. If your highlighted text contains a word that doesn't match any in the supplied English 85,000-word dictionary, up pops a dialog box. Here you can perform all the usual activities you'd expect from a good spell-checker. SpellWrite also adds a unique toolbar to the Write application that comes as part of Windows, giving access to common functions.

Bring Windows Write™ up to modern day standards with the Enhancements available through SpellWrite

- Spell Checking
Full spell checking at the touch of a button, from a 85,000-word English dictionary, with full word context checking and proper suggestions (not just guesses made by some inferior products).
- Word Count
Gives you an accurate account of your productivity.
- User friendly Toolbar of frequently used facilities
Easy access to some of the more useful Write facilities such as save, print, cut, copy, paste etc., will improve your productivity immediately.

SpellWrite also continues to aid your professionalism in any Windows program - no more spelling errors in your accounts, database records, faxes, electronic mail etc. SpellWrite provides complete spelling reliability with the same interface that you've used in Write. It allows full context checking, so that you know the exact position of the word in the text.

SPE005 SpellWrite Version 1.5 **£18⁵⁰**



FREE UPGRADE TO WINDOWS '95 VERSION WHEN AVAILABLE

Use SpellWrite with all these applications:

- Quicken • CorelDraw! • Excel • Quattro Pro
- Paradox • WordPerfect Presentations • FreeLance
- Sterling • TurboCAD • PagePlus • PageMaker
- PowerPoint • Lotus 123 • and many more!

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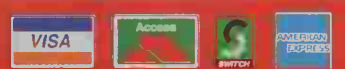
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UTILITIES

Dr Solomon's Anti-Virus Toolkits

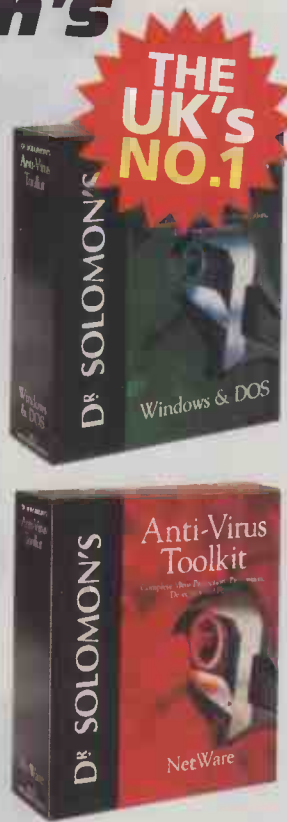
Combat all known viruses in DOS, OS/2 Windows and Netware.

Solomon's range of Anti-Virus toolkits provide the best answer to the serious problem posed by viruses. Each toolkit is made up of four basic programs geared to locate, identify and destroy existing viruses and then protect your system.

AVIRUS - Detects and identifies viruses in DOS, partition code and boot sectors using an extensive database of virus recognition information - a technology that won S&S the Queen's Award for Technology in 1993.

GENERIC DECRYPTION ENGINE - An amazing program that can actually detect those viruses that mutate, and avoid detection by looking different each time they infect a file.

US GUARD - This is the memory resident utility that is installed every time you restart your computer. It checks every program for viruses before it is opened or copied. A visual warning is displayed if there is any virus present.



THE UK'S NO.1

- 2 Toolkit Win & DOS 1/4'y..... **£71**
- 9 Toolkit Netware..... **£299**

OnFile

The easy way for Windows users to arrange and quickly locate their files. Its as simple as using a book.

Onfile's features include: long file names so you can give your files meaningful names; file summaries and file viewers let you find out about your documents without launching the relevant application; place reminders on files with Post-it style notes; bookmarks give you quick access to frequently used files or pages. Plus, there's password protection, print power and more.



ONF001 Harvard OnFile **£29**

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The latest 3 utilities from LandMark make up this exclusive Software Warehouse offer. Quantities are limited to just 1500 copies - so hurry as they wont last long.



SUM001 Summer Bundle..... **£29.95**

MAX004	DOS 386 MAX	£29
AFT004	WIN AfterDark V3	£26
AFT002	WIN More AfterDark V3	£24
CAL001	DOS Calendar Creator	£19
CEN004	WIN Central Point AntiVirus	£69
CEN003	DOS Central Point AntiVirus	£59
CHE005	DOS CheckIt Pro	£61
COR005	DOS Core! SCSI	£65
DA5002	WIN Dashboard v2	£29
DES005	WIN DesqVing 386 v2.7	£69
FAR002	WIN The Far Side Screen Saver	£26
FAS002	WIN Fast 5 Cache	£19
FRA006	WIN Franklin Ascend	£145
NEW001	WIN HP New Wave v4.1	£85
IC0001	WIN Icon Do It	£23
JUR001	WIN Jurassic Park Screen Saver	£16
LAB001	DOS Labels Unlimited	£25
LAP005	DOS LapLink	£75
LAP007	DOS LapLink for Windows	£84
MIC218	WIN MS Sound Bits Hanna Barbera	£16
MIC219	WIN MS Sound Bits MGM	£16
NOR021	WIN Norton Antivirus v3	£95
NOR018	WIN Norton Backup v3	£69
NOR001	DOS Norton Backup	£69
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PCT001	WIN PC Tools v8 10-User	£515
PCT002	DOS PC Tools Pro	£79
QEM000	DOS QEMM 386 v7.5	£45
RAM001	DOS RAM Exam	£15
SID003	WIN SideBar	£29
SST004	WIN Superstor Pro	£29
UNI005	WIN Uninstaller 3	£36
XTR006	WIN XTree Gold v4	£59
XTR004	DOS XTree Gold v3	£69
XTR003	WIN XTree Gold for Networks v4	£139

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NEW Norton Utilities for Win '95

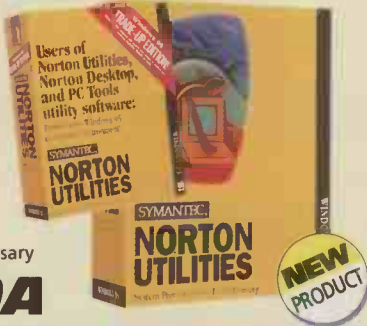
The must-have tool if you're upgrading to Windows '95!

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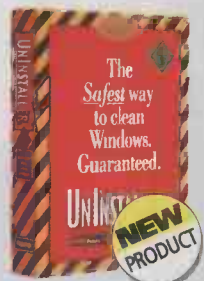
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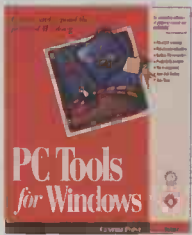
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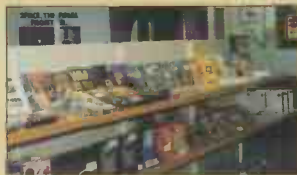
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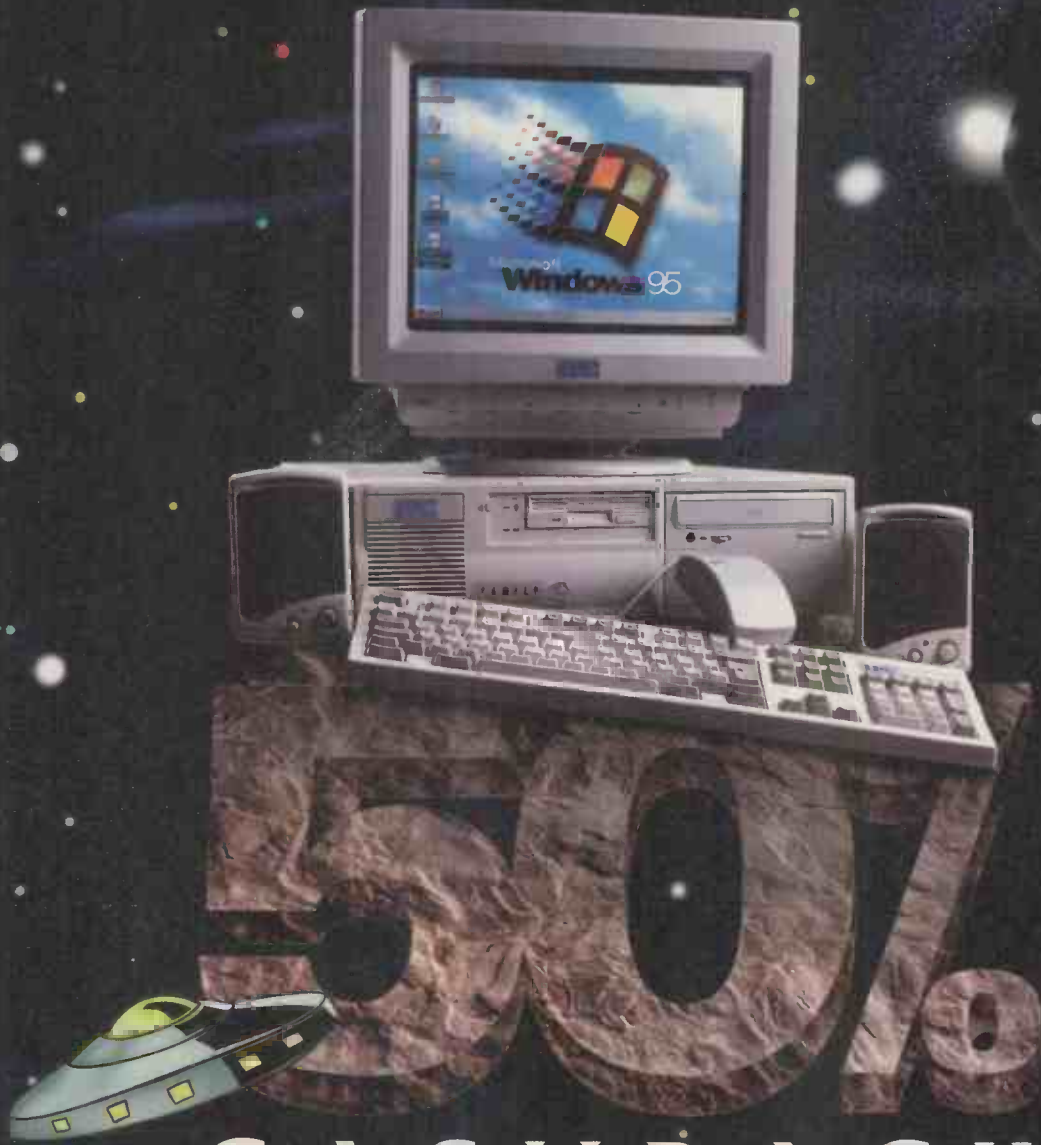
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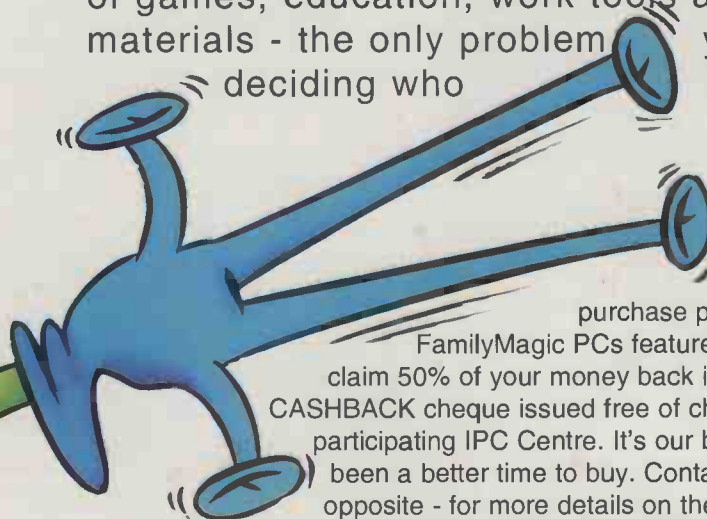
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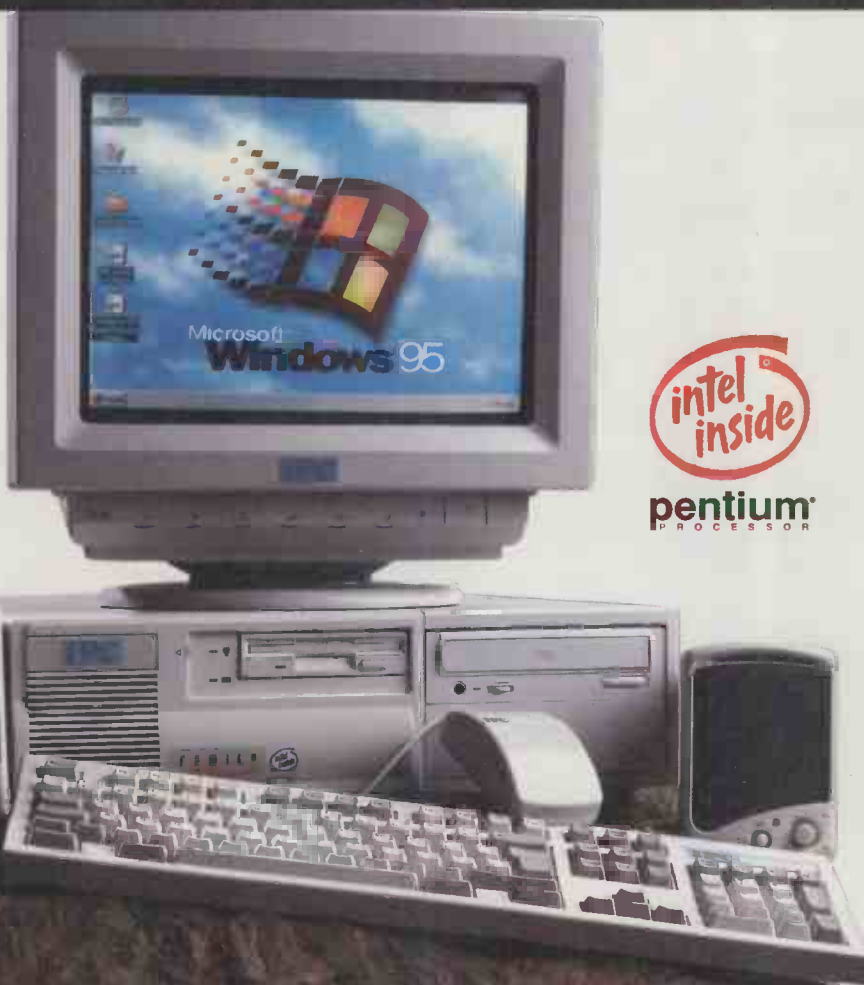
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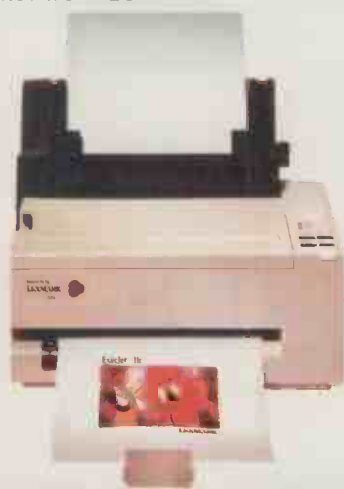
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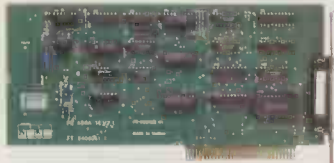
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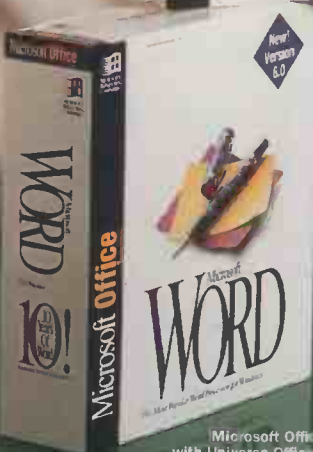
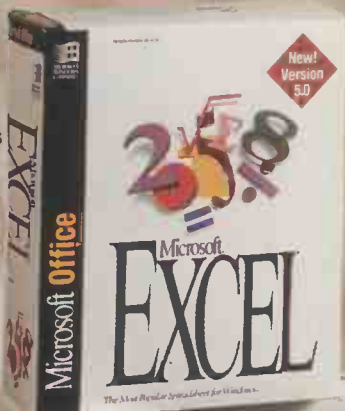
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The Aries *Perfecta*® 7000 Series

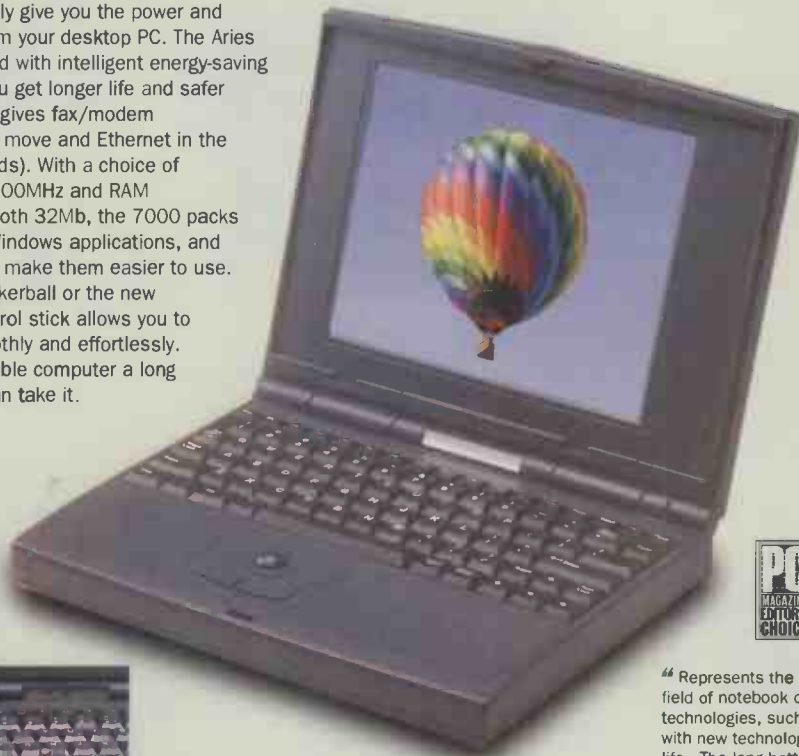
The Most Advanced Yet!

Introducing a new range of beautifully designed notebooks that genuinely give you the power and facilities you expect from your desktop PC. The Aries Perfecta 7000 is packed with intelligent energy-saving features that ensure you get longer life and safer data. PCMCIA flexibility gives fax/modem communications on the move and Ethernet in the office (with optional cards). With a choice of processors up to DX4 100MHz and RAM expandable to a mammoth 32Mb, the 7000 packs the power to run your Windows applications, and an ergonomic design to make them easier to use. While the standard trackerball or the new optional trackpoint control stick allows you to control the cursor smoothly and effortlessly.

We've taken the portable computer a long way, think where you can take it.



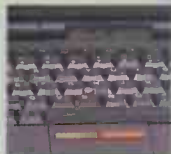
SX/DX4 Models



Notebook shown here with 19mm Trackerball with 2 buttons supplied as standard



Ergonomical designed sloping palm rests



Notebook shown here with Optional TrackPoint Control Stick

FREE
16 bit Soundcard (fitted)
with any purchase of a
Notebook this month
WORTH £49

i486sx™-33 **£999**
Mono
i486sx™-33 **£1299**
Dual Scan Colour
i486sx™-33 **£1799**
TFT Colour

"With plenty of processing power, (and) enough battery life to handle a transcontinental flight easily, ...a value winner." "...the lightest full-size notebook in the roundup; it also had excellent battery life..., optional audio and a good price..."
PC MAGAZINE, Cover Story: Notebooks

"...A great Windows PC, and an excellent value." "...the fact that you get the amount of performance we did from a battery charge speaks highly of the engineering."
LAPTOP BUYERS GUIDE & HANDBOOK, First Look



"Ranks above many famous-name notebooks. And in terms of pointing devices, it's definitely got them outnumbered." "...deserves a spot on your short list."
COMPUTER SHOPPER, PC Reviews

"Represents the best kind of innovation in the rapidly changing field of notebook computers. It keeps the best of proven technologies, such as a sharp display, and complements them with new technologies, such as those employed to stretch battery life. The long battery life makes it a good choice for anyone who needs a basic notebook that also delivers solid performance."
WINDOWS MAGAZINE, WinLab First Impressions

Reviews done on identical Notebook in the USA

LOW POWER 3.3V
All the components in the notebook run at 3.3V, giving up to three times longer life.

SOUND PLUG-IN
Mono/Stereo sound system with built-in speaker/microphone by adding a soundcard.

SUSPEND TO DISK
Suspend to memory or suspend to disk ensures data is never lost when you leave the notebook.

SUPERB PERFORMANCE
CPU Upgrade up to Intel DX4-100 and 512KB of level 2 Cache External connectivity enhanced by use of 16C550 Serial Port and Parallel Port with support for EPP/ECP

INTERNAL STATUS INDICATOR PANEL
12 distinct icons will display, flash or change appearance to give you a complete report on the state of the machine including a 5 step graduated remaining charge gauge.

ADVANCED POWER MANAGEMENT
Complete with a comprehensive set of 16 features that will allow you to customise the operation of the machine to your benefit.

REPLACEABLE HARD DISK DRIVE
Running out of space? Replace the Hard Disk Drive easily. The system BIOS will automatically detect the new HDD

EXTERNAL STATUS INDICATOR
"At a glance" multi colour indicator on the top cover shows if machine is charging, charged, suspended with battery charging or charged.

FLEXIBLE PCMCIA
Compartment for two type I/II or one type III PCMCIA slot with removable cover.

UP TO 32Mb RAM
If your applications demand it, then we can supply it.

Aries *Perfecta* 7000 Series Notebooks

- ◆ Intel SL-Enhanced CPU
- ◆ 4Mb RAM expandable to 32Mb
- ◆ 340Mb Hard Disk Drive
- ◆ Advanced Power Management
- ◆ LCD Status Indicator
- ◆ Fully Modularised Design - Upgradable CPU, LCD, Removable Hard Disk & Keyboard
- ◆ VESA Bus Video with GUI accelerator
- ◆ Advance PMU Function
- ◆ Mono/Stereo 16 bit Sound System (Optional)
- ◆ Audio Line (In/Out) with volume control
- ◆ Built-in Speaker/Microphone (requires sound system)

- ◆ 1.44Mb 3.5" Floppy Drive
- ◆ 82 key QWERTY Keyboard
- ◆ 19mm Trackerball (Optional Track-point device)
- ◆ PCMCIA slots (2 x Type II/1 x Type III)
- ◆ Hi-Speed 16C550 Serial Port
- ◆ Enhanced Parallel Port (EPP/ECP support)
- ◆ External Super VGA Monitor Port
- ◆ External Keyboard/PS/2 Mouse connector
- ◆ Optional Internal 14.4K Fax/Modem
- ◆ Rechargeable Ni-MH Battery Pack
- ◆ MS-DOS v6.22 & Windows v3.11
- ◆ Weight: 3Kg
- ◆ Carrying Case

PERFECTA 7000 OFFICE COMMUNICATIONS UPGRADE

Turn your Aries 7000 notebook into a complete voice mail system with the Aries Office Communications Workstation Kit. Suitable for home or business, supporting multiple mail boxes, Fax on Demand, and data communications. The Aries Office Communications Workstation Kit contains high speed V32bis (14400 baud) Voice/Fax Modem and software package, providing users with remote access to voice, fax and data messages. Record and play your own voice files through the Perfecta 7000 notebook's own internal mic and speaker, or play back voice files through either the 8- or 16-bit sound card modules available as an option.

SPECIAL OFFER £125

All prices are for standard 340Mb Hard Disk Supplied with **FREE Carrying Case**

Display	10" Mono 64 Grey Scale	10" Colour Dual Scan	10" Colour TFT Active Matrix
7000 Series	7100	7300	7400
SL i486SX™-33	£999	£1299	£1799
SL 486DX2™-66	£1069	£1369	£1949
SL i486DX4™-75	£1095	£1395	£1979
SL i486DX4™-100	£1145	£1445	£2029

ADDITIONAL OPTIONS

4 to 8Mb RAM Upgrade*	£159	PCMCIA Ethernet Card	£99
4 to 16Mb RAM Upgrade*	£525	Spare NiMH Battery Pack	£69
4 to 32Mb RAM Upgrade*	£1089	Spare AC Mains Adaptor	£49
Track-point device	£25	Car Lighter Adaptor	£29
8 bit Internal Sound Card	£25	Docking Station	£339
16 bit Internal Sound Card	£49	External Keyboard	£25
Aries HiFi Speakers	£29	Internal V32bis 14.4K Fax/Modem	£125
PCMCIA 9600 Fax/Modem	£59	(non-approved) with software	£125
PCMCIA 14400 Fax/Modem	£109	*Requires module exchange	

7000 Notebook Hard Disk Upgrades

(Prices valid when purchasing Notebooks only)

UGA0530/A	340Mb to 540Mb HDD	£125
UGA0540/A	340Mb to 800Mb HDD	£249

BUSINESS LEASING Low Cost Leasing - Call for details

1 YEAR SUPPORT

All Perfecta Notebooks are covered by a FREE 12 Months Warranty in mainland UK.

2 YEAR GOLD CARE

For 12% of the cost, we will collect, repair and return your notebook within mainland UK for the first 24 months.

HOTLINE SUPPORT

All Perfecta Notebooks are covered by Hotline Support. We want you to get the best from your machine, so we offer a comprehensive support package over the phone.

All prices, specifications and offers subject to change without notice. Please ensure suitability with manufacturer before ordering. All returns subject to handling charge. Goods not sold on a trial basis. Sales subject to our Terms & Conditions available on request. E & OE.



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All Prices exclude Carriage & VAT @ 17.5%

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AMAZING Notebook Offers

HURRY!
While Stocks
Last



COMPUTER SHOPPER
BEST BUY

Perfecta® 486SLC 33 Mono **£699** **Perfecta®** 486SLC 33 Colour **£899**

AMAZING FEATURES AMAZING VALUE

Open the lid and immediately you see what sets the Perfecta 3000 and 4000 apart. Ergonomically designed palm rests provide more comfortable use; the built-in trackball and dedicated numeric keypad allow easier and more productive work in confined spaces; then switch on and watch the display leap to life. The bright 64 greyscale mono or vivid Dual Scan colour display make using your notebook a pleasure.

But what sets these new ranges apart is the simple upgradability. As your needs grow the notebook has been designed to allow key elements of the system to be upgraded within seconds. Simply clip-in a new display, slot-in a new hard disc, plug-in extra memory and on the Intel 486 models simply drop-in a new processor.

Never has so many features, processing power, usability, convenience, flexibility and security been available in a notebook.

CHECK OUT THESE NEW LOW PRICES!

Display	10" Mono 64 Grey Scale	10" Colour Dual Scan
3000 Series	3100	3300
486SLC-33	£699	£899
4000 Series	4100	4300
486SX-33C	£799	£999
486DX2-66C	£869	£1069



Please note purple buttons
now supplied as black

- ◆ Co-Processor supported
- ◆ 1Kb Cache RAM
- ◆ 128K Cache RAM (4000 series)
- ◆ 4Mb RAM internally expandable to 20Mb (up to 8Mb on 3000 series)
- ◆ 120Mb Removable Hard Drive (250/340/540Mb options)
- ◆ 1.44Mb 3.5" Internal Floppy
- ◆ 84 Key Qwerty UK Keyboard
- ◆ 16mm Logitech Trackball
- ◆ 16 Key Built-in Separate Numeric Keypad
- ◆ 1 x 9-pin D Type Serial Port
- ◆ 2 x Parallel Port (1 enhanced bi-directional)
- ◆ Future Domain SCSI Port (3000 Series) Adaptec SCSI-II Port (4000 Series)
- ◆ 15-pin VGA D type External Monitor Port
- ◆ External Modes Supported: 800 x 600 256 colour, 1024 x 768 16 colour
- ◆ Simultaneous Display – LCD and External Video (not 3300/4300 models)
- ◆ Intelligent Power Management
- ◆ Security Password
- ◆ 5-level Power Meter
- ◆ External Keyboard Port
- ◆ Rechargeable Battery Pack
- ◆ 80-250V Universal Mains Adaptor/Charger
- ◆ 70 Minute Turbo Charge
- ◆ Car Battery Adaptor option
- ◆ Optional Fax Modem up to 28,000 baud
- ◆ Carry Case Included
- ◆ Dimensions 226 x 295 x 52
- ◆ Weight (inc. battery) 3Kg

Affordable Business Printing From OKI

OL400ex - LED Page Printer



The ideal personal printer for use at home, in small businesses and large corporations, HPIIP™ compatible

- ◆ Serial and parallel Interfaces
- ◆ 0.5Mb memory upgrades to 4.5Mb
- ◆ Optional 2nd paper tray and multi bin feeder
- ◆ Works in DOS applications where GDI printers fail
- ◆ Offers better print quality and lower running costs than Inkjets
- ◆ Small footprint
- ◆ 4 pages per minute
- ◆ 1 Year on-site warranty

£279

Also Available

OL410ex - LED Page Printer

Ideal for business users in both the home and working environment.

- ◆ 600dpi from Okl's MicroRes 600
- ◆ 1Mb memory upgrades to 5Mb

£385

Okijet 300c - Colour Inkjet



NEW

OkI's first colour capable inkjet printer. The OKIJET 300c is a general purpose printer providing high quality text and graphics printing on envelopes, single sheet paper, labels, index cards and transparencies.

- ◆ Colour printing with the colour print cartridge or low cost mono with the mono cartridge
- ◆ 3 pages per minute equivalent
- ◆ 300 x 300dpi text and graphics resolution and high resolution mode for transparencies
- ◆ 167cps letter quality, 300cps draft mode
- ◆ Ink saver mode for both text and graphics when printing with either the colour print cartridge or a black print cartridge
- ◆ Special OKI drivers available for easy Windows Installation

£232

OL810ex - LED Page Printer



The OL810ex is the new high quality, professional personal page printer, from OkI, offering excellent print quality with high speed printing and superb paper handling capabilities.

The 8 ppm OL810ex is the desktop page printer offering a true 600 dpi LED array to produce the very best print quality text and graphical images.

- ◆ HPLJ4P™ compatible (PCLe)
- ◆ 600 x 600dpi resolution for outstanding print quality
- ◆ 8 ppm printing speed with a fast RISC based microprocessor
- ◆ 35 Intellifont fonts, 10 Truetype fonts
- ◆ 2Mb as standard. User upgradeable to 34 Mb
- ◆ Bi-directional parallel and RS232C serial with auto switching

£649

All prices, specifications and offers subject to change without notice. Please ensure suitability with manufacturer before ordering. All returns subject to handling charge. Goods not sold on a trial basis. Sales subject to our Terms & Conditions available on request. E & OE.



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All Prices exclude Carriage & VAT @ 17.5%

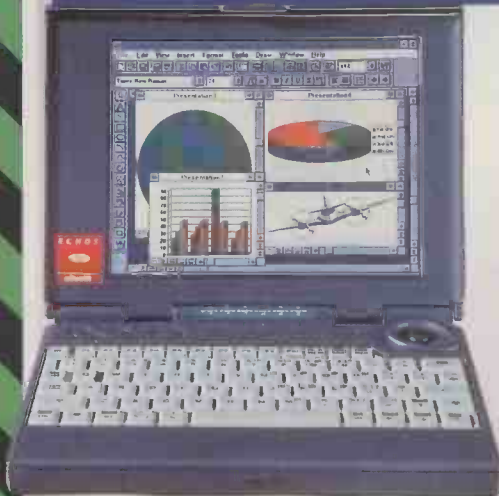
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New Olivetti Ultralight Colour Notebooks



olivetti

Olivetti Echos 20C Ultralight



Echos 20/C is a truly ultralight colour portable, weighing in at only 1.8kg. Its compact dimensions are: 264 x 190 x 38mm. Just wide enough not to skimp on the keyboard, just deep enough to mount the biggest screen in its class, and slim enough to contain all the features you need.

This ruggedly elegant little package outperforms many bulkier machines. Your graphics really move thanks to a Fast IDE interface and Vesa local bus, and Echos' 4Mb of RAM easily expands to 20Mb. With HDU ranging from 170 to 240Mb and top-performing Intel 486 CPUs, Echos is a no-compromise solution for your business.

- ◆ i486SX/33MHz Processor
- ◆ 170/240Mb Hard Disk
- ◆ 4Mb RAM
- ◆ PCMCIA Type III slot with Phoenix driver
- ◆ VESA Local Bus Video
- ◆ 9.4" DSTN colour Display
- ◆ Interfaces-serial, parallel, docking connector
- ◆ Dimensions: 264 x 190 x 38mm
- ◆ Weight: 1.8kg
- ◆ External FDU included

Echos 20C Colour

170Mb **£1289**
240Mb **£1385**

Also available:
Echos 24C Colour
with DX2-50MHz
Processor
£POA

OPTIONS

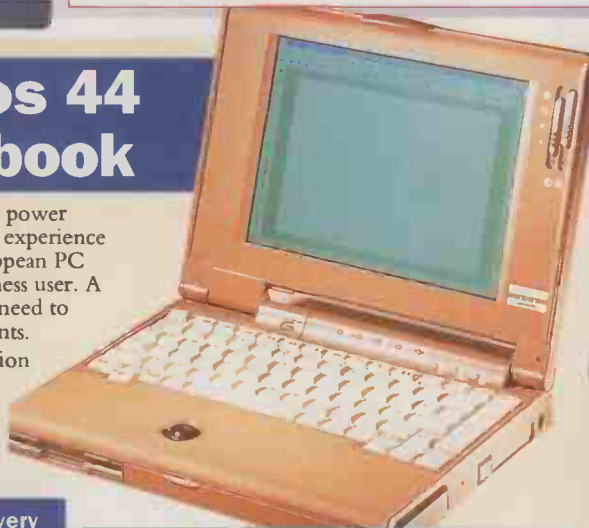
- ◆ VGA adapter
- ◆ Port replicator
- ◆ Car adapter
- ◆ Spare battery
- ◆ RAM expansion modules

Olivetti Echos 44 Colour Notebook

State of the art technology and processing power that go where you go. Echos matches the experience accumulated by Olivetti, the leading European PC player, with the requirements of the business user. A portable PC that meets the ever growing need to boost output through affordable investments.

Echos incorporates leading-edge information technology facilities in an ergonomic, essential solution designed to ensure maximum cost-effectiveness

£1649



"Light, very well built, well configured, good value for money."

PC USER VERDICT

- ◆ 486DX2-50 Enhanced 40MHz processor
- ◆ 4Mb RAM
- ◆ 2 Type II or 1 Type III PCMCIA slot
- ◆ VESA Local Bus Video
- ◆ 9.4" DSTN colour display
- ◆ 256 Colours
- ◆ 6 hours battery life
- ◆ Dimensions: 286 x 216 x 42.8mm (W x D x H)
- ◆ Weight: 2.4kg
- ◆ Integrated trackball™

Olivetti JP50 Portable Inkjet Printer



- ◆ 300dpi resolution
- ◆ 100cps LQ print speed
- ◆ 30 resident fonts
- ◆ 25 scalable fonts
- ◆ 15 auto sheet feeder
- ◆ 1.7ppm max
- ◆ PCL 3+ language
- ◆ Battery powered

£217

All prices, specifications and offers subject to change without notice. Please ensure suitability with manufacturer before ordering. All returns subject to handling charge. Goods not sold on a trial basis. Sales subject to our Terms & Conditions available on request. E & OE.



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FREE
Admission,
Seminars,
Refreshments
& Parking

Hands-on Open Day

at our Luton Showroom

Sunday 10th September 1995
from **10.00am to 4.30pm**

See
Microsoft
Windows '95
in Action
all day!

In association with Computer Shopper, PC Direct & Personal Computer World



The mark of
Experience



Aries
The sign of Quality

Amongst our many exhibitors will be:



Acorn

Borland

Canon

COREL®

CREATIVE

EPSON

IMSI

Intuit

Microsoft

NOVELL

Panasonic

SAGE
THE SAGE GROUP PLC

SYMANTEC™

Visio

It's a day out for all the family - 'hands-on' opportunities for you to try out all the latest products in the PC market. Seminars, Presentations and Demonstrations throughout the day for both the home and business user (SOHO). Our technical and sales support team will be there to assist and advise you on the best products for all your computing needs and representatives from a host of leading computer companies will be on hand to answer your questions. Try it and then buy it - for the young and old (and those in between) - its fun, it's educational and it's FREE.

For business users, demonstrations will take place throughout the day for; Wordprocessing; Spreadsheet, Accounts and Payroll software; Video conferencing and Aries Office Computer Systems will be available for hands-on evaluation

Our full range of products will be available for purchase on the day ♦ Printers ♦ Plotters ♦ Arles Notebooks ♦ Aries PC's
♦ Scanners ♦ Software ♦ Monitors ♦ MultiMedia ♦ Mice ♦ Books ♦ Education Products ♦ Psion ♦ Networks

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Jessa House, Finway (off Dallow Road), Luton LU1 1TR. Tel: 01582 487777

Direction to Jessa House from the M1 Motorway:

Exit off junction 11 of the M1. If coming from the south, turn right at the roundabout (under the motorway); or from the North, turn immediately left. Continue across 3 sets of traffic lights. At the roundabout turn right. Pass 'DO-IT-ALL' on the left. Over a bridge, across two roundabouts with B&Q on your left. You are now in Dallow Road. After half a mile you pass BESTWAYS on the left. Finway is now the first turning on the left.

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Networking Made Easy

WATFORD
the Award Winners
PRICE
PROMISE

If you can find a better price call us, we'll try and beat it.

Watford Electronics can now offer you a solution to your networking requirements, no matter how large or small. You can be confident that we will give the best advice and support that you have come to expect from Watford. We stock a wide range of Ethernet products from manufacturers such as SMC, 3Com, Intel, Genius and others, and we also have our own Aries branded products.

ETHERNET ADAPTERS

16-bit ISA Bus Adapters	Connection	Single Card Pack Part No.	5 Card Pack Part No.
3Com Etherlink III	BNC/AUI	CNA0610	£66 CNA1900 £319
3Com Etherlink III	UTP/AUI	CNA0620	£65 CNA1910 £319
3Com Etherlink III	BNC/UTP/AUI	CNA0630	£75 CNA1920 £355
Aries NE2000 II	BNC/UTP	CNA0040	£27 CNA1710 £129
D-Link DE-220CT	BNC/UTP	CNA1570	£65 CNA1730 £379 (6pk)
Genius GE2000 II	BNC/UTP	CNA1130	£28 CNA0940 £135
Genius GE2000 PnP	BNC/UTP	CNA2130	£tba CNA2140 £tba
Intel EtherExp. 16C Pro	BNC/UTP	CNA1260	£62 CNA1270 £289
Intel EtherExp. 16C Pro Flash	BNC/UTP	CNA1280	£69 CNA1290 £319
Novell NE2000 Plus	BNC	CNA1510	£48 CNA2070 £215
Novell NE2000T Plus	UTP	CNA1250	£48 CNA2080 £215
SMC Elite 16 Ultra	BNC	CNA0910	£58 CNA1200 £310 (6pk)
SMC Elite 16T Ultra	UTP	CNA0880	£54 CNA0900 £299 (6pk)
SMC Elite 16C Ultra	BNC/UTP/AUI	CNA0890	£62 CNA1210 £344 (6pk)
SMC EtherEZ	BNC	CNA2600	£58 CNA2640 £302
SMC EtherEZ	UTP	CNA2610	£58 CNA2650 £302
SMC EtherEZ	BNC/UTP	CNA2620	£66 CNA2660 £335
32-bit EISA Bus Adapters	Connection	Single Card Pack Part No.	5 Card Pack Part No.
3Com Etherlink III	BNC/AUI	CNA0710	£139 CNA1950 £699
3Com Etherlink III	UTP/AUI	CNA0720	£139 CNA1960 £699
Genius E1320	BNC/UTP	CNA1370	£169 CNA0960 £830
Intel EtherExpress 32 Flash	BNC/UTP/AUI	CNA1420	£155 CNA1740 £829
SMC Elite 32C Ultra	BNC/UTP/AUI	CNA1780	£143 CNA1930 £709
MCA Bus (PS/2) Adapters	Connection	Single Card Pack Part No.	5 Card Pack Part No.
3Com Etherlink III	BNC/AUI	CNA0730	£139 CNA1930 £709
3Com Etherlink III	UTP/AUI	CNA0740	£139 CNA1940 £709
D-Link DE-320	BNC/UTP	CNA1580	£99 CNA0960 £779
Genius E1162M	BNC/UTP	CNA1360	£159 CNA0960 £779
SMC Elite/A	BNC	CNA0350	£115
SMC Elite 10T/A	UTP	CNA0790	£115
VESA Local Bus Adapters	Connection	Single Card Pack Part No.	5 Card Pack Part No.
Aries CE3200-VL	BNC/UTP/AUI	CNA1880	£99 CNA2670 £475
D-Link DE-500CT	BNC/UTP	CNA1750	£189 CNA2700 £579
PCI Bus Adapters	Connection	Single Card Pack Part No.	5 Card Pack Part No.
SMC EtherPower	BNC/UTP	CNA1240	£93 CNA2120 £439
D-Link DE-530CT	BNC/UTP	CNA2710	£95 CNA0440 £435
Genius GE2500	BNC/UTP	CNA2110	£89 CNA1230 £339
3Com Etherlink III	BNC/UTP	CNA0430	£124
Parallel Port Adapters	Connection	Single Card Pack Part No.	5 Card Pack Part No.
Genius E3000 II	BNC/UTP	CNA1145	£69 CNA1230 £339
D-Link DE-620CT	BNC/UTP	CNA1660	£105
SMC EliteNote	BNC/UTP	CNA1630	£149
PCMCIA Adapters	Connection	Single Card Pack Part No.	5 Card Pack Part No.
3Com Etherlink III	BNC/UTP	CNA1490	£130
D-Link DE-650CT	BNC/UTP	CNA2720	£135
Genius ME3000 II	BNC/UTP	CNA1620	£95 CNA1770 £469
SMC EliteCard	BNC/UTP	CNA2630	£144

Genius® Ethernet Products

GE2000 II Ethernet Card



£28

The GE2000 is a 16-bit Ethernet card which is 100% NE2000 compatible. Installation is simple - just plug in and run the software.

- BNC and UTP connections as standard
- 35% faster than Novell NE2000 cards
- Support for Netware, WFWG & TCP/IP

Single: £28 5 Pack: £135



E3000 II Parallel Port Adapter

The E3000 II Ethernet adapter offers higher performance than any other similarly priced model available.

- BNC and UTP connections as standard
- Through connector for local printer
- Support for bi-directional and enhanced parallel port
- PS/2 mouse port power cable included

Single: £69 5 Pack: £339



Personal Network Card Pack
-Genius GE2000 II Ethernet card
-Novell Personal Network
Special Offer Price £49

NOVELL NETWORK

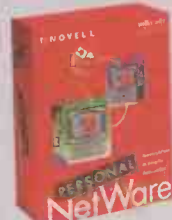
No of Users	5	10	25	50	100	250	Manuals
Network 3.12	£395	£965	£1445	£1942	£2540	£4560	£155
Network 4.1 (CD)	£415	£946	£1495	£2035	£2865	£5950	£135

Call for prices on Netware Upgrades and also for Educational Discounts

Netware 4.1 Upgrades - from any previous version

Upgrade From	Upgrade To	5	10	25	50	100	250
5 User	10 User	£239	£879	£1429	-	-	-
10 User	25 User	-	£459	£1169	£1639	-	-
25 User	50 User	-	-	£699	£1289	£2249	-
50 User	100 User	-	-	-	£939	£1799	£4179
100 User	250 User	-	-	-	-	£1249	£3879
250 User		-	-	-	-	-	£2339

Personal Netware Networking Kits



Link up to 30 PCs with Novell's new Peer to Peer networking software, and have shared access to files, printers and CD ROM drives, all at the push of a button. With support for DOS and Windows, Personal Netware is the ideal low cost solution for small scale installations.

- 2 User Pack £89
- 5 User Pack £210
- 10 User Pack £425
- Extra User Pack £55
- Notebook Pack £119
- PCMCIA Pack £179

NOVELL

All kits contain Ethernet card, 5m cables, software* and connectors



Microsoft® Windows for Workgroups Networking Kits

Now, Windows 3.1 users can have easy access to shared resources - such as printers, fax modems, CD-ROM drives and data files, all at the click of a mouse button. Send messages to other users or even have 'live' conversations over the network.

- | | |
|--------------------------------------|-----------------------------------|
| For users without Windows 3.1 | For users with Windows 3.1 |
| • 2 User Starter Kit £235 | • 2 User Add-On Kit £149 |
| • 5 User Starter Kit £595 | • 5 User Add-On Kit £375 |
| • Extra User Starter Kit £115 | • Extra User Add-On Kit £69 |
| • Notebook Starter Kit £155 | • Notebook Add-On Kit £119 |

All packs contain Ethernet card, 5m cables, software and connectors.

ETHERNET CABLING

Length	1m	3m	5m	10m	15m	20m	30m	50m	100m	300m
Thinnet £3	£5	£6	£8	£10	£15	£21	£29	£35	£115	
UTP £2	£4	£6	£9	£13	£16	£22	£30		£149	

*Software supplied will be cosmetically different from that shown

HUBS/REPEATERS

3 Com	UTP	BNC	AUI	SMNP	Price
LinkBuilder TP/12	12	-	1	-	£229
LinkBuilder FMS II	12	opt	1	opt	£389
Aries	UTP	BNC	AUI	SNMP	Price
EH-8	8	1	-	-	£119
EH-16	16	1	1	-	£279
EH-32	32	1	1	-	£459
Genius	UTP	BNC	AUI	SMNP	Price
GH4080	8	1	-	-	£89
GH4160	16	1	-	-	£POA
GH1000	12	1	1	opt	£249
GR5050	1	3	1	-	£POA
Hewlett Packard	UTP	BNC	AUI	SMNP	Price
AdvanceStack 8	8	opt	opt	opt	£135
AdvanceStack 12	12	opt	opt	opt	£369
AdvanceStack 24	24	-	1	opt	£619
AdvanceStack 48	48	-	1	opt	£1159
SMC	UTP	BNC	AUI	SMNP	Price
Elite 3812TP	12	1	1	opt	£399
Tiger TP6	6	-	1	-	£145
Tiger TP12	12	-	1	-	£259
Tiger CX3	-	3	1	-	£219

PRINTER SERVERS

HP JetDirect					
JetDirect Card - LaserJet 4/4Si					£269
JetDirect Card - LaserJet III/IIID					£279
JetDirect - External					£229
Intel NetPort	NetPort II - 2 printers	Price			
NetPort Express EL - 2 printers		£249			
NetPort Express XL - 3 printers		£250			
Not suitable for Windows for Workgroups		£299			

UPS SYSTEMS

Upsonic Standby UPS

- Station 28 - 280VA Backup UPS £84
- Station 40 - 400VA Backup UPS £129
- Station 60 - 600VA Backup UPS £155
- System 60 - 600VA On-line UPS £360
- System 100 - 1kVA On-line UPS £499

American Power Conversion UPS

- BK250I-250VA Backup UPS £83
- BK600I-600VA Backup UPS £159
- AP250I-250VA Smart UPS £175
- AP600I-600VA Smart UPS £219
- AP900I-900VA Smart UPS £389
- AP1250I-1250VA Smart UPS £510
- PowerChute Interface/Software (state OS) £59

TOOLS & CONNECTORS

- Thin Ethernet Crimp Tool £17.00
- RJ45 Crimp Tool £19.00
- Thin Ethernet Cable Stripper £9.00
- Round Cable Stripper £12.00
- BNC Crimp Plug £0.75
- BNC T Connector £1.75
- BNC In-line coupler £1.75
- BNC 50ohm Terminator £0.95
- BNC 50ohm Terminator & Earth £1.25
- RJ45 Crimp Plug £0.40
- EAD Thinwire Tap Socket System £25.00
- EAD Thinwire Drop Leads - from £17.00
- AMP Thinnet Tap Socket System £17.00
- AMP Thinnet Drop Leads - from £26.00
- Safernet Cabling System £15.00
- Safernet Drop Leads - from £15.00
- RJ45 24 Way Patch Panel - 19" rack mount £145

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**COLOUR
SCANNER**

800dpi **£99**

Handy Scanners from the UK's No.1 Genius Supplier

Up to true 800dpi resolution and supplied complete with OCR software, a powerful presentation graphics package and an advanced image scanning, enhancement and editing application.

ScanMate 32 & 256

800 dpi



- ◆ **Powerful Image software** - PhotoFinish 3.0 software has image auto enhancement functions and 87 tools to satisfy your creativity.
- ◆ **HI resolution** - up to 800 dpi gives you the best image quality available.
- ◆ **Powerful OCR** - included SmartPage Direct means you'll never have to re-key data again.
- ◆ **TWAIN Compliant** - Lets you use the scanner with all TWAIN compatible programs
- ◆ **Includes:** Interface card, PhotoFinish 3.0, Media Mate presentation software, Smart Page Direct OCR software, TWAIN compliant software, User's manuals.

ScanMate/32 Black and White scanner with 32 Halftones **£49**
ScanMate/256 256 true grey scale & B/W scanner **£69**

MOUSE 3+ £20 - with driver only £12

Designed for maximum comfort with a raised centre that fits the hollow of your palm. Includes powerful Imaging software: PC Paintbrush for Windows, Media Mate Presentation Software, MouseMate Driver and Pad.



ScanMate Colour SE

"As perfect as a hand scanner will ever be"
COMPUTER SHOPPER

COMPUTER SHOPPER
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800 dpi
24 bit Colour

SPECIAL OFFER
£99

- ◆ **Brilliant colour** - add the power of brilliant 24 bit true colour Images to your DTP and presentation packages
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- ◆ **High resolution** - up to 800 dpi gives you superb image quality
- ◆ **Powerful OCR** - included SmartPage Direct means you'll never have to re-key data again.
- ◆ **TWAIN compliant** - Lets you use the scanner with all the TWAIN compatible products
- ◆ **Includes:** Interface card, Photofinish 3.0, Media Mate presentation software, SmartPage Direct OCR software, TWAIN compliant software, User's manuals

NEW
ScanMate Colour Pro
As above but **1600 dpi** and including Morph Editor CD **£146**

Smarter Input - Smarter Output

- Multi Media Products**
- HiVideo frame grabber **£189**
 - HiVideo Pro 24-bit colour digitised video **£229**
 - HiTuner TV Tuner add in card (requires video card) **£58**
 - HiEncoder Record Computer graphics to VCR or TV **£115**
 - Game Pad greater hand held control **£9**
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- New Sketch 1212 **£119**
 - New Sketch 1812 **£185**
 - New Sketch 1812D **£209**
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- HiMouse - Serial **£19**
 - HiMouse - Serial & PS/2 **£21**
 - HiMouse - Cordless **£20**
- MouseOne**
- MouseOne PS/2 **£8**
- HiTrak**
- Stationary Trackball Serial & PS/2 **£22**
- HiMouse Optical**
- High performance Optical Mouse **£35**
- HiPoint**
- The Smart Mini-Trakerball **£28**
- Genius Windows Hand Scanners**
- Powerful scanning for professional image processing
 - GS-4500 - 32 Grey scales **£29**
 - GS-B105W -256 grey scales **£65**

EASY PAINTER £69

Amazing value graphics tablet gives you the chance to exercise your creativity. Includes PC Paintbrush for Windows that provides dozens of natural paint tools, complete Utilities Disk, Stylus Pen and keyboard power adaptor.



Aries Monitors

15" Aries Monitors

Aries EnergyPro 6000i NEW

Latest design auto-scanning colour display with micro processor controls giving you precise adjustments over all the major display functions.

- ◆ 15" Flat screen colour display
- ◆ 0.28 dot pitch, non-glare tube
- ◆ EPA Energy Star compliant
- ◆ 1280 x 1024 @ 60Hz (NI)
- ◆ Front panel controls
- ◆ Microprocessor Control
- ◆ Horiz. frequency: 29KHz-70KHz
- ◆ Digital Control with LCD providing 13 preset and 4 user modes
- ◆ Adjustable Horizontal and Vertical sizes

£239



"The Aries is an excellent low-cost monitor that is easy to use and has all the features that you could wish for. We definitely wouldn't have any qualms about using it all day long as a Windows monitor."

17" Aries Monitors

Aries EnergyPro 7500i NEW

At 0.26 dot pitch the 7560i is the finest quality display in its class and an unbeatable price. Featuring latest design auto-scanning colour display and precise adjustments over all display functions.

- ◆ 17" Flat screen colour display
- ◆ 0.26 dot pitch, non-glare tube
- ◆ EPA Energy Star compliant
- ◆ 1280 x 1024 @ 70Hz (NI)
- ◆ Horizontal frequency: 29KHz-80KHz
- ◆ Precise colour adjustment
- ◆ 20 preset and 4 user modes
- ◆ On screen controls
- ◆ Pincushion and Trapezoid adjust
- ◆ MPRII Low Radiation

£419



"In terms of price and features this monitor offers excellent value for money."

Clearly a better Image

For the ultimate in high-definition, flicker-free monitors displaying the sharpest text and graphics look no further than the new Aries Monitor range.



14" Aries Monitors

Aries EnergyPro SVGA LR

- ◆ 14" high resolution colour display
- ◆ 0.28 dot pitch, non-glare tube
- ◆ EPA Energy Star compliant
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- ◆ 800 x 600 (Non-Interlaced)
- ◆ 1024 x 768 (Maximum Resolution)
- ◆ Horizontal frequency: 29KHz-38KHz
- ◆ Controls: Horiz Width/Phase, Vert size/centre, tilt, Pincushion, Focus & Screen
- ◆ Includes Swivel base **£149**

Aries AlphaScan Pro LR

- ◆ 14" high resolution colour display
- ◆ 0.28 dot pitch, P22 non-glare tube
- ◆ 1024 x 768 @ 72Hz (non-interlaced)
- ◆ Horizontal frequency: 29KHz-70KHz
- ◆ Low radiation Swedish MPRII Standard
- ◆ Front mounted user controls
- ◆ Controls: Horiz Width/Phase, Vert size/centre, tilt, Pincushion, Focus & Screen **£185**
- ◆ Includes Swivel base

NEW LOW PRICING



The New range of Aries Monitors have been designed to easily meet the rigorous standards for energy conservation laid down in the US by the Environmental Protection Agency's Energy Star Program. With Aries EnergyPro Monitors saving energy doesn't mean compromising on features or quality. But best of all you will not have to pay any premium - The new Models are better value than ever.



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from only
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All Aries Relisys
models will scan
full A4 legal size



The Relisys Scanner has been voted the 'BEST SCANNER OF THE YEAR' by the readers of PC Direct



Computer Shopper

"better all round, and therefore a Best Buy, is Watford's Relisys...which combines value for money and good software support with quality output"



"...it is a considerable feat to produce a unit of this quality but Watford have stolen a march on everyone in so doing. Add the bundled software and it is undoubtedly the best buy."

PC Today



Winner of the Best Peripheral Award

With the Aries Relisys you'll open up a whole new world of possibilities. Imagine being able to scan pictures, diagrams, photographs in perfectly matched colour. To use unlimited zoom to create precisely the size you need. And then to combine them with other files to produce truly professional documents.

Aries Relisys Scanners are the perfect answer for Desk Top Publishing (DTP) and Optical Character Recognition (OCR) applications in both the PC and MAC environments. With Firmware Interpolated, they have outstanding Scanning Resolution in addition to stunning

colours (16.7 million) and mono (256 greyscales) definition.

Now industry standard TWAIN compliant, Aries Relisys Scanners can be used directly with Windows software.

With the new Hi-speed scanners you can scan an A4 image in colour in just minutes. And in a breathtaking 15 seconds deliver an A4 mono. It's simplicity itself to set up and use, and the new comprehensive range offers a model for every need.

FREE Software Worth over £500

The Relisys comes bundled with these FREE packages (requires Windows 3.1)



- Micrografix Picture Publisher v4 LE - Graphics Image Scanning/Editing
- Caere Omnipage Direct or Calera Wordscan* - OCR (optical character recognition)

* Depending on availability

Software Options for Aries Relisys Scanners
Special upgrade pricing valid at the time of purchase

UGA 1800	Upg Picture Publisher LE to v4	£75
UGA 1810	Upg OmniPage Direct v2 to Omnipage Professional v5	£185

Aries Relisys Scanners

VM3420 SCSI II 256 Grey Scale	£339
VM3520 SCSI II 16.7 million Colours 24 bit	£379

- ◆ Up to 1200dpi resolution
- ◆ TWAIN standard
- ◆ Opt. Document Feeder
- ◆ Bundled Software
- ◆ Optional Transparency Adapter (Mono only)

NEW LOW PRICES

Aries Relisys Hi-Speed SCSI II COLOUR Flatbed Scanners

Auto Document Feeders	Aries Relisys Hi-Speed SCSI II COLOUR Flatbed Scanners		
Specification	RELI 2412 2400dpi	RELI 4816 4800dpi	RELI 9624 9600dpi
◆ Capacity: 50 pages	Colour	Colour	Colour
◆ Paper size - Max: 8.5"x14" - Min: 5.0" x 7.2"	Colour	Colour	Colour
◆ Paper Thickness .05 to .15mm sheet	Single Pass	Single Pass	Single Pass
	16.7 million Colours	16.7 million Colours	16.7 million Colours
	256 Greyscale	256 Greyscale	256 Greyscale
	216 x 356mm	216 x 356mm	216 x 356mm
	Unlimited	Unlimited	Unlimited
	2400 x 2400	4800 x 4800	9600 x 9600
	256/256	256/256	256/256
	SCSI II	SCSI II	SCSI II
	ADF-30	ADF-40	ADF-60
	VMT-68S optional £295	VMT-68S optional £295	Included - Worth £500
	£475 PC/£495 Mac	£599 PC/£615 Mac	£1225 PC/£1295 Mac

* Resolution quoted is the maximum achievable using interpolation

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PRICE BREAKTHROUGH

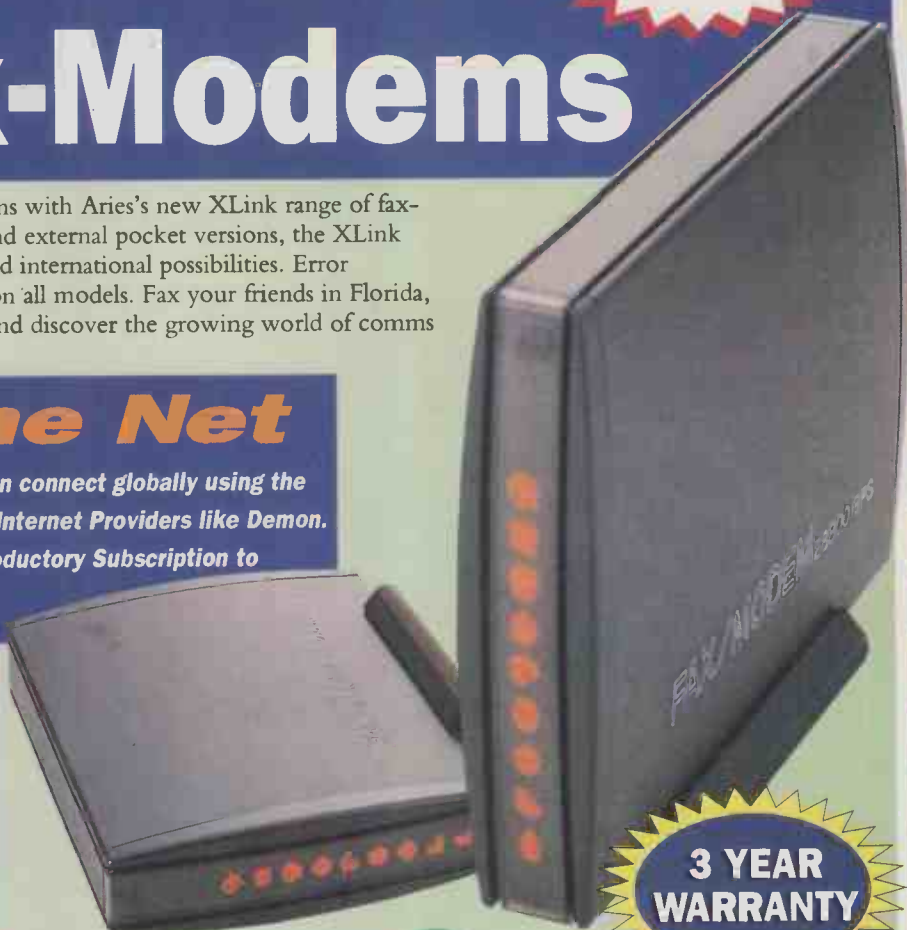
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READY***

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with Aries XLink Modems you can connect globally using the InterNet via CompuServe or other Internet Providers like Demon. Includes **FREE** Introductory Subscription to **CompuServe**



**3 YEAR
WARRANTY**

14,400 BPS

V.32
bis

£89

External Modem XL-144E

28,800BPS

V.34
CLASS

£175

External Modem XL-V34-288E



BRITISH APPROVALS
BOARD FOR
TELECOMMUNICATIONS

APPROVED
for connection to
telecommunication
systems specified in
the instructions for
use subject to the
conditions set out
in them



*VIA CompuServe



ARIES XLink RANGE: Choose from V.32bis & V.34

All models feature:

- ◆ 28,800 (V.34) or 14,400 (V.32bis) bps top data transmission speed
- ◆ V.32, V.32bis, V.23, V.22, V.22bis & V.21
- ◆ Error Correction to MNP2-5 and V.42 standards
- ◆ Data compression to MNP5 and V.42bis standards
- ◆ Call back security
- ◆ Sync & Async Operation
- ◆ Group 3, Class I & II Fax at up to 14400bps (V.17)
- ◆ Group 1 and 2 fax compatible (V.27ter and V.29)
- ◆ 16550 UART Buffer (Internal models only)
- ◆ Fully Hayes compatible
- ◆ 3 years warranty
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- ◆ Supplied complete with Delrina Winfax Lite, DOS Fax Lite plus COMit Lite for DOS and Windows

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Internal Modem XL-144i

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Internal Modem XL-V34-288i

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With PerfectOffice™, Novell have truly responded to your needs by integrating all of WordPerfect's leading business applications into one computing solution.

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Info Central	personal information manager
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Full CD Version	£265
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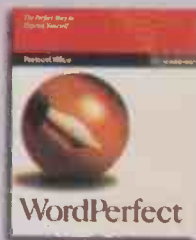
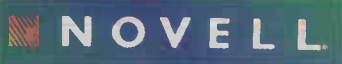
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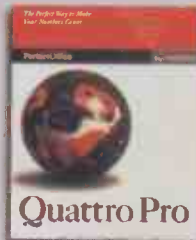
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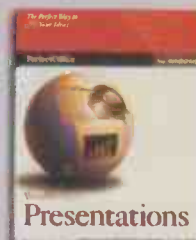
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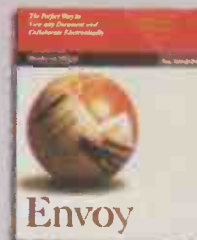
Quattro Pro 6.0

The Perfect Way to Make Numbers Count



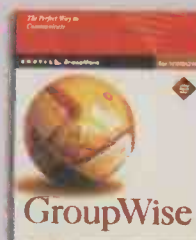
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The Perfect Way to Sell Your Ideas



Envoy 1.0a

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The Perfect Way to Share Information
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InfoCentral 1.1

The Perfect Way to Organise People, Places and Things

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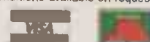
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Sidekick 95 for Windows 95

The Simplest Way to Stay Organised

Simple to use, easy to learn and incredibly powerful - Sidekick is already the best-selling personal organiser ever. The new 32bit Sidekick 95 uses the power and flexibility of Windows 95 to get you organised quicker. It takes up a fraction of the memory other PIMs use, so you can keep it running all the time without affecting your system's performance.

Sidekick 95 helps you simplify your life - not complicate it. With the improved drag-and-drop interface, there's no need to enter information twice or complete complicated import/export procedures. Sharing information between the Calendar, Cardfile, Wordprocessor, Expenses Tracker and Contact Manager is as easy as moving your mouse across the desktop. Sidekick 95 will even dial your phone! Using Windows 95's new "Plug-and-Play" technology, Sidekick automatically looks for and configures any installed modem.

New for Sidekick 95 is an integrated word processor with all the features you need for day-to-day letter writing and document production. What's more it's linked directly to the Cardfile database, so writing properly addressed letters or even mail merging is just a mouse click away.

To make life easy, Sidekick will automatically print letters, schedules, notes, names and addresses in over 70 different formats including labels, envelopes and popular paper organiser formats like filofax™.



Starfish UK



Over 10 million
copies sold!

RRP
£49.00
ONLY £29

SIDEKICK 95 FEATURES

- NEW!** Windows 95 Plug and Play compatibility
- NEW!** Integrated, full function word processor.
- NEW!** Worldwide clock
- NEW!** TAPI standard phone support for incoming calls.
- NEW!** Now you can move your appointments, notes, and to-do items from one time to another with drag-and-drop simplicity.
- NEW!** Track your expenses and create complete summaries in seconds.
- Drag-and drop to move or copy, or merge information between cardfiles and the word processor.
- New calendar lets you overlap appointments, any time, any place.
- Daily, weekly, monthly or yearly views.
- Great new label, address book and envelope printing features gets you started with more than 70 templates.
- Alarms with snooze feature.
- Alarms work all the time - whether or not Sidekick is running.
- Find and replace feature.
- Password protection keeps private information safe.
- If you get stuck, just position your mouse over an item for quick balloon help.
- Multiple, customisable cardfiles.

WHO USES SIDEKICK 95?

The business & home office professional
Friendly and flexible, Sidekick 95 offers all the calendar, address book and word processing features every overloaded professional needs. And thanks to integrated contact management, all dealings with prospects and customers can be easily tracked and managed.

The mobile professional
Sidekick 95 is the perfect portable companion - It instantly updates your files from your desktop PC to your portable and then back again.

The home PC and family PC
Sidekick 95 can keep track of everyone in the family - all in one place. From the kid's activities to personal errands, you'll always be in the right place at the right time. Even more, Sidekick 95 can organise your household inventory, car maintenance records - even your CD collection!

You!
If you've ever used a paper-based organiser or address book, then you already know how to use Sidekick 95. Imagine your current personal organiser, but with the timesaving power of your PC. Let Sidekick 95 forward unfinished tasks to the next day, sound alarms to remind you of critical appointments and help you manage important contacts.

Dashboard 95 for Windows 95

The Simplest Way to Organise Windows 95!

Like the dashboard in your car, the new native 32bit Dashboard 95 for Windows 95 helps you to get to where you want to go by keeping everything close at hand. Launch applications, check your system's memory usage, disk space and resources and at last - Windows printing made easy! Dashboard 95 makes choosing and using a new printer simple, just click an icon of the new printer and Dashboard does the rest.

New for 95 are Dashboard's Virtual Screens. This innovative and useful feature allows you to open applications on up to 9 virtual screens and then switch between them with a simple mouse click. No more cluttered screens!



- Launch Applications**
No need to search for programs - just use Dashboard 95's Launcher!
- Virtual Screens**
Switch between up to 9 virtual screens on your PC!
- Easy Printing**
Just choose the printer you need by clicking an icon - easy!
- Customise**
Customise Dashboard 95 to do exactly what YOU want it to!

ONLY £29 RRP £49.00

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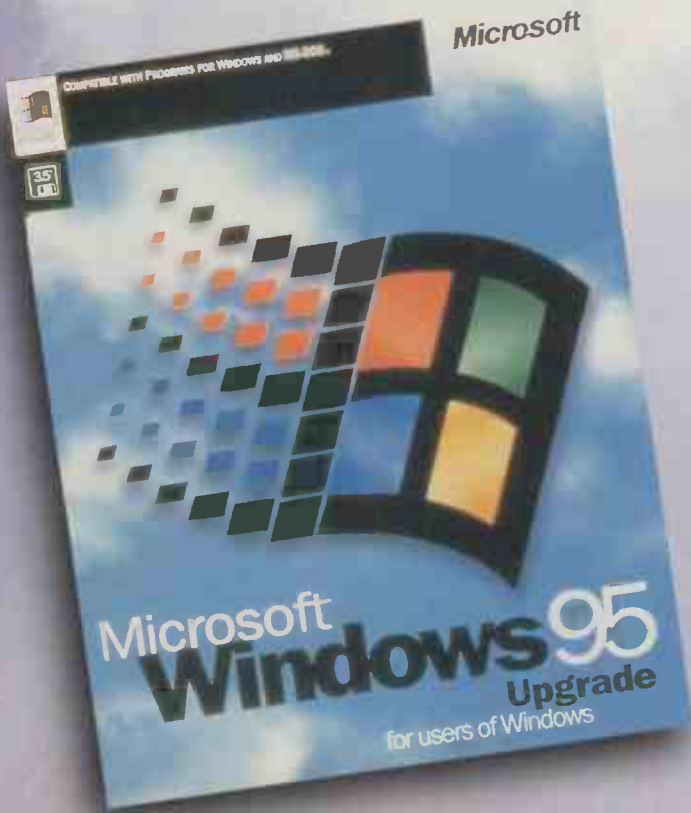
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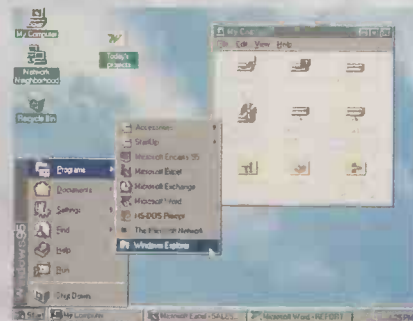
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- ◆ **Save time with an easier-to-use interface;** long file names, and one-click access to all of your programmes and documents with the Start button.
- ◆ **Plug and Play technology** automatically connects compatible disk drives, sound cards, and more.
- ◆ **32-bit preemptive multitasking** lets you run multiple programmes or perform multiple tasks simultaneously.
- ◆ **Gain built-in access to e-mail and faxes** with Microsoft Exchange, and to the internet with The Microsoft Network.
- ◆ **Full-motion video** provides vividly realistic game play with big fast, on-screen action.

With the Microsoft Windows 95 operating system, you can unlock the potential of your computer. Make it work even easier and faster. Open it wide to exciting new possibilities. And even make it more fun.

- ◆ **Easier.** Navigate your system quickly with easy-to-use tools, including the Start button, taskbar, and Windows Explorer.
- ◆ **Plug and Play.** Plug and Play frees you from manually setting up Plug and Play-compatible hardware devices such as CD-ROM drives and scanners.
- ◆ **Long File Names.** Use longer, more descriptive file names up to 250 characters long.



- ◆ **Faster.** Enjoy improved performance in all major areas, including faster file and disk access, and faster printing thanks to the 32-bit architecture of Windows 95.
- ◆ **Compatible.** Works with your current software - 16-bit programmes and drivers for Windows, Windows for Workgroups and MS-Dos are compatible with Windows 95.

A world of new possibilities.

- ◆ **Multitask.** Work on several tasks at once with fast new 32-bit programmes that support preemptive multitasking and multithreading.
- ◆ **The Microsoft Network.** Sign on to The Microsoft Network, an easy-to-use online service with e-mail, news, internet access, and more.
- ◆ **One-Stop In-box.** Microsoft Exchange is your one-stop in-box that makes it easy to view and work with such things as electronic mail from multiple sources, faxes, documents, and bulletin boards.
- ◆ **Network-Ready.** Windows 95 is network-ready, providing easy 32-bit access to network resources.
- ◆ **Mobile.** Get the most from your portable PC with features such as Dial-up networking, Battery Monitor and Plug and Play support for PCMCIA cards and docking stations.

Whatever you do, you'll enjoy it more

- ◆ **More Fun.** Your entire computing experience will be more enjoyable because you can accomplish everything more quickly, easily, and directly.
- ◆ **Better Games.** Play today's hottest games on Windows 95 thanks to better, faster graphics support for Windows-based action games.
- ◆ **Better Video.** Enjoy larger, smoother video than ever before for more fun multimedia experiences.

To run Microsoft Windows 95 you need:

- ◆ Personal computer with a 386DX or higher processor.
- ◆ 4Mb of memory (8Mb recommended).
- ◆ Typical available hard disk space required 50-55 Mb (actual requirements will vary based on features you choose to install).
- ◆ 3.5" high density disk drive or CD-ROM disk drive.
- ◆ VGA or higher resolution graphics card.

New Launches from Microsoft

New versions designed to get the full potential from Windows '95

Microsoft® Plus!

for the Windows® 95 operating system

Give Windows® 95 even more space and speed, add new Microsoft® Plus!

An intelligent new System Agent makes your PC self-maintaining.

Microsoft® Plus! has an enhanced version of DriveSpace™ that allows up to 50 percent more compression than Windows® 95 and more free disk space without any performance penalty.

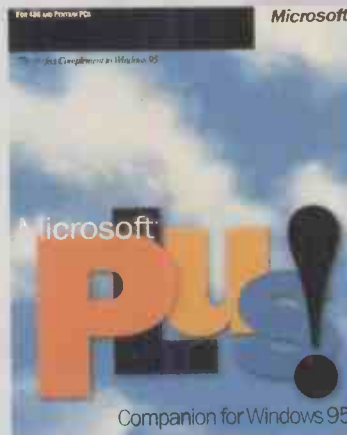
Themes - 11 colourful themes, each with 30 fonts, icons, backgrounds, sounds, screen savers, and colours.

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- ◆ Get your work done faster with full 32-bit performance

Microsoft Office Standard

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Microsoft Works for Windows 95 provides the easy-to-use, integrated tools you need - a word processor, spreadsheet, database, drawing and communication tools - to make everyday computing tasks easier and create professional documents for your business or home.

- ◆ Works has a brand new look. Besides the new 3D look, Works sports a new interface called the Task Launcher. The Task Launcher makes common tasks the primary entry point into the product.
- ◆ New Step-by-Step Help puts context-sensitive assistance right where you need it, when you need it.
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Microsoft Office Professional
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Available October

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for the Windows® 95 operating system

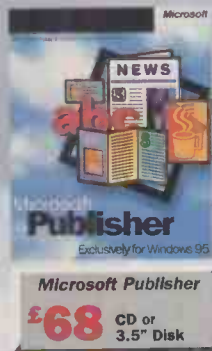
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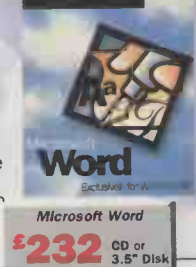


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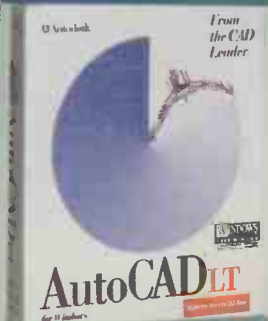
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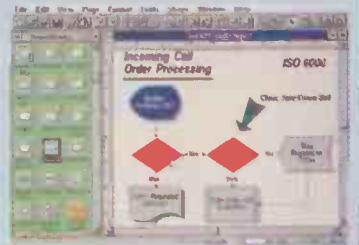
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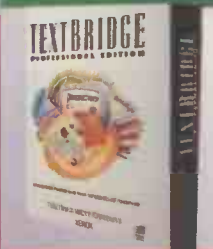
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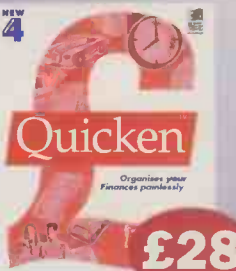
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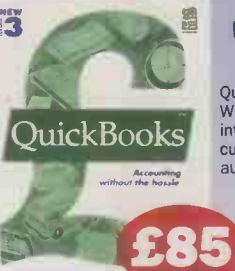


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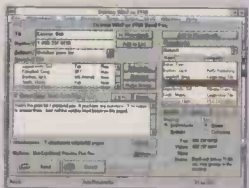
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CorelDRAW 6 is the world's premier 32-bit Windows 95 graphics application. With the speed and accuracy of 32-bit architecture, CorelDRAW 6 provides precision to 0.1 micron, multi-threading, multi-tasking and a workspace of over 150 feet by 150 feet. Support for a Multi Document Interface (MDI) allows users to open several documents at once or multiple views of a single document. CorelDRAW 6 has a fully-customisable user interface allowing easy organisation of toolbars, hotkeys, roll-ups and status bars, plus illustration, photo-editing and bitmap creation, business and multimedia presentations and 3D rendering.

New Highlights

- ◆ Increased speed and power
- ◆ Multiple Document Interface (MDI)
- ◆ Fully-customisable toolbars, hot keys, status bar
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The most advanced of their kind

The MultiSync XV15 and XE17 monitors, from NEC, are the most advanced of their kind. They are the first to feature Plug and Play which dramatically improves installation and ease-of-use. Both monitors also provide On-Screen Manager, which enables easy-to-use and customised, high-quality images. Other features include Intelligent Power Management, enabling the monitor to power down to less than 8 watts when not in use.

For every monitor sold you will receive a FREE NEC P100 Mobile Phone including FREE connection*

* Subject to status

NEC MultiSync XV15 Monitor

NEC's MultiSync XV15 is targeted at the growing small office/home office market. It offers a 15" screen with a maximum resolution of 1024 x 768 at 80Hz, and a refresh rate of 55-100Hz.

The MultiSync XV15 monitor is one of three monitors in the XV Value range, the 14-inch MultiSync XV14 and the 17-inch MultiSync XV17.

- ◆ Diagonal flat screen technology CRT
- ◆ 0.28mm dot pitch, not dare & anti-static
- ◆ 1280 x 1024 @60Hz Vertical refresh
- ◆ Horizontal frequency 31-65KHz Vertical frequency 55-100Hz
- ◆ Intelligent power management system -
- ◆ Plug & Play compatibility

£279



NEC MultiSync XV17 Monitor

NEC's MultiSync XE17 offers a 17" screen and accompanies the 21" MultiSync XE21 and the 15" MultiSync XE15. They form the XE Efficiency range which is aimed at the corporate market requiring colour intensive applications: The MultiSync XE17 has a resolution of 1024 x 768 at 80Hz and incorporates colour-management software, allowing the user to calibrate the monitor display to match printed output as well as DPI on the fly. DPI on the fly offers users resolution switching on the fly giving greater control of colour depth and definable resolution setting for each application.

- ◆ 17" Diagonal flat screen technology CRT
- ◆ 0.28mm dot pitch
- ◆ Opticlear surface, anti-static screen
- ◆ 1280x1024 @ 60Hz (NI)
- ◆ Horizontal frequency 31-65KHz Vertical frequency 55-120Hz
- ◆ Digital Control, On Screen Manager
- ◆ Plug & Play compatibility

£686

All Software supplied on 3.5" disks unless otherwise specified. For Windows Software we would recommend a minimum hardware requirement of a 386SX PC compatible with 4Mb RAM. Please check with the software publisher for suitability and system requirements before ordering. Software is not sold on trial basis. Special and bonus offer products may differ cosmetically from the standard product.

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- **MS Encarta '95** Encyclopaedia
- MS MultiMedia Works
- MS Dangerous Creatures
- MS Money
- MS Golf
- MS Scenes (3.5" disks)

Plus FREE

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- Robocop 3D
- F29
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CD-ROM DRIVE OFFERS

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Sound BLASTER

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WEPn Kit 3: CR562 with SoundBlaster 16 Stereo Soundcard	£123
WEPn Kit 4: CR562 with SoundBlaster 16 Stereo Soundcard, MegaPAK 2 with 11 CDs, Stereo Speakers	£156

Creative CR-563 Dual Speed CD-ROM

Sound BLASTER

WECr Kit 1: CR563 with Audio/Data Leads	£85
Includes Aldus PhotoStyler & Grolier's Encyclopedia	
WECr Kit 3: CR563 with SoundBlaster 16 Stereo Soundcard	£147
WECr Kit 4: CR563 with SoundBlaster 16 Stereo Soundcard, MegaPAK 2 with 11 CDs, Stereo Speakers	£182

NEC 4X IDE Quad Speed CD-ROM Drive

Sound BLASTER

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Mitsumi FX400 Quad Speed CD-ROM

Sound BLASTER

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WETo Kit 3: XM5302B with SoundBlaster 16 Stereo Soundcard	£179
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Lowest Cost ATAPI IDE Drive



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Aries ATAPI IDE Dual Speed CD-ROM

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CREATIVE MULTIMEDIA KITS



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- ◆ **MSBundle CD Software -worth £300+**
- MS Encarta 1995
- MS MultiMedia Works
- MS Money
- MS Golf
- MS Scenes (3.5")
- MS Dangerous Creatures

£198

CREATIVE/ARIES BUNDLE 3

- ◆ Aries Dual Speed IDE CD-ROM Drive
- ◆ Creative SoundBlaster 16 IDE Sound Card
- ◆ Stereo Speakers
- ◆ **MSBundle CD Software -worth £300+**
- MS Encarta 1995
- MS MultiMedia Works
- MS Money
- MS Golf
- MS Scenes (3.5")
- MS Dangerous Creatures

£179

CREATIVE/MITSUMI BUNDLE 4

- ◆ Mitsumi FX400 Quad Speed CD-ROM
- ◆ Creative SoundBlaster 16 IDE Sound Card
- ◆ Stereo Speakers
- ◆ **MSBundle CD Software -worth £300+**
- MS Encarta 1995
- MS MultiMedia Works
- MS Money
- MS Golf
- MS Scenes (3.5")
- MS Dangerous Creatures

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CREATIVE/TOSHIBA BUNDLE 5

- ◆ Toshiba XM5302B Quad Speed CD-ROM
- ◆ Creative SoundBlaster 16 IDE Sound Card
- ◆ Stereo Speakers
- ◆ **MSBundle CD Software -worth £300+**
- MS Encarta 1995
- MS MultiMedia Works
- MS Money
- MS Golf
- MS Scenes (3.5")
- MS Dangerous Creatures

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- ◆ Creative/NEC Triple Speed SCSI CD-ROM
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- Aldus Photostyler SE
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- Kal's Power Tools, Asymetrix Presentation
- Grolier's Encyclopaedia
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CPA0950

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FREE Software Bundle

Included with SoundBlaster MultiMedia Home CD Kit



Boxes shown for illustration only

Sound Blaster 16 Value IDE CD-Interface

A true 16 bit sound card that fits effortlessly into your PC and gives CD quality audio at a price you can afford. The card features 16 bit stereo sampling and playback, an enhanced FM OPL3 stereo music synthesiser, MIDI / joystick interface and 4W per channel amplifier. It has the new IDE interface system that allows simple connection to any compatible CD-ROM drive, and includes a whole host of audio software.

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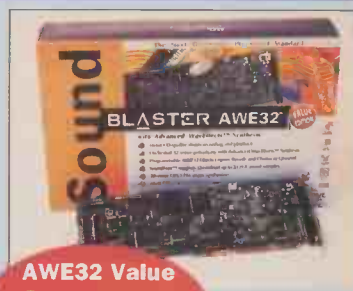


CEA1960

Sound Blaster AWE32 & AWE32 Value

This top of the range sound card features Advanced WaveEffects™ Synthesis which offers real instrument sound stored on the card to make MIDI and games sound more realistic. The card supports Qsound and the E-mu Soundfont library. The value edition includes an upgrade socket for the Advanced Signal processing chip and IDE interface.

The full edition includes an upgradable onboard RAM capability for sampling, a connector for the Wave Blaster and the Advanced Signal Processor chip on the card.



AWE32 Value
£124
 CEA1980

AWE32
£169
 CEA3350

Sound Blaster 16 pro IDE CD-Interface (Also available with Advanced Signal Processing)

This 16 bit sound card is ideal for the multimedia enthusiast who wants to upgrade at a later stage. It offers all the functionality of the value edition plus a whole host of upgrade options, including a Panasonic/Creative and IDE interface for CD-Rom drive upgrade, a connector for the Wave Blaster MIDI music daughterboard and a socket for Advanced Signal Processor chip. This card also includes Voice Assist and Text Assist software.

£89



CEA1970

With ADSP
£112 CEA1990

NEW

Sound Blaster MultiMedia Kits

Sound Blaster Discovery Kit

This low cost upgrade kit has everything you need to transform your home PC into a full multimedia PC. It features a Sound Blaster 16, Dual speed (2x) or Quad speed (4x) CD-ROM drive and stereo speakers. The bundled CD-ROM titles include a multimedia encyclopaedia, computer learning software and a whole host of games for the multimedia beginner.

Discovery 2x **£139**
 Dual Speed CD-ROM Drive CPA920

Discovery 4x **£268**
 Quad Speed CD-ROM Drive CPA930

CD-ROM titles include:

- ◆ Groliers Encyclopaedia
- ◆ How To Computers
- ◆ The Savage Empire
- ◆ Hong Kong Mahjong
- ◆ Yeagers Air Combat
- ◆ Wing Commander Academy
- ◆ Ultima 7
- ◆ Ultima Underworld
- ◆ Populous 2
- ◆ Seven Cities of Gold
- ◆ Shadowcaster
- ◆ Space Hulk

Games Blaster AWE 32 Kit **£287**

This awesome multimedia kit for the serious games player features the hottest CD based games available today. The kit features cutting edge multimedia technology with an ultra fast Quad speed CD-ROM drive and Sound Blaster AWE32 value with Advanced WaveEffects™ music capability, a high performance joystick and stereo speakers for a new dimension in games playing.

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Canon LBP4+	£139	-	-	-
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Canon LBP8 IV	£119	£279	-	-
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EPL5200/5600	£49	£115	£199	-
HP III/III/III	£59	£95	£150	-
HP II/II	£65	£95	-	-
HP III Si	-	£85	£158	£229
HP 4/4M/4P/4MP	-	£84	£115	£229
HP 4L/4ML	£65	-	-	-
KX-P4410/4430	£89	£129	-	-
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KX-P4400/5400	£75	£109	£175	-
OKI OL400e	£99	£118	-	-
Star LP8	£138	£225	-	-
Star LS5	£75	-	-	-

LASER CONSUMABLES

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Brother HL600 Series	£22	£99	-
Canon/Star 4s	£51	-	-
Canon LBP-8 IV	£70	-	-
Canon LBP-8III	£46	-	-
EPL4000/4100/4300	£64	£89	-
EPL5200	£82	-	-
EPL7100/7500/8100	£117	-	-
Fujitsu VM600	£85	-	-
Fujitsu VM800	£115	-	-
Fujitsu VM4	£29	£149	£89
HP III/III/III	£47	-	-
HP II/II/II/II	£51	-	-
HP III Si/4 Si/MX	£77	-	-
HP 4+/4M	£65	-	-
HP 4L/4ML/4P/4MP	£45	-	-
HP 4V/MV	£109	-	-
HP 5P/5MP	£60	-	-
NEC 610	£75	-	-
NEC S60/60P/62P/90/95	£105	-	-
OKI OL400/800	£19	£189	-
OKI OL400e	£17	£129	-
KX-P4410/30	£28	£80	£90
KX-P4440	£32	£108	£115
KX-P4420	£24	£57	£55
KX-P4450/50i/51/55	£18	£75	£60
KX-P4400/5400	£14	£55	-
KX-P6100	£12	£98	-
Qume Crystalprint	£99	£189	-
Star LS-5	£83	-	-
Star Wintype	£68	-	-

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Postscript Upgrade for LaserJet 4	£270
Postscript Upgrade for LaserJet 4P	£225
LaserJet 4 Lower Paper Cassette	£205
LaserJet 4 JetDirect Ethernet Card	£339
LaserJet IIP Lowe Paper Cassette	£115
Ozone filter for KX-P4420	£9
Ozone filter for KX-P4450/4455	£20
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Envelope Feeder for LaserJet 4	£199
LaserJet III FX/IBM Emulation Cart	£79
Lower Paper Tray for Canon LBP-4	£98
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Citizen 120D+Serial	80col	£105
Epson LX100	80col	£98
Epson LX300	80col	£98
Epson LX1050	132col	£187
Epson FX870	80col	£245
Epson FX1170	132col	£304
Epson DFX5000+	132col	£1188
Panasonic KX-P1150	80col	£89
Panasonic KX-P3696	80col	£259
Star LC15	132col	£177
Star LC100C	80col	£89
Star LC90	80col	£78
Star ZA200	80col	£265
Star ZA250	132col	£329

24PIN MATRIX PRINTERS

Citizen ABC Mono	80col	£103
Citizen ABC Colour	80col	£125
Citizen Swift 200 Mono	80col	£138
Citizen Swift 200 Colour	80col	£146
Citizen Swift 330X	132col	£309
Epson LQ 100	80col	£99
Epson LQ 150 Mono	80col	£112
Epson LQ150 Colour	80col	£158
Epson LQ300	80col	£150
Epson LQ570+	80col	£217
Epson LQ870	80col	£381
Epson LQ1070+	132col	£303
Epson LQ1170	132col	£441
Epson DLQ3000	132col	£805
NEC P2Q	80col	£98
NEC P3Q	132col	£178
NEC P62	80col	£315
NEC P72	132col	£372
Panasonic KX-P2023	80col	£108
Panasonic KX-P2124	80col	£198
Panasonic KX-P2135 Colour	80col	£124
Panasonic KX-P3626	132col	£252
Star LC24-15 II	132col	£232
Star LC240 Mono	80col	£90
Star LC240 Colour	80col	£103
Star XB24-200 Colour	80col	£329
Star XB24-250 Colour	132col	£395

RIBBONS/INK CARTRIDGES

Manufacturers Original Ribbons Only			
Type	Black	Colour	
Canon BJ10ex/BJ10sx	£14	-	-
Canon BJ30	£10	-	-
Canon BJ200/BJ230	£16	-	-
Canon BJ300/BJ330	£11	-	-
Canon BJC70	£9	£14	-
Canon BJC600	£7	£8	-
Canon BJC800	£6	£22	-
Canon BJC4000 Ink Tank	£7	£13	-
Citizen 120D+	£4	-	-
Citizen Swift 200/240/ABC	£4	£13	-
Citizen Swift 24X	£8	£18	-
Epson LX100	£4	-	-
Epson LX400/LX850/FX870	£4	-	-
Epson LX1050/FX1170	£5	-	-
Epson LQ100	£4	-	-
Epson LQ150	£4	£12	-
Epson LQ570/870	£5	-	-
Epson LQ1070/1170	£8	-	-
Epson LQ2550	£8	£16	-
Epson SQ870/SQ1170	£23	-	-
Epson Stylus Colour	£12	£27	-
Epson Stylus 300	£12	-	-
Epson Stylus 800/1000	£10	-	-
Fujitsu DL1150/DL1250	£5	£7	-
Fujitsu DL3600	£6	£12	-
Fujitsu B100/B200	£18	-	-
HP DeskJet 500 Series	£19	£21	-
HP DeskJet 660	£20	£23	-
HP DeskJet 850	£22	£20	-
HP DeskJet 310/320	£13	£21	-
HP DeskJet 1200C	£19	£21	-
HP PaintJet	£16	£18	-
HP PaintJet XL300	£16	£18	-
Kaga/Taxan KP810/815	£5	-	-
NEC P3Q/P32Q	£8	-	-
NEC P62/72/90	£8	£14	-
Panasonic 1150/1170/1180	£7	-	-
Panasonic 2180/23/24/35	£7	£14	-
Panasonic 1624/2624	£8	-	-
Panasonic KXP3626/3696	£11	-	-
Star LC10/LC20/LC100	£5	£9	-
Star LC100/200	£5	£11	-
Star LC24-20/24-100/24-200	£5	£12	-
Star LC24-30	£8	£12	-
Star XB24/ZA200/ZA250	£5	£12	-
Star SJ48	£15	-	-
Star SJ144 Thermal	£6	£8	-

INKJET PRINTERS

Canon BJ200ex	80col	£170
Canon BJ30	80col	£153
Canon BJ230	132col	£239
Canon BJ300	80col	£351
Canon BJ330	132col	£390
Canon BJC70	80col	£225
Canon BJC600e	80col	£335
Canon BJC800	32col	£1065
Canon BJC820 (Mac)	132col	£1228
Canon BJC4000	80col	£232
Citizen ProJet IIC	80col	£198
Epson Stylus 1000	132col	£311
Epson Stylus Colour	80col	£350
Epson Stylus Colour Pro XL	132col	£1549
Epson SQ870	80col	£453
Epson SQ1170	132col	£609
HP DeskJet 320	80col	£164
HP DeskJet 320 & CSF	80col	£180
HP DeskJet 540	80col	£225
HP DeskJet 660C	80col	£294
HP DeskJet 850C	80col	£387
HP DeskJet 1200C	80col	£630
HP DeskJet 1200C PS	80col	£985
HP DeskJet 1600C	80col	£830
HP PaintJet XL300+ A4	80col	£1599
OKI OJ300 Colour	80col	£232
Star SJ144	80col	£178
Star Wintype 800C Thermal	80col	£592

SHEET FEEDERS

Canon BJ10ex/BJ10sx	£40
Canon BJ300	£86
Canon BJ330	£96
Citizen Swift 24/200/240	£75
Epson LX400	£79
Epson LQ570/LQ870	£47
Epson LQ1070/LQ1170	£89
HP DeskJet 310/320	£48
NEC P20/P220	£59
NEC P3Q/P32Q	£85
Panasonic 1170/1180/1123	£59
Panasonic 1124i/1124/2124	£79
Panasonic 1824/2824	£128
Panasonic KX-P2135	£30
Star LC100	£69
Star LC24-20	£69
Star LC200/LC24-200	£69

INKJET REFILL PACKS FOR

◆ Canon BJ10ex/BJ10sx - 2 pack	£10
◆ Canon BJ10ex/BJ10sx - 5 pack	£24
◆ Canon BJ10ex/BJ10sx 1 Original Cart & 3 refills	£36
◆ Canon BJ200 2 refills	£34
◆ Epson SQ870/1170 - 2 refills	£9
◆ HP DeskJet Std capacity - 2 pack	£8
◆ HP DeskJet Std capacity - 5 pack	£20
◆ HP DeskJet Std capacity black Cart + 3 Std capacity refills	£30
◆ HP DeskJet Hi-capacity - 2 pack	£17
◆ HP DeskJet Hi-capacity - 5 pack	£35
◆ HP DeskJet Colour Cart & 1 each (3) colour refills	£39

ACCESSORIES

Citizen Swift 200/240/ABC Colour It	£32
Canon BJ10sx Battery Pack	£32
Epson OK Serial Interface	£29
Epson 8K Serial Interface	£75
Epson 32K Serial Interface	£95
Epson LQ100 Tractor Unit	£29
Epson LX300 Colour Kit	£29
HP DeskJet FX Emulation Cartridge	£49
HP DeskJet IBM Emulation Cartridge	£57
HP DeskJet 500 256K RAM Cartridge	£75
HP DeskJet 320 Battery Pack	£33
HP DeskJet 320 CarryCase	£49
HP DeskJet 320/540 Colour Kit	£28
HP DeskJet 320 Parallel Cable	£12
HP DeskJet 1200 Postscript Upgrade	£499
HP DeskJet Prestige Elite Fonts	£55
HP DeskJet Letter Gothic Fonts	£56
Panasonic Serial Interface	£49
Panasonic 32K Buffer	£16
Panasonic 2180/2123 Colour Kit	£30
Star 8K Serial Interface - LC Range	£52
Star 8K Serial Interface - XB Range	£39
Star 32K Buffer - LC24/XB24	£52
Dustcovers for 80col printers	£6
Dustcovers for 132col printers	£9

SPECIAL OFFERS

◆ 80 col Perspex Printer Stand	£7
◆ 132 col Perspex Printer Stand	£10
◆ 80 col Printer Stand	£8
◆ 132 col Printer Stand	£12

LUTON STORE

Finway, Dallow Road, Luton, Beds
Tel: 01582 745555

WATFORD STORE

250 Lower High Street, Watford, Herts.
Tel: 01923 237774

HP On-Site Warranty Packs

Model	1yr	3yr
Mono DeskJet/Deskwriter	£32	£40
Colour DeskJet/Deskwriter	£45	£85
LaserJet 4L/ML DJ1200/1600	£78	£90
LaserJet 4+/4M+	£135	£160
LaserJet 4V/4MV	-	£200
LaserJet 5P/5MP	-	£130

PRINTER SHARER/BUFFER

Manual Printer Sharers			
Type	Serial	Parallel	
2in/1out	£12	£13	
2in/2out	£28	£29	
3in/1out	£15	£17	
4in/1out	£24	£26	
5in/1out	-	£38	

Auto Parallel Printer Sharer Buffers			
Type	OK	256K	1Mb
2in/1out	£29	-	-
2in/2out	-	£105	£134
4in/1out	£45	-	-
4in/2out	£69	£124	£149
8in/1out	£64	-	-

Auto Serial Printer Sharer Buffers			
Type	OK	256K	1Mb
2in/1out	£27	-	-
2in/2out	-	£124	-
4in/1out	£44	-	-
4in/2out	£69	£147	-
8in/1out	£62	-	-

RAM Expansion for above Auto Sharers

RAM Module	256K	1Mb	2Mb
	£59	£78	£124

Pocket Buffers

	256K	1Mb	2Mb
Parallel Flash Buffer	£65	£98	£119
Parallel Fast Flash Buffer	£85	£125	£158
RS232 Plotter Buffer	£155	£184	£330

COMPACT CONVERTER

Serial to Parallel & Parallel to Serial	£49
As above with 256K buffer	£55
IEEE-488/Centronics Converter	£49
RS232 to RS422 Converter	£37
Parallel Line Extender	£37

PRINTER LEADS

	1.8m	5m	10m
PC Parallel - 18			

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- Altus PhotoStyler v2.0 SE £14
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 Clipmaster Pro £39
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 Colour Digital Photos Vol 6 £19
 Core! Artshow 3 £18
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 Core! Artshow 5 £20
 Core! CD Power Pak £24
 Core! Draw v4 WIN CD £84
 Core! Draw v5 WIN CD £279
 Core! Gallery £25
 Core! Gallery v2 £47
 Core! Ventura v4.2 £109
 Core! Ventura v5.0 £195
 Deep Voyage £12
 Font Fun House £35
 Font Access: 13000 TrueType Fonts £15
 Font Heaven £15
 Fonts Pro (Softkey) £13
 Full Bloom £35
 InPrint Art Library v2 £18
 Island Designs £10
 Kodak Photo CD (only with drive) £14
 Kodak Photo CD Access "Money, Money, Money!" £12
 Multimed Publishing Toolkit v3.0 MS £235
 Night Owl Publisher £12
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 SPC Harvard Graphics Clip Art £16
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 Bonny Scotland (Corel) £18
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 Americans in Space £25
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 Our Solar System £6
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 Space Series - Apollo £15
 Visions of Saturn I £13
 Visions of Saturn II £13
 World of Flight (Plane Pictures) £15
 World of Flight Simulators £15

DICTIONARIES & REFERENCE

- 500 Nations MS £33
 Anecdotes Vol. 1 £14
 Anecdotes Vol. 2 £14
 Bookshelf 1995 MS £61
 Business Assistant £19
 Chambers Dictionary £39
 CNN Newroom Global £35
 CNN Time Capsule 1993 £25
 Collins Electronic English Dict & Thes £58
 Compton's Family Choice £49
 Compton's Interactive Encyclopaedia £35
 Creepy Crawlers/Cute & Cuddles £25
 Encarta Encyclopaedia 1995 MS £55
 Encyclopaedia MS £28
 MacMillan Children's Dictionary £19
 Money Magazine £15
 My First Amazing Incredible Dictionary (DK) £25
 Oxford English Dictionary 2nd Ed £379
 Oxford English Reference Library £295
 Random House Kids Encyclopaedia £28
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- Advanced Spelling Tricks £32
 Berlitz Think & Talk French (Hypergot) £85
 Berlitz Think & Talk German (Hypergot) £85
 Berlitz Think & Talk Italian (Hypergot) £85
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 Learning Core!DRAW 4 (JIT) £28
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- 3 Foot 6 Pak (6 CDs Inc. Pult Pult Fun Pak, Basic Spelling Tracks, Cinderella) £18

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- 7th Guest £12
 1942 The Pacific Air War Gold £29
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 Asimov's The Ultimate Robot MS £11
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 Core! Wild Cards £30
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- Street Atlas USA v2 £69
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- BodyWorks 4 £29
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- C Users Group CD-ROM £18
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 Casino Collection £9
 CIA World Fact Book £6
 CIA World Tour £6
 Classic Cartoons £6
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 Computer Reference Library £8
 Creepy Crawlers £8
 Cute & Cuddles £15
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 Dr OS/2 Gold £6
 Dr Reference £6
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 Elite Plus £9
 Encyclopaedia of Sound £6
 Encyclopaedia of Sound 2 £6
 European Monarchs £9
 *117A (Microprose) £13
 *15 Strike Eagle III £13
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 Four Days of Gemini 4 £16
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 Kids Rhymes £6
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 Software Vault Collection 2 £6
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 Software Vault Platinum Collectn £6
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- Creative Blasterkeys £115
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 Sound Blaster 16 Pro IDE £87
 Sound Blaster 16 Value £57
 Sound Blaster 16 Multi CD £79
 Sound Blaster ADSP Multi CD £106
 Sound Blaster 16 Pro IDE ADSP £110
 Sound Blaster 16 SCSI II Value £103
 Sound Blaster 16 ADSP SCSI II Value £124
 Sound Blaster AWE 32 Value £124
 Sound Blaster AWE 32 (Full Pack) £169
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GRAVIS

- UltraSound £98
 UltraSound Max £135
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LOGITECH

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ORCHID

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CD ROM DRIVES

Model	Access ms	Speed	Transfer Kb/s	I/F Type	Inter Bare	Exter Bare	Inter Kit	Exter Kit
Aries Dual Speed	250	Dual	307	IDE	£75*			
BackPack Dual Speed	250	Dual		PAR				£314
BackPack 4S		Quad		PAR				£349
Creative CR563	320	Dual	300	Pana	£83*			
Goldstar GCDR402B		Dual		IDE	£83			
Goldstar GCDR5404B		Quad		IDE	£103			
ICD CD952	350	Dual	307	PCMCIA				£249
Mitsumi FX400	250	Dual	600	Quad	£106			
Nakamichi MBR-7	380	Dual	300	SCSI	£275		Holder up to 7 Cds	
NEC 4X/IDE	190	Quad	600	IDE	£119			
NEC 4Xi	180	Quad	600	SCSI	£245			
NEC 6Xi	150	Six	900	SCSI-2	£289			
NEC 6Xe	150	Six	900	SCSI-2		£369		
Panasonic CR562	320	Dual	300	Pana	£72*		£95	
Panasonic PD Optical						£649	Accepts rewritable Cd's	
Pioneer DRUA124X		Quad		IDE	£145			
Teac 1.44Mb (Combo)	195	Quad	600	PAR		£POA		
Teac CD-55A	195	Quad	600		£149			
Toshiba 3601B	150	Quad	660	SCSI	£213		£269	£309
Toshiba 5302B	195	Quad	600	IDE	£149			

*Audio & Data Leads supplied

MULTIMEDIA ▸ SCANNERS ▸ INPUT DEVICES

MULTIMEDIA (VIDEO)

- CANON**
 on RC260 Camera PC Kit **£475**
 on RC560 Camera only **£1995**
 on RC560 Camera PC Kit **£2495**
 on RC560 Camera Macintosh Kit **£2525**
- CREATIVE LABS**
 sharevision PC3000 **£995**
 Video Blaster SE **£169**
 Video Blaster RT300 **£240**
 V Coder External **£119**
- DIAMOND**
 VideoStar **£279**

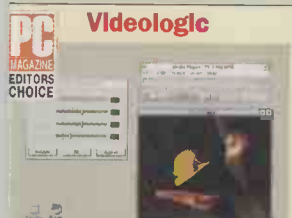
Hauppauge



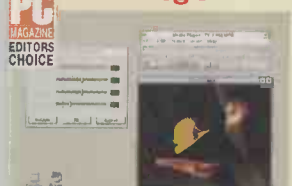
- Win TV CELEBRITY **£265**
- Win TV Cinema **£189**
- Win TV Prisma Card **£159**

- RGHID**
 elvin MPEG Playback card **£POA**
 diola **£245**
 diola Pro **£429**
 diola Premium **£565**

- FB**
 tionCD MPEG Playback Card **£189**



Videologic



- MPEG Player **£218**
- Captivator Pro **£189**
- Captivator Pro TV **£209**
- 1Mb 928 Movie **£179**
- 1Mb 928 Movie with Sound **£229**
- 1Mb 928 Movie with MPEG **£398**
- 2Mb PCI Movie **£275**
- MediaSpace **£POA**

CREATIVE MULTIMEDIA KITS

- Discover 2X Value **£169**
 Discovery CD 16 Dual Speed **£205**
 Discovery 4X Kit **£275**
 GameBlaster CD16 Dual Speed **£209**
 GameBlaster AWE32 **£298**
 Multimedia Home CD 4X **£299**
 Digital Edge 3X Multimedia Pack
 Offer whilst stocks last **£248**

SPEAKERS & ACCESSORIES



Aries Ultra Power Speakers

- Ideal for Multimedia PC's**
- Aries Stereo Speakers **£6**
 Aries HiFi Speakers **10W £19**
 Aries HiFi Pro Speakers **25W £28**
 Aries Digital Speakers **25W £39**
 Aries Digital Plus Speakers **80W £48**
 Aries Ultra Power Speakers **160W £99**
 Aries Screen Microphone **£4.50**
 Aries Stereo Headphones **£4.50**
 Aries Internal Speakers
 (fits 5.25" bay) **£12**



Aries Digital Plus Speakers

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SCANNERS

- Aries Relysis Flatbed Scanners**
 All supplied complete with SCSI interface, Micrografix Picture Publisher LE and Caere Omnipage Direct OCR software.
- VM3420 1200dpi 256 Grey scale **£339**
 VM3520 1200dpi 24-bit Colour **£379**
 RELI 2412 2400dpi 24-bit Colour **£475**
 RELI 4816 4800dpi 24-bit Colour **£599**
 RELI 9624 9600dpi 24-bit Colour **£1225**

- Canon**
 Canon IX-4015 Colour Scanner with AT-SCSI Interface & OFOTO Software **£550**

- Epson**
 Epson A4, 24 bit colour Flatbed Scanner: Supplied complete with Pic. Publisher LE, Omni Direct OCR, Interface Card & Cables
- GTx6500 Parallel **£385**
 GTx6500 SCSI **£465**
 GTx8500 Parallel **£497**
 GTx8500 SCSI **£576**
 GTx9000 Parallel **£599**
 GTx9000 SCSI **£678**

- Genius**
 ScanMate 32 - mono **£49**
 ScanMate 256 - 256 greyscale **£65**
 ScanMate Colour SE 24-bit 800dpi **£99**
 ScanMate Colour Pro 1600dpi **£146**

- Hewlett-Packard**
 A4 Flatbed Scanner supplied with Adobe Photoshop software, interfaces & cables.
- ScanJet 3P Mono **£245**
 ScanJet 3C Colour **£629**
 ADF 3P **£145** ADF 3C **£265**

- Logitech**
 ScanMan Colour **£165**
 ScanMan EasyTouch - Parallel **£98**
 Scanman PowerPage **£298**
 Scanman 256 for Windows **£77**
 ScanMan 32 for Windows **£63**

TRACKERBALLS

- Genius**
 HiPointTrackerball - Serial & PS/2 **£19**
 HiTrak Trackerball - Serial & PS/2 **£22**
- Logitech**
 Pilot TrackMan **£27**
 Trackman Voyager **£43**
 TrackMan II Combo - Serial & PS/2 **£42**
 Trackman Portable - Serial & PS/2 **£32**

DIGITISING TABLETS

- Genius**
 Easy Painter **£65**
 New Sketch 1212 - 12"x12" **£119**
 New Sketch 1812 - 18"x12" **£185**
 New Sketch 1812D - 18"x12" **£209**

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- Aries**
 2 Button Serial Mouse **£12**
- Creative**
 Aero Mouse **£65**
 Aero Pen **£65**
 Aero Duet **£83**
- Genius**
 Mouse 3 **£12**
 Mouse 3+ **£20**
 Includes powerful imaging software: PC Paintbrush for Windows, Media Mate Presentation Software, MouseMate Driver and Pad.
- HiMouse - Serial **£19**
 HiMouse - Serial & PS/2 **£21**
 HiMouse - Cordless **£20**
 Mouse Too - Serial & PS/2 **£11**
 HiMouse Optical - Serial **£35**
- Logitech**
 Chroma Mouse - Serial & PS/2 **£24**
 MouseMan Sensa - Serial & PS/2 **£38**
 MouseMan - Bus **£33**
 My Mouse - Serial **£18**
 MouseMan Cordless - Serial & PS/2 **£49**
 Pilot Mouse - Serial & PS/2 **£17**
- Microsoft**
 MS Mouse v2 - Serial or PS/2 **£35**
 MS Mouse v2 - Bus **£48**
 MS Home Mouse **£27**

JOYSTICKS

- CH Products**
 Flightstick **£29**
 Flightstick Pro **£54**
 Virtual Pilot Yoke **£62**
 Virtual Pilot Pro Yoke **£75**
- Gravis**
 Analog **£24**
 Analog Professional **£32**
 Advanced Game Pad **£17**
- Logitech**
 Cyberman **£59**
 Wingman **£24**
 Wingman Extreme **£30**
 Suncom FX3000 **£26**
 Command Control Pad **£16**
 G-Force Flight Yoke **£37**
 Axyx **£18**

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 Aries Click-Action Professional. **£29**
 KeyPro a Programmable Keyboard with LCD Calculator, Diagonal Cursor keys and Keylock, Professional **£49**
 KeyTrack Keyboard with built-in Trackerball, Alps Keys **£39**
 Cherry G83-6000 Membrane **£18**
 Cherry G83-3210 Membrane **£23**
 Cherry G80-3000 Click-Action **£33**
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All Keyboards have 102 Keys

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- Optional 3-year On-Site warranty

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HP SupportPack PCs & Peripherals



PART No.	PRODUCTS COVERED	PRICE
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GUA1012	Mono DeskJet/Deskwriter	£40
GUA1015	Colour DeskJet/Deskwriter	£65
GUA1022	LaserJet 4L/4ML	£96
GUA1025	LaserJet 5P/5MP	£132
GUA1028	LaserJet 4+/4M+	£166
GUA1031	LaserJet 4V/4MV	£199
GUA1041	LaserJet 4Si/4Si MX	£199
GUA1050	LaserJet Colour	£1199

MONITORS • VIDEO CARDS • MODEMS • HARD DRIVES

MONITORS

Aries VGA Monitors
14" Mono VGA - Paper White £85
EnergyPro 14" LR SuperVGA
0.28mm dot pitch, EnergyStar compliant, supports up to 1024x768 resolution £159

Aries Multiscan Monitors



The New Aries Multiscan monitors with Horizontal Frequency ranging from 29KHz to 75KHz providing rock solid images at resolutions of upto 1280 x 1024. Non-interlaced, coupled with the 0.28mm dot pitch Picture Tube provides the Ultra High Image that is expected from the Aries range of Low Radiation Swedish MPRII Standard Monitors. Supplied complete with tilt and swivel base.

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1024 x 768/72Hz (NI) H-Sync 70KHz, Front Mounted user controls. £189

Aries EnergyPro 6000 LR
15" Colour Display, 0.28mm dot pitch, 1280 x 1024/60Hz NI, Microprocessor Control with digital display, inc. Pincushion, Trapezoid, Rotation settings. EPA EnergyStar Compliant. £239

Aries EnergyPro 7500 LR
17" Flat Screen 0.26mm, 1280 x 1024/70Hz (NI) H-Sync 80 KHz, Microprocessor Controls include Pincushion, Trapezoid, Rotation & Individual RGB Colours, EnergyStar Compliant. £419

CTX Multiscan Monitors
1451LR 14" £169
1565GN 15" £235
1765GM 17" £449
1785GM 17" £495

Hitachi Multiscan Monitors
17MXV 17" £495
20CM2096 20" £1025

NEC Multiscan Monitors
XV15 15" £279
XV17 17" £559
XE17 17" £686
XE21 21" £1329

Panasonic Monitors - 2yr On-site warranty
TX-T1562 15" £260
TX-D1732 17" £439
TX-D1751 17" £625
TX-D2051 20" £1019
TX-D2151 21" £1316
TX-D2131 21" £1359

Sony Multiscan Monitors
CPD-15SF1 15" £295
GDM-17SE1 17" £815
GDM-20SE1VT 20" £1295
GDM-20SE1 20" £1425

Taxan Ergovision Monitors
EV 410LR 14" £185
EV 580LR 15" £265
EV 895LR 17" £799
EV 1080LR 20" £879
EV 2100LR 21" £1489

Viewsonic Multiscan Monitors
15ES 15" £245
17G 17" £549
20G 20" £989

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1Mb Stealth 64 DRAM VLB £88
2Mb Stealth 64 DRAM VLB £127
1Mb Stealth 64 Video VLB £98
2Mb Stealth 64 Video VLB £223
4Mb Stealth 64 Video VLB £325
1Mb Stealth SE PCI £77
1Mb Stealth 64 DRAM PCI £95
2Mb Stealth 64 DRAM PCI £129
1Mb Stealth 64 Video PCI £98
2Mb Stealth 64 Video PCI £228
4Mb Stealth 64 Video PCI £365

Matrox
2Mb Impression+ ISA £259
2Mb Millennium PCI £239
4Mb Millennium PCI £349

Number Nine
1Mb 9FX Vision 330 £99
2Mb 9FX Vision 330 £145
1Mb 9FX Motion 531 £139
2Mb 9FX Motion 771 £279
4Mb 9FX Motion 771 £399

Please specify PCI or VLB Bus when ordering

Orchid
1Mb Kelvin EZ ISA £98
2Mb Kelvin 64 ISA £129
1Mb Kelvin EZ VLB £87
2Mb Kelvin 64 VLB £94
2Mb Kelvin 64 VLB £128
1Mb Fahrenheit 64 VLB £115
2Mb Fahrenheit 64 VLB £154
2Mb Fahrenheit Pro 64 VLB £232
3Mb Fahrenheit Pro 64 VLB £346
1Mb Kelvin EZ PCI £88
1Mb Kelvin 64 PCI £98
2Mb Kelvin 64 PCI £129
1Mb Fahrenheit 64 PCI £117
2Mb Fahrenheit 64 PCI £155
2Mb Fahrenheit Pro 64 PCI £244
4Mb Fahrenheit Pro 64 PCI £345



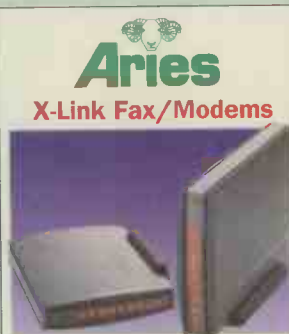
2Mb Velocity 64V S3 968 £219
4Mb Velocity 64V S3 968 £345
2Mb Powergraph 64V S3 Trio £135
Please specify VL or PCI bus when ordering

Taxan
2Mb WinTurbo £245
4Mb WinTurbo Plus £395
Please specify ISA, VL or PCI bus when ordering

Videologic

1Mb GrafixStar 300 £97
2Mb GrafixStar 300 £135
1Mb GrafixStar 500 £132
2Mb GrafixStar 500 £185
2Mb GrafixStar 700 £235
4Mb GrafixStar 700 £379
VMC Controller £45
Please specify PCI or VLB Bus when ordering

MODEMS



X-Link Fax/Modems
XL-144i Internal 14400bps V.Fast, V32bis, V42bis, MNP5 £87
XL-144E External 14400bps V.Fast V32 bis V42bis MNP5 £89
XL-V34i Internal 28800bps V34, V32bis V42bis, MNP5 £168
XL-V34E External 28800bps V34 V32 bis V42bis MNP5 £175

All above Modems are BABT approved carry 3 years warranty & are supplied complete with cables & Winfax Life Software.

Creative Labs
Phone Blaster v32 £POA
Phone Blaster v34 £POA

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ideal for Thinkpads 14.4 £129

PACE Fax/Modems
Manufacturer's 5 Year no-quibble guarantee
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GOA0900 Mobifax 14.4 Pocket £92
GOA0770 Linnet 32+ FX £149
GOA1010 Linnet Message Desk £209
GOA0780 Linnet 34 FX £264
GOA0270 Microlin Quad FX Pocket £89
GOA0020 Microlin Quad FX Internal £79
GOA0420 Microlin 32+ FX Pocket £147
GOA290 Microlin 32+ FX Internal £134
GOA1020 Microlin 34 FX Pocket £235
GOA0510 Microlin 32 PCMCIA £189
GOA1030 Microlin NB 34 PCMCIA £275
GOA0260 Ultralink 32 £330

Except for Linnet, all PACE Fax/Modems are supplied with cables, Win/Dos/Fax & CoMit software.

US Robotics Modems

	Ext	Int
Sportster 14.4 Fax/Modem	£107	£107
Sportster 28.8 V34 Fax/Modem	£169	£169
Worldport Dual Cellular	-	£122
Courier v34 Fax/Modem	£249	£249
Worldport PCMCIA 2496 Fx/Md	-	£129
Worldport Dual standard cellular PCMCIA	-	£193
Worldport v34 PCMCIA Connecting Cable 9/25	-	£8

Dataflex Fax/Modems
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3 year warranty. Complete with cables & software

Motorola Fax/Modems
3400 On-Line Internet Solution £178
3400 PRO Desk Top £164

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At our Luton Showroom
10am - 4.30pm

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IBM
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Trailblazer 850Mb 12ms 3.5" £149
Fireball 1.08Gb 12ms 3.5" £189

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ST31220A 1.05Gb 12ms 3.5" £189

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AC2850 850Mb 10ms 3.5" £159
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AC31600 1.62Gb 10ms 3.5" £399

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DK211A-51 510Mb 11ms 2.5" £199
DK212A-81 810Mb 11ms 2.5" £329
DK212A-10 1.0Gb 10ms 2.5" £479

Seagate
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CFP4207S 4.22Gb 9ms 3.5" £895

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74G7045 4.0Gb 8ms 3.5" £999
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Precision sound for music & games
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MEMORY ▾ DATA-STORAGE ▾ FAX ▾ PSION ▾ SPARES

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HP Colorado Tape Drives

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DJ-25 680Mb Internal	£129
DJ-50 1.4Gb Internal	£229
T1000 800Mb Internal	£135
JT-35 350Mb External	£159
JT-25 680Mb External	£199

Accessories

KE-10 ISA External Kit	£59
KE-15 PC/2 External Kit	£77
FC-20 Fast Tape Controller	£49
TC-15 Fast Cont. with H'Ware Comp	£105
SK7 Windows Backup Software	£39
SK1 OS/2 Backup Software	£72

Imega Storage Solutions

Tape700 680Mb Internal	£185
Tape700 680Mb External	£259
Ditto420 420Mb Internal	£POA
Ditto800 800Mb Internal	£POA

Wangtek Tape Drives

5525ES 525Mb Internal SCSI Drive	£389
5525ES 525Mb External SCSI Drive	£535
51000HT 1.0Gb Internal SCSI Drive	£495
51000HT 1.0Gb External SCSI Drive	£635
3100 2.0Gb Internal SCSI Drive	£683
3100 2.0Gb External SCSI Drive	£792

Data Cartridges

DC2000	£12	DC2120	£9
DC6250	£16	DC2120XL	£14
MC3000 XL	£15	TR1	£POA

CABLES & ACCESSORIES

Single 40w Internal IDE cable	£6
Dual 40w Internal IDE cable	£8
Single 50w Internal SCSI cable	£8
Dual 50w Internal SCSI cable	£9
50w - 50w Amphenol SCSI cable	£16
25w - 50w Amphenol SCSI cable	£16
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5.25" Power Splitter cable	£5

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Syquest

SQ3105A 105Mb IDE Internal	£215
SQ3105S 105Mb SCSI Internal	£235
SQ3270A 270Mb IDE Internal	£269
SQ3270S 270Mb SCSI Internal	£290
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BackPack External Parallel Port Drives

3.5" 1.44Mb	£115
5.25" 1.2Mb	£131

MOTHERBOARDS

CEA1800: 486 VL Bus, 256K Cache, ZIF Socket, 3 VESA, 4 ISA - 2 x 72 & 4 x 30 pin SIMM	£62
CEA5040: 486 VL Bus, 128K Cache, ZIF Socket, 3 VESA, 4 ISA - 4 x 72 pin SIMM	£59
CEA5030: 486 VL Bus, 256K Cache, ZIF Socket, 3 VESA, 4 ISA - 4 x 72 pin SIMM	£66
CEA5000: 486 PCI, 256K Cache, ZIF, Enh. IDE, Enh. Parallel/Hi-Speed 16550 Serial	£109
CEA5060: 486 PCI, 256K Cache, ZIF, SCSI II I/FACE Multi I/O (IDE/Serial & Enh. Parallel)	£129
CEA5090: Pentium P60/66MHz, 256K Cache, Enh. IDE/Enh. Parallel/Hi-Speed 18550 Serial	£99
CEA5080: Pentium P75/90/100, 256K Cache, Enh. IDE/Enh. Parallel/Hi-Speed 16550 Serial	£142
CEA5070: Pentium P75/90/100/120/133, 256K Intel Triton, EDO RAM & Pipeline Cache opt.	£165

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INTEL

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i486SX-33 SL	3V	£49
i456SX2-50	5V	£39
i486DX-33	5V	£49
i486DX2-50	5V	£55
i486DX-50	5V	£97
i486DX2-66	5V	£85
i486DX4-75	3V	£99
i486DX4-100	3V	£145
Pentium P75		£149
Pentium P90		£239
Pentium P100		£299
Pentium P120		£345
Pentium P133		£519

OTHERS

SGS 486DX2-50	5V	£45
SGS 486DX2-66	5V	£54
SGS 486DX2-80	3V	£95
AMD 486DX2-80	3V	£94
AMD 486DX4-100	3V	£99

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TOP QUALITY SIMMS AT LOW PRICES

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1Mb x 9	3 chip	£27
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4Mb x 9	3 chip	£104
1Mb x 32	4MB	£96
2Mb x 32	8MB	£203
4Mb x 32	16MB	£319
8Mb x 32	32MB	£689
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2Mb x 36	8Mb	£216
4Mb x 36	16Mb	£358
8Mb x 36	32Mb	£689
1Mb x 32	4Mb EDO 5v	£112
2Mb x 32	8Mb EDO 5v	£220
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80387SX-16/20MHz	£38
80387DX-40MHz	£45
80387SX-25MHz	£38
80487SX-25MHz	£275
80307SX-33MHz	£42
Overdrive 486SX-80387SX-40MHz	£44
25MHz-50M	£188

CONTROLLER CARDS

ISA

CEA0190 Multi I/O - 2S/1P/G	£9
CEA 0290 Multi I/O -IDE/FDD/2S/1P/G	£11
CEA 1910 Enhanced I/O -IDE/FDD/2S/1P	£39
CEA2400 Multi I/O - 2S (16550) /1P	£32
CEA0230 2 x IDE/2x FDD Controller	£9
CEA0100 Dual RS232 Serial Port Card	£8
CEA2410 Enhanced 16550 Serial Card	£29
CEA0110 Parallel Port Card	£9
CEA0300 Game Port Card	£11

ISA IDE Caching Controllers

Promise DC-100 0K	£69
Promise DC-100 1Mb	£95
Promise DC-200 0K	£75

VESA Local Bus

CEA1610 Multi I/O-IDE/FDD/2S/1P/G	£28
CEA1900 Multi I/O-IDE/FDD/2S(16550)/1P	£39
CEA2060 Multi I/O-IDE/FDD/2S/1P	£16

SCSI Controllers

Adaptec 1542 Controller Kit ISA	£174
Adaptec 1542 ControllerISA	£132
Adaptec 2842 Controller Kit VLB	£198
Adaptec 2940 Controller Kit PCI	£239
Adaptec 2742 Controller Kit EISA	£289
Adaptec PCMCIA SCSI Controller	£169
Promise DC2040 ISA	£149
Future Domain TMC1610 ISA - 16 bit	£89
Future Domain TMC850ISA - 8 bit	£45
Future Domain PCMCIA SCSI Controller	£165

COMPUTER CASES-CHIC

Mini Tower Case with PSU	£33
Midl Tower case with PSU	£58
Full Tower Case with PSU	£74
Slim Line (Desk) Case with PSU	£44
Desk Top Std Case with PSU	£33
200W PSU Unit (Desk/MiniTower)	£25
230W PSU Unit (Full Tower)	£39

FAX MACHINES

HP Fax 900	£449	HP Fax 950	£620
Pana UFV40	£259	Pana UFV60	£339
Pana UF315	£549	Pana UF322E	£675
Fax PaperRoll	£5		

PCMCIA GAME CARDS II

Play PC games on portable computers
One or two joysticks as standard
No software modification needed
Simple installation and configuration
100% British designed & manufactured **£45**

3.5" EXCEL DISKS

Pre-formatted Lifetime Warranty High Quality (65 Clip Rate Disks)

10 x DSHD Black	£5
10 x DSHD Multicolour	£6
10 x DSDD	£4
50 x DSHD	£22

PSION COMPUTERS

Ser 3A 256K	£175	Ser 3A 512K	£199
Ser 3A 1Mb	£249	Ser 3A 2Mb	£299

RAM Solid State Disks (SSD)

128K	£37	512K	£89
1Mb	£188		

Flash Solid State Disks (SSD)

128K	£26	256K	£39
512K	£64	1Mb	£88
2Mb	£138	4Mb	£255

Parallel Interface Link	£23
RS 232 Serial Link for PC	£48
Winlink 2 for PC Serial Link	£55
Fax Modem for Series 3A	£24
Mains Adapter 9V AC	£158
Professional Finance	£11
Spelling Checker/Thesaurus	£38
Spreadsheet	£29
Chess	£24
Leather Case	£24
Desk Stand	£18
Finance Pack	£14
Games Pack 3	£49
VT 100 Emulator	£32
Comcard Compute-a-diet	£49
	£59

Aries

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ESL 486 VLB

- Vesa Local Bus motherboard
- Upgrade with ZIF socket
- Latest AMI WIN BIOS
- 256K cache memory
- 8MB SIMM Memory upgradable to 64MB
- Western Digital Enhance IDE hard drive
- 1.44MB Mitsubishi floppy drive
- VLB ENHANCE IDE controller card
- 2 serial, 1 parallel and 1 game port
- VLB 1MB Cirrus Logic 5429 (New)
- Desktop or Minitower case with 200w PSU Minitower
- 14" Samsung SVGA Syncmaster 3 LR monitor MPRII
- 102 key enhance UK Keyboard

Upgrade options:

Extra 8MB RAM	£209
15" Samsung 15GL monitor	£80
17" Samsung 17GLS monitor	£380
17" Idek Vision Master monitor	£360
Midi Tower case & 230W PSU	£23
Full Tower case & 230W PSU	£46
Cherry soft touch keyboard	£10
Fujitsu ergonomic keyboard click	£15
Microsoft natural keyboard	£49
Dos 6.22 & Windows 3.11 Workgroup	£59
MS Windows 95	£89
3 button mouse & mat	£10
Microsoft Mouse V2 2 button	£29
Fax modem US Robotics Sportster	£129
Quad speed CD Rom drive	£119



SYSTEM PRICE	540MB	650MB	850MB	1.2GB	1.6GB
486DX2/66MHZ INTEL	£709	£719	£739	£799	£949
486DX2/80MHZ AMD	£709	£719	£739	£799	£949
486DX4/100MHZ AMD	£729	£739	£759	£819	£969
486DX4/100MHZ INTEL	£759	£769	£789	£849	£999

System with 8MB Simm RAM, 2 x fast serial and enhance parallel ports.

Multimedia Upgrade Options:

1. **Mitsumi Quad Speed package:** £209
Sound Blaster 16; Mitsumi FX400 quad speed CD Drive; Speakers; MS Encarta 95.
2. **NEC/Toshiba package:** £289
Sound Blaster AWE 32; NEC/Toshiba quad speed CD Drive' 25W Speakers.
3. **Sound Blaster Multimedia Home CD:** £319
Sound Blaster 16 ASP Card; Quad speed CD Drive speakers; MS Works; MS Publisher; Encarta 95; Bookshelf 94; Ancient Lands; Dangerous Creatures; Scenes; Musical Instruments Cinemania 95; Golf; Syndicate; Ultima VIII Strike Commander; Wing Commander II.

486DX 2/66 PCI

486DX 4/100 PCI

- 256K Cache memory
- Latest Phoenix BIOS
- Upgradeable to Pentium
- 8MB Simm memory
- Western Digital IDE enhance
- 1.44MB Floppy drive
- Built in enhance IDE & FDD
- 2 fast serial & parallel port
- 1MB Diamond stealth 64D
- Minitower & 200W PSU
- 14" Samsung monitor
- 102 key UK keyboard

INTEL TRITON

PENTIUM® 75 MHz

PENTIUM® 90 MHz

- Intel Zappa Motherboard
- 256K Cache memory
- Support flash BIOS
- 8MB Simm memory
- Western Digital IDE enhance
- 1.44MB Floppy drive
- PCI enhance IDE
- 2 serial 1 parallel 1 game
- 1MB Diamond Stealth 64D
- Minitower & 200W PSU
- 14" Samsung monitor
- 102 key UK keyboard

INTEL TRITON

PENTIUM® 90 MHz

PENTIUM® 120 MHz

- Intel Endeavour Motherboard
- 256K Cache memory
- Support flash BIOS
- 16MB RAM
- Western Digital IDE
- 1.44MB Floppy drive
- Built in Enhance IDE controller
- 2 fast serial + parallel port
- 2MB Diamond Stealth 64 video
- Minitower & 200W PSU
- 15" Samsung monitor
- Cherry soft touch keyboard

NT WORKSTATION

DUAL PENTIUM 90

DUAL PENTIUM 100

- Intel Naptune chipset
- 512K Cache memory
- Support flash BIOS
- 32MB Simm RAM
- Built in PCI SCSI Controller
- 1.44MB Floppy drive
- EISA 3 Com 3C579 card
- 2 x fast serial & parallel port
- 2MB Diamond stealth 64 VRAM
- Minitower & 200W PSU
- 15" Samsung 15GL monitor
- Cherry soft touch keyboard

650MB £829 / £859	650MB £969 / £1039	650MB £1569 / £1789	SCSI 520MB £2699 / £2859
850MB £849 / £879	850MB £989 / £1059	850MB £1589 / £1809	SCSI 1GB £2869 / £3029
1.2GB £929 / £959	1.2GB £1049 / £1119	1.2GB £1649 / £1869	SCSI 2 GB £3239 / £3399
1.6GB £1079 / £1109	1.6GB £1199 / £1269	1.6GB £1799 / £2019	SCSI 4GB £3529 / £3689

Warranty: All ESL systems are covered by 3 year Return to Base warranty; First year includes parts & labour; second and third years free labour. Optional on-site warranty available @ £35. 14 days money back guarantee. Free lifetime telephone support.

MOTHERBOARDS

Table listing various motherboard models and prices, including ISA, VESA Local Bus, and PCI Motherboards.

DISPLAY CARDS

Table listing display cards such as Trident 8900, VESA Local Bus, and various graphics accelerators.



CASES & POWER SUPPLY UNITS

Table listing computer cases and power supply units with their respective prices.

SOFTWARE

Table listing software products like Microsoft Windows 95, MS Office, and Lotus Smart Suite.

MONITORS

Table listing various monitor models and prices, including Samsung and LG monitors.

KEYBOARDS

Table listing different keyboard models and their prices.

MOUSE & JOY STICKS

Table listing computer mice and joystick models.

MEMORY MODULE

Table listing memory modules such as DIMMs and SIMMs.

SOUND CARDS

Table listing sound cards from brands like Sound Blaster and Creative.

FLOPPY DRIVES

Table listing floppy disk drives and their prices.

CD-ROM DRIVES

Table listing CD-ROM drives from various manufacturers.

HARD DRIVES

Table listing hard disk drives with different capacities and interfaces.

SCANNERS

Table listing various scanner models.

NETWORK

Table listing network-related hardware and software.

PRINTERS

Table listing various printer models including inkjet and laser printers.

MULTIMEDIA PACKAGE

Table listing multimedia packages that include speakers, sound cards, and CD-ROM drives.

CONTROLLER CARDS

Table listing various controller cards for different hardware components.

FAX/MODEM

Table listing fax and modem devices.

CONTROLLER CARDS

Table listing additional controller cards.

TAPE STREAMERS

Table listing tape streamer devices.

Advertisement for the NOKIA 447V 17" MONITOR £479, featuring a large image of the monitor and a list of specifications.

Warranty: All prices exclude VAT @ 17.5% & DELIVERY. All products carry 1 year return to base warranty unless specified otherwise.

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UK's best combination of value, service and support from Allgem Ltd.

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Which is committed to hard drives and your future with Allgem.

IDE HARD DRIVES

IDE is the industry standard and is fast and easy to install. All drives listed below are mode 3 or higher and capable of giving data transfer rates in bursts of up to 13.5 Mb/s.

Up To 700Mb

Make	Model	Capacity	Access	Size	Wrnty	Cache	Price/Mb	Price
Quantum	TB420AT	420Mb	14.0ms	3.5" 1"	2 yrs	128k	0.22/Mb	£94
Conner	CF8425A	425Mb	14.0ms	3.5" 1"	2 yrs	32k	0.23/Mb	£97
West. Digit.	WD1425	425Mb	12.0ms	3.5" 1"	3 yrs	64k	0.27/Mb	£114
Seagate	ST3491A	428Mb	14.0ms	3.5" 1"	3 yrs	120k	0.27/Mb	£117
Maxtor	7540AV	540Mb	12.0ms	3.5" 1"	2 yrs	32k	0.21/Mb	£111
Conner	CFS540A	540Mb	14.0ms	3.5" 1"	2 yrs	64k	0.21/Mb	£112
Fujitsu	M2684T	532Mb	12.0ms	3.5" 1"	2 yrs	256k	0.23/Mb	£123
Quantum	FB540AT	540Mb	12.0ms	3.5" 1"	2 yrs	128k	0.20/Mb	£110
Quantum	LT540AT	540Mb	11.0ms	3.5" 1"	2 yrs	128k	0.22/Mb	£119
Quantum	MV540AT	540Mb	14.0ms	3.5" 1"	2 yrs	128k	0.20/Mb	£108
West. Digit.	WD2540	540Mb	12.0ms	3.5" 1"	3 yrs	64k	0.21/Mb	£115
Seagate	ST3660A	545Mb	14.0ms	3.5" 1"	3 yrs	128k	0.21/Mb	£116
IBM	85G3863	548Mb	12.0ms	3.5" 1"	2 yrs	96k	0.22/Mb	£118

Up to 600Mb

These Drives come with free software to overcome the 528Mb BIOS barrier (except quantum - add £33 for software if required).

West. Digit.	WD2635	635Mb	11.0ms	3.5" 1"	3 yrs	64k	0.20/Mb	£130
Quantum	LT730AT	730Mb	11.0ms	3.5" 1"	2 yrs	128k	0.18/Mb	£133
West. Digit.	WD2850	851Mb	10.0ms	3.5" 1"	3 yrs	64k	0.17/Mb	£141
Maxtor	7850AV	853Mb	12.0ms	3.5" 1"	2 yrs	64k	0.18/Mb	£155
IBM	84G8998	1,000Mb	10.5ms	3.5" 1"	3 yrs	448k	0.24/Mb	£239
Quantum	FB1080AT	1,080Mb	12.0ms	3.5" 1"	2 yrs	128k	0.16/Mb	£172
IBM	7126A	1,260Mb	12.0ms	3.5" 1"	2 yrs	256k	0.17/Mb	£216
Conner	CFA1275A	1,275Mb	12.0ms	3.5" 1"	2 yrs	256k	0.21/Mb	£273
Conner	CFS1275A	1,275Mb	14.0ms	3.5" 1"	3 yrs	64k	0.16/Mb	£204
West. Digit.	WD31200	1,282Mb	10.0ms	3.5" 1"	3 yrs	64k	0.17/Mb	£218
West. Digit.	WD31600	1,600Mb	10.0ms	3.5" 1"	3 yrs	128k	0.18/Mb	£285

TAPE BACKUP

Never have more not backed up than you can afford to lose. Awkward sentence - frightening thought!

Make	Model	Capacity	int	ext
Colorado	DJ20	125/250Mb	£ 107	£ 172
HP	HP35470	DAT	£ 538	£ 636
HP Surestore	2000	DAT	£ 647	£ 768
Sony	SD15200	DAT DDS2	£ 558	£ 626
HP	HP35480	DAT	£ 622	£ 721
HP Surestore	5000	DAT	£ 728	£ 856
HP	HPC1533	DAT DDS2	£ 722	£ 799
HP Surestore	6000	DAT DDS2	£ 824	£ 954
Sony	SD15000	DAT DDS2	£ 616	£ 672
H. Packard	HPC1553	DAT DDS2	£1577	£1699

Hewlett Packard DATs can have warranty extended to 3 years On Site Maintenance

REWRTABLE OPTICAL DISKS

Works like a floppy - but much larger and much faster!

Make	Model	Capacity	int	ext
PANASONIC	PD** NEW **	650Mb + Quad CD Rom see PD section	£ 474	£ 577
Fujitsu	M2512A	230 Gb	£1322	£1399
Sony	SMOF521	1.3 Gb	£1599	£1750
H. Packard	C1716T			

Hewlett Packard opticals can have a warranty extended to 3 years On Site Maintenance

MEMORY

Capacity	Pins	Price
1 Mb	30	£ 38
4 Mb	30	£120
1 Mb	72	£ 38
4 Mb	72	£123
8 Mb	72	£260
16 Mb	72	£499
32 Mb	72	£899

Please call for proprietary memory

IOMEGA ZIP

The Zip drive Works like a large external floppy BUT it takes 100Mb cartridges and is MUCH quicker. It comes in three flavours: Parallel Port, SCSI and Apple

Zip Drive £129
Media £ 15

PANASONIC PD

This new device is a combined quad speed CD Rom and also a 650Mb rewritable optical. Yes. 650 Mb disks to backup on or copy to. Think how many Gb's of easily accessible information could you carry in your pocket!

Model	Price
LF1004B PD internal	£493.00
LF1004BK PD internal kit	£544.00
LF1000E PD external	£614.00
LF1000EK PD external kit	£676.00
LMR 650E 650Mb disk	£ 43.00

SCSI HARD DRIVES

For larger and more powerful systems SCSI drives are more desirable. SCSI gives you the advantage of having devices externally as well as internally up to a total of seven on a chain. Also you have the option of not only hard disks but high performance scanners, tape backup, optical, CD Rom etc. N.B. you must have a SCSI interface to run SCSI devices.

Make	Model	Capacity	Access	Size	Wrnty	Cache	Price/Mb	Price
UP TO 1Gb								
Quantum	TB420S	420Mb	14.0ms	3.5" 1"	2 yrs	128k	0.27/Mb	£115
Fujitsu	M2684S	532Mb	12.0ms	3.5" 1"	2 yrs	256k	0.24/Mb	£126
Quantum	FB540S	540Mb	12.0ms	3.5" 1"	2 yrs	128k	0.23/Mb	£126
IBM	66G9743	548Mb	12.0ms	3.5" 1"	2 yrs	96k	0.29/Mb	£160
Quantum	LT730S	730Mb	11.0ms	3.5" 1"	2 yrs	128k	0.22/Mb	£160
Quantum	TB850S	850Mb	14.0ms	3.5" 1"	2 yrs	128k	0.21/Mb	£177
1Gb TO 1.9Gb								
IBM	84G9001	1,000Mb	10.5ms	3.5" 1"	3 yrs	448k	0.32/Mb	£323
Conner	CFP1080S	1,000Mb	11.0ms	3.5" 1"	3 yrs	256k	0.27/Mb	£273
Quantum	FB1080S	1,080Mb	12.0ms	3.5" 1"	2 yrs	128k	0.24/Mb	£261
Fujitsu	M1606S	1,090Mb	11.0ms	3.5" 1"	5 yrs	512k	0.27/Mb	£294
HP	C3724S	1,200Mb	9.5ms	3.5" 1"	5 yrs	512k	0.27/Mb	£325
2Gb TO 4Gb								
IBM	86F0102	2,000Mb	9.2ms	3.5" 1"	5 yrs	512k	0.35/Mb	£699
Quantum	2100S	2,100Mb	9.5ms	3.5" HH	5 yrs	512k	0.25/Mb	£524
HP	C3725S	2,100Mb	9.5ms	3.5" 1"	5 yrs	512k	0.27/Mb	£557
Conner	CFP2105S	2,100Mb	8.5ms	3.5" 1"	5 yrs	512k	0.26/Mb	£539
Micropolis	MIC4221	2,100Mb	8.5ms	3.5" HH	5 yrs	512k	0.29/Mb	£603
Conner	CFP2107S	2,110Mb	8.5ms	3.5" 1"	5 yrs	512k	0.27/Mb	£579
Fujitsu	M2903S	2,110Mb	11.0ms	3.5" HH	5 yrs	512k	0.25/Mb	£537
Quantum	XP32150	2,150Mb	8.0ms	3.5" 1"	5 yrs	1,024k	0.28/Mb	£611
IBM	74G7044	2,160Mb	8.0ms	3.5" 1"	5 yrs	512k	0.28/Mb	£739
Fujitsu	M2909S	3,100Mb	11.0ms	3.5" HH	5 yrs	512k	0.24/Mb	£734
4Gb AND UP								
Conner	CFP4207S	4,220Mb	9.0ms	3.5" HH	5 yrs	512k	0.21/Mb	£891
Quantum	GP4280S	4,280Mb	8.6ms	3.5" HH	5 yrs	512k	0.18/Mb	£768
Micropolis	MIC3243	4,300Mb	8.5ms	3.5" HH	5 yrs	512k	0.18/Mb	£792
Quantum	XP34300	4,300Mb	8.0ms	3.5" HH	5 yrs	2,048k	0.22/Mb	£964
IBM	74G7045	4,320Mb	8.6ms	3.5" HH	5 yrs	512k	0.25/Mb	£1,080
IBM	747G037	5,200Mb	8.0ms	3.5" HH	5 yrs	512k	0.23/Mb	£1,186
Micropolis	MIC1991	9,110Mb	12.0ms	5.25" FH	5 yrs	512k	0.16/Mb	£1,485
Audio Visual (AV) Drives								
Micropolis	MIC4221AV	2,100Mb	8.5ms	3.5" HH	5 yrs	512k	0.30/Mb	£638
Conner	MIC3243AV	4,300Mb	8.5ms	3.5" HH	5 yrs	512k	0.20/Mb	£852
Micropolis	MIC1991AV	9,100Mb	12.0ms	5.25" FH	5 yrs	512k	0.17/Mb	£1,573
Wide Drives								
Conner	CFP2105W	2,100Mb	8.5ms	3.5" 1"	5 yrs	512k	0.27/Mb	£567
Micropolis	MIC4221W	2,100Mb	8.5ms	3.5" HH	5 yrs	512k	0.32/Mb	£669
Conner	CFP2107W	2,110Mb	8.5ms	3.5" 1"	5 yrs	512k	0.29/Mb	£609
Conner	CFP4207W	4,220Mb	9.0ms	3.5" HH	5 yrs	512k	0.22/Mb	£920
Micropolis	MIC3243W	4,300Mb	8.5ms	3.5" HH	5 yrs	512k	0.20/Mb	£858
Micropolis	MIC1991W	9,100Mb	12.0ms	5.25" FH	5 yrs	512k	0.17/Mb	£1,573

Please call for external SCSI

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EOB. Prices and manufacturer's specifications subject to change without notice. All prices exclude VAT and delivery. Please check suitability before ordering. All goods sourced from authorised channels - please beware of grey importers. 7 day money back guarantee on advertised hard drives excludes carriage and must be in "as new" condition. Goods not sold on trial basis. Restocking fee applicable (except 7 days on hard drives) but try before you buy available on some goods, please enquire. All returns must have prior authorisation and a valid returns number. All returns must be in original packing or warranty may be affected.



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When you compare our prices and service with other PC advertisers, remember to check the small print. For instance, do they offer free next day delivery to anywhere in mainland UK? How fast (and how much) is their delivery service? Do they even have the goods in stock, or are they waiting for your order before they build your PC or buy one from the manufacturer? And will their PC have a mouse, manuals and other basic items, or will these be charged as extras? Check 'Multimedia Upgrades' too - do they include a sound card and speakers, or just a CD-ROM Drive - and is that dual or quad speed?

At Silica, we try to make things clear - a fast and free delivery on all PCs, no hidden extras and multimedia features that will blow your mind!

*The Silica PC is not stocked by our Harrods store.

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MON-FRI: 9AM-7PM SAT: 9AM-5.30PM

SYSTEM SPECIFICATIONS

PROCESSOR

- 4 models: DX4 100, Intel Pentium™ 75MHz, 90MHz, 120MHz
- Type 5 ZIF socket on all Pentium™ processor based models
- P24T upgradeable - DX4 100 model

MEMORY

- 8Mb RAM (exp. to 128Mb) Pentium™ based models
- 4Mb RAM (expandable to 64Mb) DX4 100 model
- Accepts 72-pin SIMMS - single or double sided
- 256K external write-back cache
- Pentium™ systems upgrade to 166 - DX4 100 to 512K

DRIVES

- 540Mb or 850Mb lightning fast Quantum hard drive
- 3.5" 1.44Mb floppy disk drive
- PCI enhanced IDE hard and floppy drive controller
- Customisable settings for 4 drives
- 1 x 3.5" and 2 x 5.25" storage bays

DISPLAY

- 14" .28mm NI S-VGA colour monitor
- Low radiation MPRII compliant
- EPA energy star compliant
- 15" monitor upgrade available (extra £59+vAT)
- 1Mb MicroCrystal 12SD Trio 32 PCI video accelerator
- 2Mb upgrade £50+vAT - 2 x MEM 1316

ARCHITECTURE

- Mini-tower case
- 102-key UK keyboard
- Microsoft mouse
- Plug and play PCI motherboard
- SIS chipset - energy star compliant (75, 90 models)
- Integrated motherboard with flash BIOS
- 2 x PCI, 1 x PCI (ISA) and 3 x ISA expansion slots
- EPP & ECP capable printer ports
- 16550 compatible UART driven high speed ports
- Powerful 230w switchable PSU with whisper quiet fan
- Power saving mode
- CPU cooling fan

SOFTWARE

- MS DOS 6.22
- Windows For Work Groups 3.11
- PC Utility Software
- Tutorial Software
- All software includes disks and manuals (not OPC 1424)
- Pre-configured, optimised and ready to run
- Multimedia Option (not OPC 1424) - see right

WARRANTY

- 1 year on-site maintenance - with DIGITAL
- Next working day response
- Lifetime technical support hotline

486DX4 100MHz PROCESSOR

MULTI MEDIA OPTION + £200 SEE LEFT

4Mb RAM UPGRADABLE TO 64Mb

540Mb HD

14" MONITOR
28MM NI S-VGA COLOUR

£799 VAT

OR £29 PER MONTH INC VAT

£140.32 deposit and 36 monthly payments of £29
cash price £938.83 inc vat credit price £1184.32 inc vat - APR 19.9%
Ref: OPC 1404 + MON 1514

PENTIUM™ 75MHz PROCESSOR

8Mb RAM UPGRADABLE TO 128Mb

540Mb HD

14" MONITOR
28MM NI S-VGA COLOUR

£999 VAT

OR £39 PER MONTH INC VAT

£99.97 deposit and 36 monthly payments of £39
cash price £1173.83 inc vat credit price £1503.97 inc vat - APR 19.9%
Ref: OPC 1424 + MON 1514

PENTIUM™ 75MHz PROCESSOR

MULTI MEDIA OPTION + £200 SEE LEFT

8Mb RAM UPGRADABLE TO 128Mb

850Mb HD

14" MONITOR
28MM NI S-VGA COLOUR

£1099 VAT

OR £42 PER MONTH INC VAT

£134.87 deposit and 36 monthly payments of £42
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Ref: OPC 1427 + MON 1514

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QUAD SPEED CD-ROM DRIVE

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MICROSOFT DINOSAURS

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MICROSOFT ENCARTA '95

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36 MONTHS TO PAY 19.9% APR

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MULTI MEDIA OPTION + £200 SEE LEFT

8Mb RAM UPGRADABLE TO 128Mb

850Mb HD

14" MONITOR
28MM NI S-VGA COLOUR

£1199 VAT

OR £49 PER MONTH INC VAT

£59.63 deposit and 36 monthly payments of £49
cash price £1408.83 inc vat credit price £1823.63 inc vat - APR 19.9%
Ref: OPC 1449 + MON 1514

PENTIUM™ 120MHz PROCESSOR

MULTI MEDIA OPTION + £200 SEE LEFT

8Mb RAM UPGRADABLE TO 128Mb

850Mb HD

14" MONITOR
28MM NI S-VGA COLOUR

£1399 VAT

OR £55 PER MONTH INC VAT

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IBM APTIVA PCs

IBM Aptiva™

SILICA OFFERS SEE BELOW

THE NEW RANGE

INCLUDES 1 YEAR ON-SITE WARRANTY



APTIVA RANGE	MULTIMEDIA - CD-ROM DRIVE - SOUND CARD - SPEAKERS & SOFTWARE					MULTIMEDIA - WIN 95
	DESKTOP 788 486DX2 66MHz	DESKTOP 855 486DX2 50MHz	DESKTOP 858 486DX2 66MHz	TOWER 857 486DX2 66MHz	TOWER 792 486DX2 66MHz	DESKTOP T82 486DX2 66MHz
UPGRADE	OVERDRIVE	OVERDRIVE	PENTIUM™ 28.7	PENTIUM™ 28.7	PENTIUM™ 28.7	PENTIUM™ 28.7
RAM	4Mb	4Mb	4Mb	8Mb	8Mb	4Mb
MAXIMUM RAM	128Mb	32Mb	128Mb	128Mb	128Mb	128Mb
EXTERNAL CACHE	OPTIONAL	-	OPTIONAL	OPTIONAL	OPTIONAL	OPTIONAL
HARD DISK DRIVE	540Mb	270Mb	540Mb	540Mb	540Mb	540Mb
3 1/2" FLOPPY DRIVE	✓	✓	✓	✓	✓	✓
14" S-VGA MONITOR	✓	✓	✓	✓	✓	✓
MONITOR DOT PITCH	28mm DIGITAL	28mm DIGITAL	28mm DIGITAL	28mm DIGITAL	28mm DIGITAL	28mm DIGITAL
VIDEO RAM	1Mb	1Mb	1Mb	1Mb	1Mb	1Mb
CIRRUS VIDEO CHIPSET	30	26	30	30	30	30
LOCAL BUS	VESA	VESA	VESA	VESA	VESA	VESA
EXPANSION SLOTS	4	3	4	8	8	4
DRIVE BAYS	4	4	4	6	6	4
TV TUNER/CAPTURE CARD	-	-	-	-	-	-
IBM HELPWARE	✓	✓	✓	✓	✓	✓
MULTIMEDIA FEATURES	✓	✓	✓	✓	✓	✓
QUEST/PRINTER OPTION	✓	✓	✓	✓	✓	✓
ON-SITE WARRANTY	1 YEAR	1 YEAR	1 YEAR	1 YEAR	1 YEAR	1 YEAR
SILICA EXC VAT	£850²¹ <small>IBM 1505 - MON 1328</small>	£850²¹ <small>IBM 1492 - MON 1314</small>	£1190⁶³ <small>IBM 1515 - MON 1328</small>	£1360⁸⁵ <small>IBM 1483 - MON 1328</small>	£1105⁵³ <small>IBM 1625 - MON 1328</small>	£1275⁷⁴ <small>IBM 1748 - MON 1328</small>
CREDIT TERMS - 36 MONTHLY REPAYMENTS - 19.9% APR						
CASH PRICE INC VAT	£999	£999	£1399	£1599	£1299	£1499
DEPOSIT	£90.35	£90.35	£159.93	£167.19	£142.54	£149.80
36 M'THS APR 19.9%	£33	£33	£45	£52	£42	£49
TOTAL CREDIT PRICE	£1278.35	£1278.35	£1779.93	£2039.19	£1654.54	£1913.80

*Pentium is a trademark of the Intel Corporation

SPECIFICATIONS INCLUDE:

- 14" S-VGA Colour Monitor
- IBM Helpware Support
- Cirrus Video Chipsets
- Intel Processor
- Pentium Overdrive Upgradeable
- 1 Year On-Site Warranty

SOFTWARE INCLUDES:

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- MS-Windows 3.1
- PC DOS 6.3
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- MS-Works for Windows 3
- Index
- Scheduler
- Personal Desktop
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- First Steps

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COMPAQ PRESARIO MULTIMEDIA PCs

COMPAQ

Presario

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3 YEAR WITH 1 YEAR ON-SITE WARRANTY



PRESARIO RANGE	CDS 522	CDS 524	CDTV 528	CDS 742	CDS 772	CDS 942	CDS 962	CDS 972
	INTEGRATED 486SX2 66MHz	INTEGRATED 486DX2 66MHz	INTEGRATED 486DX2 66MHz	DESKTOP 486DX4 90MHz	DESKTOP PENTIUM P75	MINI-TOWER 486DX4 90MHz	MINI-TOWER PENTIUM P60	MINI-TOWER PENTIUM P75
HARD DISK DRIVE	270Mb	420Mb	420Mb	420Mb	535Mb	420Mb	535Mb	725Mb
3 1/2" FLOPPY DRIVE	✓	✓	✓	✓	✓	✓	✓	✓
MEMORY (RAM)	4Mb	8Mb	8Mb	8Mb	8Mb	8Mb	8Mb	8Mb
MAXIMUM RAM	64Mb	64Mb	64Mb	100Mb	136Mb	100Mb	136Mb	136Mb
14" S-VGA MONITOR	INTEGRATED 28mm	INTEGRATED 28mm	INTEGRATED 28mm	28mm	28mm	28mm	28mm	28mm
FAST VESA BUS	✓	✓	✓	✓	✓	✓	✓	✓
ISA EXPN SLOTS	2	2	2	3	2 + 2 PCI	5	3 + 2 PCI	3 + 2 PCI
DRIVE BAYS	3	3	3	3	4	5	5	5
PLUG & PLAY	✓	✓	✓	✓	✓	✓	✓	✓
HOME COMMUNICATIONS ANSWERPHONE/FAX/MODEM	-	✓	✓	✓	-	✓	-	-
SOFTWARE	✓	✓	✓	✓	✓	✓	✓	✓
CD DRIVE + S CARD + SPEAKERS	✓	✓	✓	✓	✓	✓	✓	✓
QUEST/PRINTER OPTION	✓	✓	✓	✓	✓	✓	✓	✓
SILICA EXC VAT	£1020⁴³ <small>CPD 7522</small>	£1190⁶⁴ <small>CPD 7524</small>	£1445⁹⁶ <small>CPD 7528</small>	£1403⁴⁰ <small>CPD 7742</small>	£1616¹⁷ <small>CPD 7772</small>	£1445⁹⁶ <small>CPD 8842</small>	£1531⁰⁶ <small>CPD 8862</small>	£1701²⁸ <small>CPD 8872</small>
CREDIT TERMS - 36 MONTHLY REPAYMENTS - 19.9% APR								
CASH PRICE INC VAT	£1199	£1399	£1699	£1649	£1899	£1699	£1799	£1999
DEPOSIT	£125.14	£132.40	£157.05	£134.59	£191.84	£157.05	£174.45	£209.24
36 M'THS APR 19.9%	£39	£46	£56	£55	£62	£56	£59	£65
TOTAL CREDIT PRICE	£1529.14	£1788.40	£2173.05	£2114.59	£2423.84	£2173.05	£2298.45	£2549.24

SPECIFICATIONS INCLUDE:

- Quad Speed CD-ROM Drive
- 14" S-VGA Colour Monitor
- 16-Bit Stereo Sound Card & Stereo Speakers
- 3 1/2" Floppy Drive
- Answerphone, Fax & Modem (not in CDS 522, 722, 962, 972)

SOFTWARE INCLUDES:

- MS-DOS 6
- MS-Money 3
- MS-Encarta
- MS-Windows 3.1
- MS-Entertainment IV
- Compaq Welcome
- MS-Works for Windows 3
- Ultimate Human Body
- Tabworks

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CDA468-011

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16-Bit Sound Galaxy Sound Card,
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drive with removable cartridges

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Software - CDR 2152

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Soundcard
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Interface

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Lemmings,
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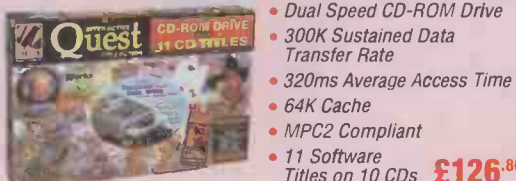
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- 16-Bit Stereo Sound Card
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 - Includes Winfax Lite
for DOS & Windows
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- £89.36**
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16.7 Million Colours, 1600x1200 Resolution,
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GD5434 Processor & MPEG controller - PDC 1238

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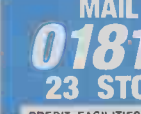
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BJ200EX

- 3 Pages/Minute - 204cps & 248cps (for NLQ & draft) 10cpi
- 80 Column - A4
- Resolution: 360x360dpi
- 720x360dpi with Smoothing Function
- 8 Built-in and 20 Scalable Fonts Supplied on Disk
- IBM, Canon & Epson LQ510 Emulations
- Parallel Interface
- 62K Input Buffer
- Built-in Sheet Feeder

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EXC VAT PRI 1720

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parallel interface, Inc A/S/F - PRI 1630

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parallel interface - PRI 1720

BJC-4000 Colour B/Jet £271.49
80 column, 248cps, 360 x 720dpi (mono),
parallel interface - PRI 1734

BJC-70 Colour B/Jet £254.47
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parallel interface, inc A/S/F - PRI 1645

BJC-600e Colour B/Jet £382.13
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parallel interface - PRI 1767

**OPTIONAL MONO
HIGH SPEED HEADS**
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BJC4000

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- Resolution: 360x360dpi
- 720x360dpi with Smoothing Function
- LQ2550, X23E & Canon Enhanced
- 5 Typefaces
- Parallel Interface
- 64K Input Buffer
- Auto & Manual Feeder

£271.49
EXC VAT PRI 1734

EPSON

Stylus Colour Inkjet £359.00
80 column, 200cps, 360 x 720dpi,
parallel interface - PRI 4300

HEWLETT PACKARD

A4 MONO INKJET

DeskJet 540



- 3 Pages Per Minute in Econofast Mode
- Res: 600x300dpi Black Printing 300x300dpi Colour Printing (Optional)
- Smooth Crisp Characters with HP RET
- 256 Levels of Greyscales
- 6 Built-in Fonts
- 14 TrueType Scalable Fonts
- Parallel Interface
- 3 Year Warranty - Return to Hewlett Packard

£254.47
EXC VAT PRI 5240

DeskJet 320 Inkjet £228.94
A4, 3ppm, 600 x 300dpi, parallel
interface inc sheet feeder - PRI 5143

DeskJet 540 Inkjet £254.47
A4, 3ppm, 360 x 720dpi,
parallel interface - PRI 5240

DeskJet 660 Col Inkjet £365.11
A4, 4ppm, 600 x 600dpi,
parallel interface - PRI 5391

DeskJet 850 Col Inkjet £475.74
A4, 6ppm, 600 x 600dpi,
parallel interface - PRI 5394

LaserJet 4L Laser £385.00
A4, 4ppm, 300 x 300dpi,
parallel interface - LAS 4110

LaserJet 4Plus Laser £995.00
A4, 12ppm, 600 x 600dpi,
parallel interface - LAS 4144

LEXMARK

A4 COLOUR INKJET

ExecJet IIC



- Latest Technology Thermal Inkjet
- >3 Pages/Min - 300cps Black Only 2.7 Pages/Min - Colour Printing
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- 12 Resident Scalable Fonts 2 Bitmap Fonts
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- Res: 600x300dpi Black Only 300x300dpi Colour
- Built-in Automatic Sheet Feeder
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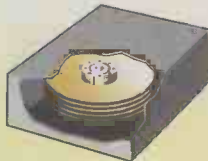
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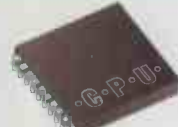
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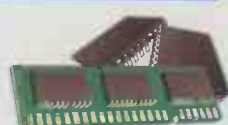


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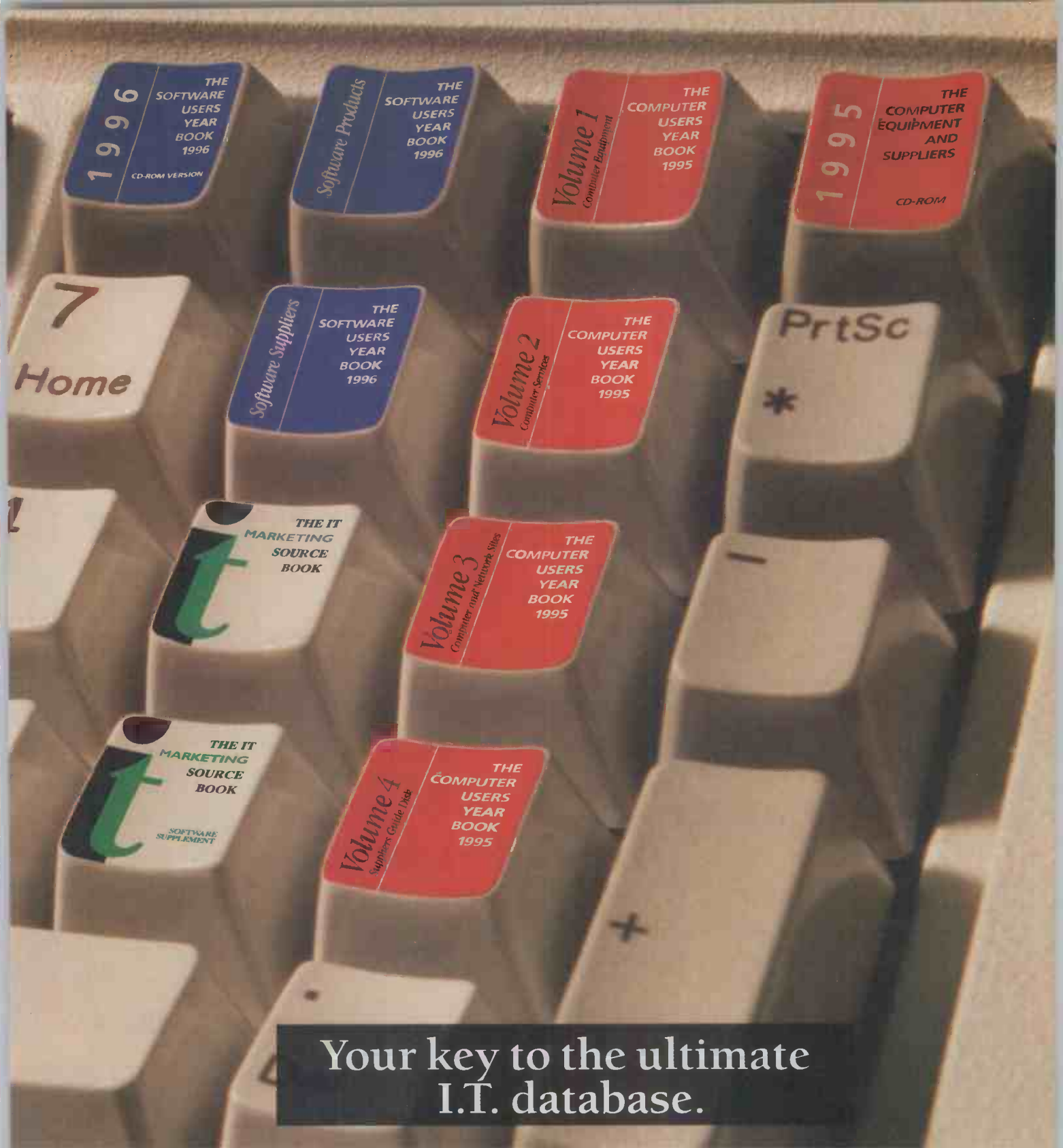
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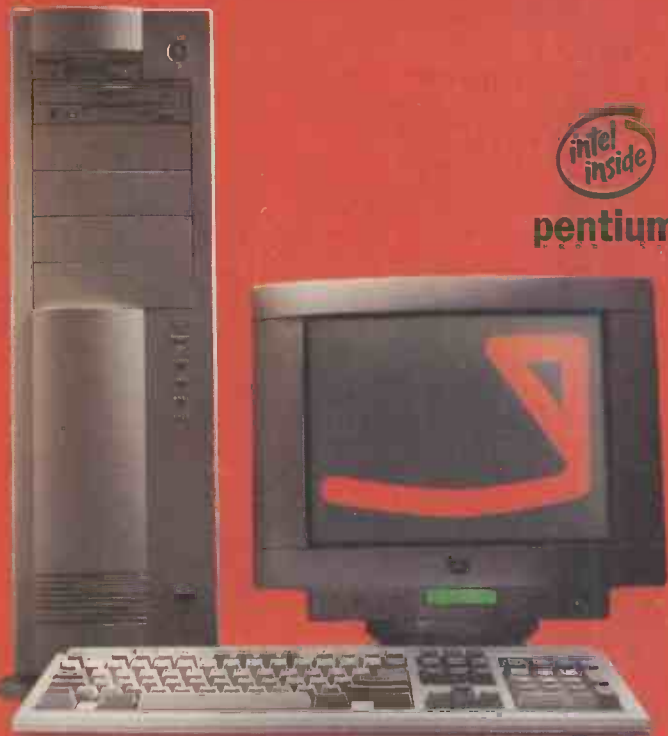
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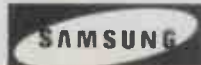
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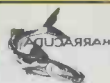
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STEALTH 64 1MB DRAM VLB	£92
STEALTH 64 1MB DRAM PCI	£95
STEALTH 64 2MB DRAM VLB	£127
STEALTH 64 2MB DRAM PCI	£129
STEALTH 64 2MB VRAM VLB	£230
STEALTH 64 2MB VRAM PCI	£216
STEALTH 64 4MB VRAM VLB	£318
STEALTH 64 4MB VRAM PCI	£318
ORCHID	
KELVIN 64 1MB ISA	£98
KELVIN 64 1MB VLB	£97
KELVIN 64 1MB PCI	£98
KELVIN 64 2MB ISA	£129
KELVIN 64 2MB VLB	£130
KELVIN 64 2MB PCI	£129

MONITORS

PHILIPS 14M	
PHILIPS 14M	£89
PHILIPS 15B	£254
PHILIPS 17C	£423
PHILIPS 20C	£CALL
PHILIPS 20T	£1315
PHILIPS 21A	£CALL
SONY 155H	£590
SONY CP0130	£595
SONY GDM175E1	£811
SONY GDM205E1V1	£1403

CTK 14" SVGA	£169
CTK 15" SVGA	£229
CTK 17" SVGA	£489
NEC3V	£307
NEC4E	£364
NEC5FGP	£862
NEC6GFP	£1419
PHILIPS 14M	£89
PHILIPS 15B	£254
PHILIPS 17C	£423
PHILIPS 20C	£CALL
PHILIPS 20T	£1315
PHILIPS 21A	£CALL
SONY 155H	£590
SONY CP0130	£595
SONY GDM175E1	£811
SONY GDM205E1V1	£1403
CONTROLLER CARDS	
ISA MULTI I/O	£9
VLB MULTI I/O	£12
VLB ENHANCED MULTI I/O	£19

SCSI CONTROLLERS

ADAPTEC 1510	£55
ADAPTEC 1542	£174
ADAPTEC 2842	£189
ADAPTEC 2940	£239
ADAPTEC 2742	£289
PROMISE DC200	£275

MULTI MEDIA VIDEO PRODUCTS

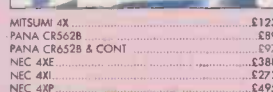
CANON ION RC260	£475
CANON RC260 CAMERA ONLY	£250
CANON RC500 ION CAMERA	£1995
CANON RC560 PC KIT	£2495
CREATIVE SE VIDEO BLASTER	£184
CREATIVE FS200	£240
CREATIVE VIDEO SPOOT	£172
CREATIVE TV CODER	£109
DIAMOND VIDEOSTAR	£279
WIN TV CELEBRITY	£289
WIN TV CINEMA	£199
INTEL SMART VIDEO RECORDER	£339
LOGITECH FOTOMAN PLUS	£382
VIDEOLOGIC CAPTIVATOR	£169
VIDEOLOGIC CAPTIVATOR PLUS	£189
928 MOVIE ISA/VLB	£189
928 MOVIE & SOUND ISA/VLB	£249
VIDEOLOGIC MPEG PLAYER	£229
VIDEOLOGIC MPEG & 928	£429
VIDEOLOGIC PCI MOVIE	£379
VIDEOLOGIC CAPTIVATOR PRO	£219

SOUND CARDS

CREATIVE	
SB PRO VALUE	£52
SB 16 VALUE	£69
SB 16 MULTI CD	£90
SB 16 MULTI CD ASAP	£110
SB 16 SCSI II	£115
SB 16 SCSI II ADSP	£139
SB AWE 32	£179
MIDI KIT	£49

CD ROM DRIVES

MITSUMI 4X	
4X	£123
PANIA CR562B	
CR562B & CONT	£97
NEC 4XE	
4XE	£388
NEC 4XI	
4XI	£272
NEC 4XP	
4XP	£495



LABTEC CS150	
CS150	£17
SOUNDREAR QS820	
QS820	

Mitac Notebooks

Excellent new high performance range of personal notebooks from Mitac with wonderfully crisp mono or dual scan STN colour screens and featuring the high performance 486DX2-66 or 486DX4-100 processors with low power consuming 3.3v technology. RAM options from 4Mb to 20Mb, fast IDE hard disks, from 340Mb to 1.2Gb and the latest PCMCIA type II/III slots. They come with a 3.5" 1.44Mb removable floppy drive, all the standard ports and feature a full notebook keyboard with easy to use trackball.



Small and Light Weight
Size 10.5" x 8" x 1.8"
Weight 4.4lbs

Display
High contrast 9.5" LCD
VGA Mono display or
superb VGA Dual Scan
STN colour display

Power Management
Up to 3 hour battery life with
power management. Battery
and AC pack included

Fast 486DX2-66 or 486DX4-100 Processors
These processors offer high performance
using low power 3.3V technology

Expandable RAM to 20Mb
RAM can be expanded from 4Mb to
8Mb, 12Mb, or 20Mb

Fast Local Bus Graphics
VESA local bus graphics with
Windows acceleration

Large Hard Drives to 1.2Gb
Fast high capacity IDE
340Mb, 540Mb, 810Mb, 1.2Gb
hard disks

External Ports
Parallel port, Serial
port, VGA port & PS/2
port

PCMCIA slots
Two type II or one
type III

Removable 3.5" Floppy
The 1.44Mb floppy drive
comes as standard and is
removable to reduce
weight

Warranty
Systems comes with 12
months warranty and can
be extended to 3 years

Easy Use Trackball
Built in 25mm trackball

79-Key Keyboard
Integral 79-key keypad
with embedded keypad

Preloaded Software
All systems are ready to
use with DOS and MS
Windows 3.11

MITAC NOTEBOOK MODELS

MONO 486DX2-66 340Mb / 4Mb					COLOUR 486DX2-66 340Mb / 4Mb				
£849					£1219				
Hard Disk	340Mb	540Mb	810Mb	1.2Gb	Hard Disk	340Mb	540Mb	810Mb	1.2Gb
486DX2-66	£849	£939	£1109	£1329	486DX2-66	£1219	£1309	£1479	£1699
486DX4-100	£889	£979	£1149	£1369	486DX4-100	£1259	£1349	£1519	£1739

Options

RAM upgrade to 8Mb £150 Extra
 RAM upgrade to 12Mb £300 Extra
 RAM upgrade to 20Mb £600 Extra

Options

RAM upgrade to 8Mb £150 Extra
 RAM upgrade to 12Mb £300 Extra
 RAM upgrade to 20Mb £600 Extra

TDRM28A

All prices exclude delivery and VAT (17.5%). Delivery:- Systems £19, Lasers and large items £15, software and small items £10. Visa /Access/ American Express /Switch and Government orders welcome. Prices, specifications and offers are subject to change and subject to our conditions of sale copies of which are available on request. Mail order only. No collections please. Goods are normally despatched within 7 days. All orders will be fulfilled within 28 days unless otherwise specified. E&OE.

TIME DIRECT

Granville House, Blackburn Road, Simonstone, Burnley, Lancashire BB12 7GT

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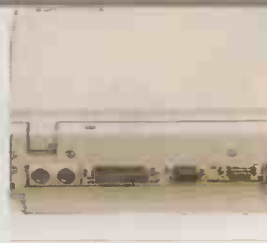
Networking/Volume enquires Telephone 01282 77 00 99



The Satellite Pro 400 has a versatile configurable storage format via swappable CD-ROM and FDD.



The easy to use integral Mousepoint on all except T4850



All systems include PS/2 mouse, external PS/2 keyboard parallel printer, serial and external SVGA ports. (no PS/2 mouse on T21 series)



Port replicator (mini docking station) option is available for the T21 series, plus enhanced port replicator for Satellite Pro.

COMMON TOSHIBA FEATURES

Toshiba notebooks are unbeatable in terms of quality, advanced features, performance and ease of use. Do not consider a low quality clone-buy the best. The following common features are standard with all models:-

SCREENS

Mono notebooks include a high quality sidelit Super Twist Nematic (STN) mono LCD capable of 64 grey scales and VGA resolution. STN colour portables utilise the latest advanced STN (Dual Scan) screens for enhanced contrast and faster response. Thin Film Transistor (TFT) or active matrix screens provide the best displays with upto 16.7 million bright colours, ultra fast response and the ability to use motion video.

KEYBOARD

Ergonomically designed 84 key full-size keys with 12 function keys and overlay numeric keypad. Dedicated cursor control keys.

INTERFACES

Standard ports include centronics parallel, RS-232C serial, PS/2 ext. keyboard, PS/2 mouse and VGA/SVGA for ext. monitor. Either Quickport port with bundled Ballpoint mouse or integral MousePoint device included. Other ports and PCMCIA details see individual notebook. (NB. PS/2 mouse port on T21 series via port rep)

POWER

Autosensing AC adaptor (100 to 240V) suitable for world wide usage provides power for notebook and recharges batteries. Removable rechargeable batteries are standard (type of battery and life varies as shown).

SOFTWARE

Microsoft MS DOS 6.2 with Toshiba notebook enhancements, Windows 3.1 (Rel 3.11) or WFWG 3.11 are pre-loaded. CardWare PCMCIA support provides transparent use of PCMCIA cards without incompatibility problems and supports 'insertion'.

SPECIAL FEATURES

Intel 3.3v or 2.9v SL technology with low power consumption. Reset button for warm reboot. AutoResume puts your systems in standby mode for upto 7 days. AutoSave automatically saves your data if your battery power is running out. LIM EMS/XMS/Hard RAM support. MaxTime Power Management can be set to switch off your disk drive, screen, keyboard and CPU after a certain time. Advanced Power Management is also supported. Flash BIOS allows easy upgradeability in the future. Kensington Cable Lock Provision for physical security. Password/MultiSafe security with various levels of protection.

MONO 486DX2-50



T2100

This powerful 486DX2 notebook combines ultra-fast 50MHz with innovative ergonomics. An advanced high-resolution 9.5" mono STN screen enhances the level of performance yet further.

- Intel DX2-50 processor
- 4Mb RAM expandable to 28Mb
- 260Mb Mib hard disk
- Internal 3.5" 1.44Mb floppy drive
- VGA/SVGA (640 x 480 pixel resolution) 9.5" diagonal display
- 84 key keyboard with mouseport and overlay numeric keypad
- Standard ports
- 11.8" x 8.9" x 1.9" with 3.0Kg (6.6lb) weight
- Built-in autosensing AC adaptor
- NIH2 removable battery. Up to 4 hours usage.

Options

4Mb RAM (PA2012U).....	£170
8Mb RAM (PA2013U).....	£298
16Mb RAM (PA2014U).....	£745
NIH2 Battery (PA2429UR).....	£94

£845

COLOUR 486DX2-50



A superb large colour 10.4" dual scan screen. Local bus video makes this 486DX2-50 the ideal platform for high-quality graphics and mobile presentations.

- Intel DX2-50 processor
- 4Mb RAM expandable to 28Mb
- 350Mib hard disk
- Internal 3.5" 1.44Mb floppy drive
- VGA/SVGA (640 x 480 pixel resolution) STN 10.4" diagonal display
- 84 Key keyboard
- Standard ports and port replicator
- PCMCIA Rel 2.0 one type III or two type II)
- 11.8" x 8.9" x 2.1" with 3.1Kg (6.8lb) weight
- NIH2 removable battery (4 hours use)
- MS DOS 6.22, MS Windows 3.11

Options

4Mb RAM (PA2026U).....	£215
8Mb RAM (PA2027U).....	£385
16Mb RAM (PA2028U).....	£745
Port Replicator (PA2170R).....	£128
Battery (PA2437U).....	£95
Battery charger (PA2436U).....	£149

£1355

COLOUR DX4-75 CD ROM



T2150CDT

The DX4-75 notebook offers spectacular performance using a 520Mib hard disk drive and top of the range TFT colour LCD 10.4" screen

- Intel DX4-75 processor
- 8Mb RAM expandable to 32Mb
- 520Mib hard disk
- Dual Spin internal 5.25" CD-ROM
- External 3.5" 1.44MB floppy drive
- VGA/SVGA (640x480 pixel resolution) TFT 10.4" diagonal display
- 84 Key keyboard with mousepoint
- Standard ports, and port replicator
- Built in AC Adaptor
- PCMCIA Rel 2.0 two Type II or one Type III
- 11.8" x 8.9" x 2.1" with 3.2kg (7 lb) weight
- Soundblaster Pro compatible sound system
- NIH2 removable battery (3 hours use)
- MS DOS 6.22 and MS Windows for work groups 3.11

T2150CDS260.....	£2095
T2150CDS520.....	£2167
T2150CDT520.....	£2715

Options

4Mb RAM (PA2026U).....	£215
8Mb RAM (PA2027U).....	£385
16Mb RAM (PA2028U).....	£745
Port Replicator (PA2170R).....	£128
Battery (PA2437U).....	£95
Battery charger (PA2436U).....	£149

£2715

TFT COLOUR PENTIUM NOTEBOOK



Satellite Pro 400CS

Toshiba's first modular notebook with Pentium processing power. Swappable CD-ROM and floppy disk drive modules and one touch docking.

- Intel Pentium® 75 processor
- 8Mb EDO RAM expandable to 40Mb
- 810Mb hard disk
- Swappable internal external 3.5" 1.44Mb floppy drive
- VGA/SVGA (640 x 480 pixel resolution) colour STN 10.4" diagonal display
- 84 key keyboard and MousePoint device
- Parallel, serial port
- Serial infra-red port
- Enhanced port replicator port
- SVGA port
- External FDD port
- Memory exp slot
- PCMCIA Rel. 2.0 slot, 2 x type II slot or 1 x type III
- Rechargeable, removable Lithium Ion battery (4 hrs use)
- MS-DOS 6.22 and Windows for Workgroups 3.11
- Microphone, headphone and speaker sockets

OPTION

8Mb EDO RAM (PA2031U).....	£420
16Mb EDO RAM (PA2032U).....	£804
32Mb EDO RAM (PA2034U).....	Call
Quad speed CD-ROM (PA2653U).....	£255
Li Ion battery 4hrs use (PA2487UR).....	£166
Battery charger (PA2488U).....	£166

£2425

TFT COLOUR PENTIUM NOTEBOOK



Satellite Pro 400CDT

Unbeatable high end performance A4 package with modular storage and Pentium processing power coupled with flexible connectivity facilities.

- Intel Pentium® 75 processor
- 8Mb EDO RAM expandable to 40Mb
- 810Mb hard disk
- Swappable enhanced IDE quad speed CD-ROM
- Swappable internal external 3.5" 1.44Mb floppy drive
- VGA/SVGA (640 x 480 pixel resolution) colour TFT 10.4" diagonal display
- 84 key keyboard and MousePoint device
- Parallel, serial port
- Serial infra-red port
- Enhanced port replicator port
- SVGA port
- External FDD port
- Memory exp slot
- PCMCIA Rel.2.0 slot, 2 x type II slot or 1 x type III
- Rechargeable, removable Lithium Ion battery (4 hrs use)
- MS-DOS 6.22 and Windows for Workgroups 3.11
- Microphone, headphone and speaker sockets

8Mb EDO RAM (PA2031U).....	£420
16Mb EDO RAM (PA2032U).....	£804
32Mb EDO RAM (PA2034U).....	Call
Li Ion battery 4hrs use (PA2487UR).....	£166
Battery charger (PA2488U).....	£166

£3139

TOSHIBA



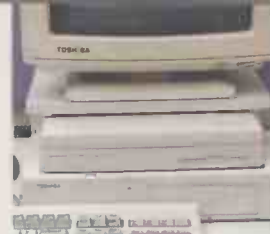
Two PCMCIA slots on all models provide ultimate expansion. Intel fax/data modem at an incredible £99 (except T3600)



Built-in Microsoft Sound System on T4850, and T4900.



With Soundblaster Pro compatible sound system on T2150, Portégé and Satellite Pro



Deskstation IV turns your T4850 and T4900 notebooks into expandable desktop systems

TFT COLOUR DX4-75



T2110CS

Brilliant notebook, offers greater power than the T2100CS. Has top end 75Mhz DX4 processor and a large 10.4" dual scan screen combine with a high capacity nickel hydride battery providing long lasting quality performance.

- Intel DX4-75 processor
- 4Mb RAM expandable to 28Mb
- 350Mb hard disk upgradeable
- Internal 3.5" 1.44Mb floppy drive
- VGA/SVGA (640 x 480 pixel resolution) STN 10.4" diagonal display
- 84 key keyboard and MousePoint device
- Parallel, serial port
- Replicator port
- SVGA port
- Memory exp slot
- PS2 keyboard port.
- PCMCIA Rel.2.0 slot, 2 x type II slot or 1 x type III
- Rechargeable, removable nickel hydride battery (4 hrs use)
- MS-DOS 6.22 and Windows 3.11

T2130CS/3200 £1179

Options

- 4Mb RAM (PA2026U) £187
- 8Mb RAM (PA2027U) £340
- 16Mb RAM (PA2028U) £744
- 24Mb RAM (PA2029U) £1526
- Battery (PA2437U) £90
- Battery charger (PA2436U) £149

£1525

TFT COLOUR DX4-75



T2130CT

The T2130CT combines top-end DX4-75 processing with a TFT 10.4" colour screen and comes with 8Mb RAM, 520Mb hard disk.

- Intel DX4-75 processor
- 8Mb RAM expandable to 32Mb
- 520Mb hard disk upgradeable
- Internal 3.5" 1.44Mb floppy drive
- VGA/SVGA (640 x 480 pixel resolution) TFT 10.4" diagonal display
- 84 key keyboard and MousePoint device
- Parallel, serial port
- Replicator port
- SVGA port
- Memory exp slot
- PS2 keyboard port.
- PCMCIA Rel.2.0 slot, 2 x type II slot or 1 x type III
- Rechargeable, removable nickel hydride battery (4 hrs use)
- MS-DOS 6.22 and Windows 3.11

Options

- 4Mb RAM (PA2026U) £187
- 8Mb RAM (PA2027U) £340
- 16Mb RAM (PA2028U) £744
- 24Mb RAM (PA2029U) £1526
- Battery (PA2437U) £90
- Battery charger (PA2436U) £149

£2119

TFT COLOUR SUBNOTE



Portégé 610CT GE 610CT

The world's first Pentium 90 ultra notebook and the most powerful Toshiba portable. It offers very high performance in a lightweight ultra notebook package

- Intel Pentium® 75 processor
- 8Mb EDO RAM expandable to 40Mb
- 720Mb hard disk
- External 3.5" 1.44Mb floppy drive
- VGA/SVGA (640 x 480 pixel resolution) TFT 9.5" diagonal display
- 84 key keyboard and MousePoint device
- Parallel, serial port
- Replicator port
- SVGA port
- External FDD port
- Memory exp slot
- PCMCIA Rel.2.0 slot, 2 x type II slot or 1 x type III
- Rechargeable, removable Lithium Ion battery (4 hrs use)
- MS-DOS 6.22 and Windows for Workgroups 3.11
- Microphone, headphone and speaker sockets

Options

- 8Mb EDO RAM (PA2031U) £420
- 16Mb EDO RAM (PA2032U) £804
- 32Mb EDO RAM (PA2034U) Call
- Li ion battery (PA2488U) £166
- Battery charger (PA2486U) £166

£3019

TFT COLOUR DX4-75



T4850CT

The DX4-75 has all the power you will ever need out on the road - even for multimedia applications. Whatever your requirements, the T4850CT is perfectly equipped to handle them all.

- Intel DX4-75 processor
- 8Mb RAM expandable to 40Mb
- 500Mb hard disk
- Internal 3.5" 1.44Mb floppy drive
- VGA/SVGA (640x480 pixel resolution) TFT 10.4" diagonal display
- 84 full size keys with overlay numeric keypad, 12 function keys
- Standard ports
- PCMCIA Rel 2.0 one Type II and one Type III
- 11.7" x 8.3" x 2.2" with 3.2kg (6.9 lb) weight
- NiH₂ removable battery 3.5 hours use
- MS DOS 6.2 and MS Windows for work groups 3.11

Options

- 4Mb RAM (PA2012U) £170
- 8Mb RAM (PA2013U) £298
- 16Mb RAM (PA2014U) £745
- NiH₂ Battery (PA2429U) £34
- DeskStation IV £374

£2970

TFT COLOUR PENTIUM



T4900CT

The T4900CT is the first notebook to have Intel 3.3volt 75MHz Pentium processor. It takes mobile computing into a spectacular new dimension offering unsurpassed performance for all power-hungry applications.

- Intel Pentium P75 processor
- 8Mb RAM expandable to 40Mb
- 810Mb hard disk
- Internal 3.5" 1.44Mb floppy drive
- VGA/SVGA (640 x 480 pixel resolution) TFT 10.4" diagonal display
- 84 key keyboard with mouse point
- Standard Ports
- PCMCIA Rel 2.0 one Type II and one Type III
- 11.7" x 8.3" x 2.2" with 3,1kg (6.8 lb) Weight
- Soundblaster Pro compatible sound system
- Built in speakers and microphone
- NiH₂ removable battery 3 hours use
- MS DOS 6.2 and MS Windows for work groups 3.11

Options

- 8Mb EDO RAM (PA2031U) £420
- 16Mb EDO RAM (PA2032U) £804
- 32Mb EDO RAM (PA2034U) Call
- Li ion battery 4hrs use (PA2488U) £166
- Battery charger (PA2486U) £166

£3139

TOSHIBA OPTIONS

External Battery Charger:

- T3400/T3600 (2482U) ...£166
- T2100 ...£149
- T1910CS ...£107
- Others (PA2422U-E) ...£107

ExtraUniversal AC Adaptor:

- T1910, T4700CT, T4800 (PA2478U) ...£56
- T2400 (PA2430U) ...£48
- T4600 (PA2411U) ...£48
- T3400, T3600 (PA2426U-E) ...£48

Toshiba PCMCIAcards:

- PCMCIA ethernet adaptor (PCE-10BC) ...£192
- PCMCIA V34 Modem ...£254

Other Options:

- Carry case T6600C (T239L) ...£39
- Carry case others (T202L) ...£34
- Ballpoint Quickport mouse (PA2805U) ...£73
- Deskstation IV ...£374 (Docking station for T4900, T4700 and T4800 models. It includes all standard ports, two full-size 16-bit slots, 5.25" drive bay, power supply and monitor stand)

THIRD PARTY OPTIONS

PCMCIA Options

- Intel 2496 Fax/data Modem ...£99
- New media Bus Toaster SCSI Adaptor ...£173
- New Media Visual SCSI adaptor ...£149
- New Media 16-bit Soundcard ...£196
- New Media Combo Ethernet Card ...£125
- MiniStore 130Mb hard drive ...£399

Parallel Port Devices

- Backpack DS CD-ROM Drive ...£299
- Backpack 5.25" floppy drive ...£149
- Logitech Scanman Easytouch Scanner ...£142
- Trakker 250Mb Tape backup ...£208

Keyboards & Mice

- External COL 130 key keyboard (needs PS/2 adaptor) ...£29
- PS/2 to DIN keyboard adaptor ...£9
- Microsoft Natural keyboard ...£69
- IMSI PC Stylus PS/2 ...£29
- IMSI Mini Thumball ...£24
- Logitech Trackman Portable ...£32

Portable Printers

- HP DeskJet 320 ...£169
- Canon BJ30 ...£193

Other Options:

- Universal third party car adaptor ...£99
- Laplink XL & serial cable ...£39
- Laplink Pro v5 for Win. ...£74
- Time external speakers ...£18

TDR16D

All prices exclude delivery and VAT (17.5%). Delivery:- Systems £19, Lasers and large items £15, software and small items £10. Visa /Access/ American Express /Switch and Government orders welcome. Prices, specifications and offers are subject to change and subject to our conditions of sale copies of which are available on request. Mail order only. No collections please. Goods are normally despatched within 7 days. All orders will be fulfilled within 28 days unless otherwise specified. E&OE.



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The keyboard flips up with easy access to memory slot, batteries, floppy drive and hard disks, all of which are removable on 360 & 755 models



Port Replicators I & II (mini-docking stations) provide standard ports and cable convenience (Replicator I also has additional PCMCIA III or two type II slots.)



The unique easy to use TrackPoint II or III pointing device provides better cursor control than any mouse! Equally good for right & left handers.



Portable Dock I has standard ports, SCSI, Speakers, one ISA slot, one 5.25" drive bay (suitable for CD-ROM) and a handle. Shown with ThinkPad attached.

COMMON THINKPAD FEATURES

The IBM ThinkPad range of notebooks are the most advanced notebooks money can buy. In terms of quality, innovation, useability and technology, these systems are way ahead of the competition.

CASE

Elegant yet robust case made from special carbon fibre re-inforced plastic for extra durability, yet incredible light weight.

TRACKPOINT

IBM's innovative red device situated in the middle of the keyboard has no moving parts and responds naturally to your finger's pressure. Easier to use than any mouse or trackball!

SCREENS

High quality screens open to 180 degrees and feature edge to edge display with contrast and brightness control.

-STN colour screens on some 360 & 755 models provide sidelit 9.5" diagonal, 256 colours

-TFT or active matrix screens (8.4" on 360; 10.4" on 370, 755 & 701/CS) provide the best displays with 256 bright colours.

-New Black Matrix on array 10.4" TFT colour screens on 755CE, LV, LX & 755CD reduce glare, give the brightest and clearest display and 65 thousand colours.

GRAPHICS

All 360, 370 & 755 models include VESA Local Bus graphics with 1Mb RAM and Windows accelerator. Simultaneous display to external SVGA screen.

MODULAR DESIGN

All models except 340 allow removable hard disk (340Mb to 810Mb), floppy drive and battery. The keyboard easily flips up for access.

KEYBOARD

Ergonomically designed, quiet, 85 key full-size keys with 12 function keys and overlay numeric keypad.

INTERFACES

Standard ports include enhanced centronics parallel, RS-232C serial, PS/2 ext. keyboard/mouse and SVGA for external monitor. One type III PCMCIA slot (also functions as two type II on 360/755 370, or one type II on 340).

POWER & MANAGEMENT

Powerful rechargeable batteries coupled with Advanced Power Management and non-disruptive battery exchange allow you to work a whole day without being near a powerpoint. Fuel gauge provides an indicator of battery life. AC adaptor provides power for notebook and recharges batteries with quick charge facility

(1.5 hours). Minimum battery life figure shown is for full use whilst top figure is for typical use with power management.

SECURITY

Hard disk is removable (except 340) and lockable in the computer and can be protected by a password. Kensington Cable Lock Provision and security loop for physical security. Just send in the registration card to IBM for engraved nameplate personalised for you or your company.

SOFTWARE

IBM PC DOS 6.3, Windows 3.1 plus additional software as shown. Various utilities including PC Card Director with Auto Configuration, Hot PCMCIA insertion (Easy Playing).

DOCKING OPTIONS

360, 370 & 755 models have ability to use 4 docking stations; port replicator 1 for economical expansion and cable management, replicator 2 also has additional PCMCIA slots. Portable DOCK 1 and larger DOCK 2 full size docking stations provide extra drive bays and expansion slots and room for multimedia options in addition to port replication.

IBM SERVICE & SUPPORT

12mth IBM HelpWare hotline support. 12mth warranty with 3 year warranty on 755 models.

WHICH THINKPAD IS FOR YOU?

ThinkPad 340. The entry level ThinkPad with colour screen and 200Mb hard disk. Has limited expansion and modularity. Ideal for home annual business use.

ThinkPad 360. All the modularity, expansion capability, security and versatility of the ThinkPad range with a wide choice of screens, hard drives, processors and docking facilities.

ThinkPad 701/701CS. These two new subnote type models are designed to provide unique and powerful, lightweight solutions with full size 85-key keyboards & 10.4" Dual Scan or TFT displays.

ThinkPad 755. All the features of the ThinkPad 360 plus multimedia sound, larger screens and faster processors. Ideal for presentations and business uses where performance is important.

ThinkPad 755CE & 755CD. The ultimate mobile computers with innovative technology, the world's best BMA TFT screen, 100Mhz processor, full-feature multimedia and modern facilities, and InfraRed communications. Ideal for the top executive.

ThinkPad 755CV & 755CX. Two new ThinkPads with all the features of the ThinkPad 755CE. The 755CV model has a 10.4" TFT BMA screen with removable back panel, allowing it to be placed over an overhead projector, ideal for presentations. The 755CX model has 10.4" TFT BMA Screen and is powered by Intel's P75 Processor.

THINKPAD 340CSE



340CSE

The ideal entry level 486 colour notebook with fast 50MHz processor, 200Mb hard drive PCMCIA and dual scan colour

- Fast IBM 486SLC2-50 processor
- 16K internal CPU Cache
- 4Mb RAM expandable to 12Mb
- 200Mb IDE fixed hard disk
- 3.5" 1.44Mb floppy drive
- VGA (640 x 480) Graphics
- 9.4" (diagonal) dual Scan VGA colour display
- Quiet full size 85 key keyboard with TrackPoint III and built in numeric keypad function
- Standard Ports
- PCMCIA Rel 2.0 Type III Slot (or one type II)
- 48mm x 297mm x 210mm with 2.2Kg Weight
- ThinkPad 340CSE NiMH battery pack
- 35W worldwide AC/DC power adaptor, internal quick charger (1.5 Hrs)
- 12mth warranty extendable to 3 years
- Integral Trackpoint II pointing device
- Preinstalled IBM DOS 6.3, Windows 3.1 & diskette factory software

Options
4Mb RAM.....£186
8Mb RAM.....£369
NiCad battery.....£41
AC adaptor.....£36

£1336

THINKPAD 701CS/755/755CX

COMMON FEATURES

ThinkPad 755 range is available with a range of processors, large 9.5" Dual Scan or 10.4" TFT colour screens, various hard disks.

All systems have a modular design with multimedia capability included as standard. All the features of the 360 are included such as Trackpoint II, lightweight design and built-in modularity.

- 4Mb or 8Mb base RAM expandable to 20Mb using one 4, 8 or 16Mb IC DRAM card or 36Mb/40Mb (using DIMM adaptor which provides two slots, which can be fitted with two 16Mb DIMM modules)
- Removable 3.5" 1.44Mb floppy drive
- VESA Local Bus Graphics with 1Mb RAM, Windows Accelerator and Dual VGA support for external SVGA display (256 colours at 1024 x 768)
- 85 key keyboard (701 range has TrackWrite full size 85-key keyboard 19mm keys and advance TrackPoint III)
- Standard ports include enhanced parallel, serial, PS/2 for mouse, keyboard or external SVGA
- PCMCIA type III slot (can be used as two type II slots)
- Sound card is included as standard (701 range has SoundBlaster Compatibility)
- Expansion but port for dock 1, dock2, port replicator 1 and port replicator 2 (701 range is Dock II Compatible, adaptor kit required)

Thinkpad 755CE and 755CD include 486DX4-100 processor, 8Mb base RAM, extra multimedia/modem features, Trackpoint III, Black Matrix on array TFT screens, motion video support, Infra-red comms, and 5.25" CD on 755CD model

Thinkpad 701C & 701CS include IBM's new TrackWrite expandable full sized keyboard & 10.4" displays.

ThinkPad 755CV & 755CX Two new ThinkPads with all the features of the ThinkPad 755CE. The 755CV model has a 10.4" TFT BMA screen with removable back panel, allowing it to be placed over an overhead projector, ideal for presentations. The 755CX model has 10.4" TFT BMA Screen and is powered by Intel's P75 processor.

Popular 755 Options

8Mb DRAM (35G2316).....£405
16Mb DRAM (66G6574).....£1031
DIMM Adaptor (provides 2 slots).....£72
8Mb DIMM (TOMMD08).....£599
16Mb DIMM (TOMMD16).....£1031
750 NiMH Battery.....£135
750 Battery Safety Cover.....£12
NiMH Battery Pack II (755CE/CD).....£117

Other options: See General Options

701CS 486 DX2-50/DX4-75 STN/TFT



ThinkPad 701CS

Open a ThinkPad 701 and you'll find IBM's new TrackWrite expandable full sized keyboard. The display screen is equally uncompromising Dual Scan or TFT, both are 10.4" colour panels

- General specification as shown under common features
- Intel DX2-50 or 486DX4-75
- 4Mb or 8Mb RAM upgradeable to 20Mb
- 360Mb, 540Mb or 720Mb hard disk
- VGA/SVGA 1Mb VESA LB 10.4" diagonal display All models
- External 3.5" 1.44Mb floppy disk drive
- Trackwrite full size 85-key keyboard, full size 19mm keys including 12 full-size PF keys, TrackPoint III
- Standard ports, and 160 pin expansion bus
- Internal Super NiCad rechargeable battery pack 1.5 hour charge auto sensing AC adaptor
- PCMCIA Rel 2.0 two Type II or one Type III
- 44mm H x 247mm W x 201mm D
- Soundblaster & Soundblaster Pro compatible sound system
- MS Dos 6.22 MS windows 3.11

701CS DX2-50 360/4Mb£2551
701CS DX2-50 540/4Mb£2772
701CS DX4-75 360/8Mb£3209
701CS DX4-75 540/8Mb£3430
701CS DS4-75 720/8Mb£3645
701C DS2-50 360/4Mb£2989
701C DX2-50 540/4Mb£3209
701C DX4-75 360/8Mb£3645
701C DX4-75 540/8Mb£3865
701C DX4-75 720/8Mb£4085

£2551

486DX2-50/DX4-100 TFT COLOUR



ThinkPad 755C / 755CV

Powerful TFT colour ThinkPad 755 models with 486DX2-50, 486DX4-75 or DX4-100 Processor and a range of hard disks. (Shown with Dock 2 & matching keyboard options)

- General specification as shown under common features
- 486DX2-50 processor or 486DX4-100
- 4Mb RAM to 36Mb maximum
- 10.4" TFT colour display with 256 colours and 100:1 contrast ratio (removable back panel on 755CV, allowing it to be placed over an overhead projector)
- 340Mb, 540Mb, 810Mb removable hard disks or 1.2Gb on 755CV
- 61h x 297w x 210d in mm
- 2.9Kg weight with battery and drives
- DOS 6.3, Windows 3.1, Lotus Organizer and PC Card Director (DOS 7 and IBM OS/2 Warp v3 on 755CV model)
- Battery life 3.1 to 8 hours
- 35 watt universal AC adaptor with 755CV
- Built-in soundcard with audio jacks, microphone and speaker (16-bit sound card on 755CV)
- Built in Infra-red Ports on 755CV
- IBM 3 year warranty

755C TFT 486DX2-50 340Mb£2723
755C TFT 486DX4-75 340Mb£3312
755C TFT 486DX4-75 540Mb£3605
755C TFT 486DX4-75 810Mb£4046
755CS DS2 486DX2-50 340Mb£2916
755CS DS5 486DX4-75 340Mb£3209
755CS DS6 486DX4-75 340Mb£3501
755CV1 TFT DX4-100 540/8Mb£4734
755CV2 TFT DX4-100 810/8Mb£5013
755CVDV1 DX4-100 540/8Mb£5116
755CV3 TFT DX4-100 1.2Gb/8Mb£5431

£2723

IBM ThinkPad



Matching black monitor and black keyboard are available to complement your IBM ThinkPad. Shown with monitor stand and Dock 2 (2 ISA slots, 2 bays & PCMCIA slots).



Various nylon and leather cases are available for ThinkPad and Portable Dock I.



A plethora of high quality multimedia, comms & productivity software for the mobile professional comes pre-loaded on many models.



The Communicate Connexion 1440C PCMCIA type II fax/data modem attaches to the Motorola Micro TAC II mobile phone (and others e.g. BT Bear, Vedac VP130, Ford Compact).

THINKPAD 360 / 370

DUAL SCAN COLOUR/ TFT COLOUR

GENERAL OPTIONS FOR ALL

Common Features

ThinkPad 360 / 370 Range is available with a range of Processors, Screens, Hard Disks and Software Pre-loads. All systems have a modular design and full docking capabilities

- Standard Thinkpad features such as Trackpoint II, lightweight design and built-in modularity
- 4Mb base RAM expandable to 20Mb using one 4, 8 or 16Mb IC DRAM card (fits into memory slot). 4Mb to 36Mb on 370
- Removable 3.5" 1.44Mb floppy drive (to reduce weight)
- VESA Local Bus graphics with 1Mb RAM, Windows Accelerator and Dual VGA support for external SVGA display (256 colours at 1024 x 768). Active black matrix TFT 10.4" on 370
- 85 key keyboard which flips open to provide access to battery, removable hard disk and floppy bays
- Standard ports include enhanced parallel, serial, PS/2 for mouse or keyboard (adaptor allows use of both)
- PCMCIA type III slot (can be used as two type II slots)
- Soundcard port for optional soundcard (only to special order - factory fitted)
- Expansion bus port for dock 1, dock 2, port replicator 1 and port replicator 2
- Sizes, weights, battery (NiMH) life vary as shown
- Pen model is also available

Popular 360 Options

4Mb RAM (TONPM04).....	£186
8Mb RAM (TONPM08).....	£369
16Mb RAM (TONPM16).....	£923
360 NiMH battery #66G2946.....	£95
750 NiMH battery #66G2946.....	£135
750 battery safety cover #66G0027.....	£12

Other options: See General Options



ThinkPad 360/360C/360CE/360CS/360CSE & 370C Popular Dual Scan colour ThinkPad 360 models with 486DX2-50 processor and a range of hard disks. Shown with optional modem & mobile phone

- General specification as shown under common features
- 486DX2-50 processor or 486DX4-75 processor
- 4Mb RAM upgradeable to 20Mb or 36Mb on 370C model
- 9.5" STN Dual Scan colour display with 256 colours and 20:1 contrast ratio on 360, 360CS and 360CSE
- 8.4" TFT active matrix colour display with 256 colours and 100:1 contrast ratio of 10.4" on 360C and 360CSE
- TFT Black Matrix on 370C
- 340Mb or 540Mb removable hard disks
- 360, 360CS and 360CSE models are 51h x 297w x 210d in mm
- 360C, 360CE and 370C models are 47h x 297w x 210d in mm
- 2.8Kg weight with battery & drives
- IBM PC DOS 6.3, Windows 3.1 & PC Card Director
- Lotus Organizer, Lotus ScreenCam, Lotus cc:Mail Mobile, OAG FlightDisk, Triton CoSession Host (Organizer only with 486SX-33 Models)
- Battery life 3 to 10 hours

Dual Scan Colour

360CSE DS4 486DX2-50 340Mb.....£1791

TFT Colour

360CE TF4 486DX-50 340Mb.....£2097

370C TC1 486DX4-75 340Mb.....£2281

370C TC2 486DX4-75 540Mb.....£2488

£1791

Additional Removable

Hard Drives

340Mb.....	£590
540Mb.....	£982
810Mb.....	£1323

PCMCIA type II Cards

Intel fax/data modem.....	£99
Communicate Connexion 1440C.....	£Call

IBM PCMCIA options

-3270 Card.....	£269
-14.4 fax/data modem.....	£324
-Modem UK DAA for above.....	£63
-164 Token Ring card.....	£360
-10Base2 Ethernet card.....	£180
-10BaseT Ethernet card.....	£190

Docking Options (360 & 755)

Port Replicator 1 #66G3515.....	£198
Port Replicator 2 #66G3530.....	£72
Portable Dock I #66G3971.....	£536
-Includes 5.25" bay, one ISA slot, one special slot for A to D adaptor for motion video, two integral speakers, SCSI port, and standard ports	
Dock I carry case #66G3585.....	£77
Dock I display stand #66G3517.....	£77
Ext. floppy enclosure #66G3957.....	£32
Dock I CD-ROM kit #66G3506.....	£414
Dock I Anal to Digit. video card #66G3509.....	£363
Dock I audio cable #66G3521.....	£19
Dock I SCSI install kit #66G3513.....	£41
Dock I IDE install kit #66G3502.....	£45
Dock II ITD002UK.....	£500
Dock II display stand ITD002SHJ.....	£50
Dock II 553Mb tape backup ITD018UK.....	£475

Carry Cases

Deluxe leather overnight #B130922.....	£176
Deluxe leather #B130921.....	£104
Deluxe nylon #79F0981.....	£72
Nylon #07G1530.....	£38

Black Matching Extras

Black 15X FST SVGA screen.....	£432
Black external keyboard.....	£140
Black Keypad for keyboard.....	£45
Black mouse.....	£30

Other Options

Keyboard/mouse connector cable.....	£23
KeyGuard.....	£63
Numeric keypad.....	£22

AC adaptor 40W.....	£48
AC adaptor 60W.....	£108
Car battery adaptor.....	£48
Quick charger (can take 2 batteries).....	£176

Microphone kit

Laplink XL & serial cable.....	£39
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755CE/CD only options

Headset.....	£95
DAA/telephone kit.....	£104
FDD bay PCMCIA cartridge.....	£41

701/701 CS Options

4Mb RAM SO-DIM.....	£169
8Mb RAM SO-DIM.....	£369
Super NiCad battery.....	£49
NiMH Battery pack.....	£59
Multiport II.....	£119

P75 BMA TFT COLOUR

486DX4-100 BMA TFT COLOUR & MPC2

THINKPAD POWER SERIES 820 TFT



ThinkPad 755CX

The new Pentium Thinkpad from IBM with P75 processor, large TFT BMA screen, Advanced Multimedia / Modem and Infra red Comms.

- General specification as shown under common features
- 8Mb RAM upgradeable to 40Mb
- 10.4" TFT Black Matrix on array colour display with 65,000 colours, reduced glare and excellent visibility even in daylight. 100:1 contrast ratio. VGA Resolution on CX4, CX5 and CX6
- Trackpoint III pointing device with improved rubber grip and drag & drop features
- 540Mb, 810Mb or 1Gb removable hard disks
- 50h x 297w x 210d in mm; 2.9Kg weight with battery & drives
- IBM PC DOS 7, IBM OS/2 Warp v3 & Windows 3.11
- Software Suite including Lotus Organizer 1.1, ScreenCam, cc:Mail Mobile, Audiofile TalkWorks, Asymetrix Presentation PE, Soundcard, microphone and speaker
- 35 watt universal AC adaptor with Internal quick charger 1.5 - 2 hours
- Built-in IRDA compatible Infra-red ports

755CX P75/810/8Mb TFT CX4.....	£3433
755CX P75/810/8Mb TFT CX5.....	£3712
755CX P75/1.2Gb/8Mb TFT CX6.....	£4131
755CX P75/540/8Mb TFT CX1.....	£4522
755CX P75/810/8Mb TFT CX2.....	£4801
755CX P75/1.2Gb/8Mb TFT CX3.....	£5220

£3433



ThinkPad 755CD/755CE

Ultimate TFT colour fully MPC2 compliant multimedia notebook with 486DX4-100 processor, Large TFT BMA screen, advanced stereo multimedia/modem, and built-in CD ROM

- General specification as shown under common features
- 8Mb RAM upgradeable to 40Mb
- 10.4" TFT Black Matrix on array colour display with 65,000 colours, reduced glare and excellent visibility even in day light. 100:1 contrast ratio.
- Trackpoint III pointing device with improved rubber grip and drag & drop features
- 340Mb, 540Mb or 810Mb removable hard disks
- 57h x 297w x 210d in mm; 2.9Kg weight with battery & drives
- IBM PC DOS 6.3, Windows 3.1, & PC Card Director
- Software Suite including Lotus Organizer 1.1, ScreenCam, cc:Mail Mobile, Audiofile TalkWorks, Asymetrix Presentation PE & Digital Video Producer, Puma TranXit, OAG TightDisk, Video for Windows runtime
- Built-in soundcard with audio jacks, headphone jack, MIDI/Joystick port, (no MIDI on 755CE)
- Video capture/overlay features and Composite (video) in; video out to TV ports (755CD only)
- Battery life 3.5 to 7 hours
- Built-in IRDA compatible InfraRed ports
- Built-in 5.25" double speed multi-session CD-ROM Drive (755CD only)

755CE CE2 486DX4-100 340Mb.....	£3595
755CE CE3 486DX4-100 540Mb.....	£3802
755CE CE4 486DX4-100 810Mb.....	£4081
755CD CD3 486DX4-100 540Mb.....	£4941
755CD CD4 486DX4-100 810Mb.....	£5220

£3595



ThinkPad Power 820

Blazingly fast performance of the PowerPC 604 microprocessor, superior RISC architecture, TFT black matrix display and internal CD-ROM. Designed to give commercial users the competitive edge.

- PowerPC 603 100MHz 16Mb expandable to 48Mb 540Mb, 810Mb or 1.2Gb removable hard disks
- 10.4" TFT black matrix display, 640x480 or 800x600
- PCI Local bus graphics
- Internal double speed CD-ROM
- External 3.5" 1.44Mb floppy drive (exchangeable with internal CD-ROM drive)
- Built in microphone and stereo speakers
- PCMCIA expansion slots (two type I/II or one type III)
- Keyboard with TrackPoint III
- Support for multiple 32-bit operating system

820 PPC603e/100 540/16Mb #820A1UK.....	£4028
850 PPC603e/100 540/16Mb #850A1UK.....	£4698

Note 850 is expandable to 96Mb RAM and has PCI G10 bus with motion video as standard

Options	
8Mb RAM #DDMEM08.....	£594 Extra
16Mb RAM #DDMEM16.....	£895 Extra
540Mb hard disk #DWSF540.....	£490 Extra
810Mb hard disk #DWSF810.....	£769 Extra
1.2Gb hard disk #DWSF12G.....	£1193 Extra
NiMH Battery #DTEABTE.....	£112 Extra
AC Adaptor #DWPDUKE.....	£54 Extra

£4028

All prices exclude delivery and VAT (17.5%). Delivery: Systems £19, Lasers and large items £15, software and small items £10. Visa /Access/ American Express /Switch and Government orders welcome. Prices, specifications and offers are subject to change and subject to our conditions of sale copies of which are available on request. Mail order only. No collections please. Goods are normally despatched within 7 days. All orders will be fulfilled within 28 days unless otherwise specified. E&OE.



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TDPIB7IC

TFT Colour Specials

The TravelMate 4000M Series provides everything you'd expect in state-of-the-art, high performance notebook computers.

Texas Instruments newest notebooks pack in additional performance with exceptional features that include a 16-bit sound card that is compatible with Sound Blaster Pro and much more.



486DX2-50 455Mb TFT



The UK's best value TFT multimedia notebook - incredible specification at just £1499

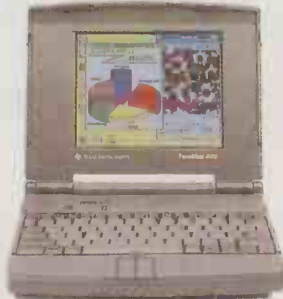
- 486DX2-50 Processor
- 4Mb RAM, 20Mb max
- 8Kb Internal Cache
- 455Mb hard drive
- 1.44Mb 3.5" Floppy Drive
- 8.4" TFT Colour
- 640 x 480 Resolution
- 1Mb Video RAM
- Interfaces: parallel, serial, keyboard/mouse, audio-in, audio out, Fast SCSI II, microphone and 16-bit MIDI with game port
- Sound capabilities: 16-bit media vision jazz 16 sound card, thunderboard, CD multisession photo, CO audio and pro audio 16, Internal microphone, internal speaker and bi-directional MIDI interface
- NIMH battery (3-5 Hours)
- Integral pointing device with Microsoft drivers
- MS DOS, MS Windows for Workgroups, Adaptec EZ-SCSI, Windows Sound Software and Real Time Video with Indeo Video
- 2.9Kg weight, 21.6 x 27.9 x 5.1cm

Models
DX2-50 455Mb TFT colour£1499

Limited Offer

£1499

486DX4-75 / 100 TFT



Full feature TFT colour multimedia notebook. Attach CD-ROM for just £499

- DX4-75 Processor
- 4Mb Ram, 20Mb max.
- 8Kb Internal Cache
- 455Mb or 525Mb hard drive
- 1.44Mb 3.5" floppy drive
- 8.4" (9.5" on DX4-100) TFT colour display
- 640 x 480 Resolution
- 1Mb Video RAM
- Interfaces: parallel, serial, keyboard / mouse, audio-in, audio out, Fast SCSI II, microphone and 16-bit MIDI with game port
- Sound capabilities: 16-bit media vision jazz 16 sound card, thunderboard, CD multisession photo, CD audio and pro audio 16, Internal microphone, internal speaker and bi-directional MIDI interface
- NIMH battery (3-5 hours)
- Integral pointing device with Microsoft drivers
- MS DOS, MS Windows for Workgroups, Adapter EZ-SCSI, Windows sound software and real time video with indeo video
- 2.9Kg weight, 21.6 x 27.9 x 5.1cm

Models
DX4-75 455Mb TFT£1799
DX4-100 525Mb TFT£2499

£1799

Options



The Portable CD-ROM Docking System gives your TravelMate 4000M notebook the power of a desktop multimedia system, with all the advantages of portability. With a weight of under five pounds including battery, the ergonomically styled Portable Docking System includes:

- A Double-Speed CD-ROM Drive That Operates at 250 Milliseconds
- Built-in Stereo Speakers
- Controls for Volume, Balance and Mix
- Microsoft headphones and external microphone
- A Separate NiMH Battery, giving you the options of AC or Battery-Powered Operation
- A 50-pin Centronics SCSI II Connection
- Battery Charger System
- Optional SCSI II Bay

£499

Other Options

- 4Mb RAM£149
- 16Mb RAM£945
- NiMH Battery£85
- AC Adaptor£85
- Briefcase (for Main unit, CD-ROM system and accessories)£79
- Carrying Case (for Main unit and accessories)£39
- Leather Case (for Main unit only)£29

TDRTX19D

All prices exclude delivery and VAT (17.5%). Delivery:- Systems £19, Lasers and large items £15, software and small items £10. Visa /Access/ American Express /Switch and Government orders welcome. Prices, specifications and offers are subject to change and subject to our conditions of sale copies of which are available on request. Mail order only. No collections please. Goods are normally despatched within 7 days. All orders will be fulfilled within 28 days unless otherwise specified. E&OE.

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Colossus Power Notebooks

The new range of high performance Colossus notebooks incorporate advanced features and high specification such as removable hard drives up to 1.2Gb, 32Mb RAM, multimedia capability, advanced touchpad mouse, VESA Local bus graphics and a choice of advanced upgradeable screens. These high specification systems are now available directly from Time Direct at truly amazing prices.

Choice of Removable Screens
9.5" STN VGA mono screen, 10.5" dual scan colour or 9.5" TFT colour screens with 256 vivid colours. Modular design allow the screen to be upgraded

LCD Status Display
All the important parameters are easily visible on this LCD display

External Ports
One advanced bi-directional parallel port, 9 pin fast serial ports with 16550 UART, keyboard, external monitor and PS/2 mouse ports

486DX4-75 or 486DX4-100 Processors
These Intel processors are the fastest processors available and use low power consumption SL technology

Ample RAM up to 32MB
Two memory module slots allow flexible memory upgrade to 32MB using 4, 8 or 16Mb modules

Advanced Ports
Ports for docking, and optional infra red and TV tuner modules

Fast Local Bus Graphics
Advanced 32-bit VESA local bus graphics card with 1Mb Video RAM and Windows* Accelerator

PCMCIA 2.0 Slots
One type III or two type II slots suitable for advanced modems and network cards

Light weight
Only 6.2lb weight with dimensions of 8.8"x11.6"x1.9"

High Quality 84-Key Keyboard
with 12 function keys and embedded numeric keypad with ergonomic palmrest

Large Removable Hard Drives
High capacity state-of-the-art 2.5" IDE drives with 340Mb, 540Mb, 810Mb or 1.2Gb capacity

Multimedia Ready
Twin speaker system built-in with microphone. Sound card module option available

Long Life Battery
The latest NiMH rechargeable battery is removable. There is full advance power management support with suspend to RAM and suspend to disk

Advanced touchpad Mouse
The incredible touchpad is easier to use and more reliable than any trackball. This is the most advanced pointing device available for notebooks

Removable 3.5" Floppy
The 1.44Mb floppy drive comes standard and is removable to reduce weight

Preloaded Software
All systems are ready to use with MSDOS 6.22 and Windows 3.11

9.4" MONO

486 DX4-75 340Mb / 4Mb

£ **1049**

486DX4-100 Model.....£100 Extra
RAM Upgrade per 4Mb£140
540Mb Model£90
810Mb Model£260
1.2Gb Model.....£480
Sound card.....£80

10.4" DUAL SCAN COLOUR

486 DX4-75 340Mb / 4Mb

£ **1419**

486DX4-100 Model.....£100 Extra
RAM Upgrade per 4Mb£140
540Mb Model£90
810Mb Model£260
1.2Gb Model.....£480
Sound card.....£80

9.4" TFT COLOUR

486 DX4-100 540Mb / 8Mb

£ **2249**

RAM Upgrade per 4Mb£140
810Mb Model£170
1.2Gb Model.....£390
Sound card module.....£80

TDRCN30A

All prices exclude delivery and VAT (17.5%). Delivery:- Systems £19, Lasers and large items £15, software and small items £10. Visa /Access/ American Express /Switch and Government orders welcome. Prices, specifications and offers are subject to change and subject to our conditions of sale copies of which are available on request. Mail order only. No collections please. Goods are normally despatched within 7 days. All orders will be fulfilled within 28 days unless otherwise specified. E&OE.

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MITAC 486



Mitac 486DX2-66 and 486DX4-100 stand alone and networked systems shown here include fast 540Mb hard drives, and superb 14" SVGA colour screens.

- 486DX2-66 or 486DX4-100 processor
- 4Mb RAM expandable to 64Mb
- 540Mb hard disk
- Quad speed CD-ROM drive (shown) is £120 extra
- Pentium technology ready
- 3.5" 1.44Mb floppy drive
- VESA bus graphics
- 14" SVGA colour screen
- IDE hard and floppy controller
- Parallel, 2 serial & keyboard ports
- Expandable Mitac desktop case
- 4 drive bays and 7 slots (2 VESA)
- 102 Enhanced keyboard
- Microsoft compatible mouse
- Select operating system from below.

486DX2-66 540/4Mb 14"£599
486DX4-100 540/4Mb 14"£669

Mitac Only Options

- RAM upgrade per 4Mb£120
- MS DOS 6.22 & Windows 3.11£50
- MS DOS 6.22 & Windows 3.11 for workgroups£70
- 16-bit ethernet combi card£50
- 15" Screen£110 Extra
- 850Mb hard drive£50 Extra
- Double speed CD-ROM£70
- Quad speed CD-ROM£120
- Approved fax/data modem£40

£599

COMPAQ PROLINEA 486



New Compaq Prolinea models come with 3 case styles and PCI graphics. All except 486-50 include a minimum of 8Mb of RAM.

- 486DX2-50, 486DX2-66 or 486DX4-100 processor
- 8Mb RAM (4Mb on 486DX2-50 model)
- 128K Cache on 486DX4-100
- Integrated 1Mb PCI local bus graphics
- Triflex/PCI bus
- 270Mb, 420Mb or 720Mb
- PCI IDE hard disks
- User friendly: plug & play bios, easy to open with sliding motherboard & swinging drive cage.
- Compaq keyboard & mouse
- MSDOS, Windows 3.1 & Compaq utilities
- CDS models include quad speed CD & 16-bit business sound
- Slimline models: 3 bays & 3 slots
- Standard desktop: 4 bays & 4 slots
- Mini-Tower: 5 bays & 5 slots

Select screens from below

Slimline (3/3) Models
486DX2-50 (3/3) 270Mb (17210-A23)£685
486DX2-66 (3/3) 420Mb (172202-A23)£899
486DX4-100 (3/3) 420Mb (172002-A23)£1029

Desktop (4/4) Models
486DX2-66 (4/4) 420Mb (172702-A23)£915
486DX4-100 (4/4) 420Mb (172802-A23)£1059

Mini-Tower (5/5) Models
486DX2-66 (5/5) 420Mb (173802-A25)£955

Options

- 14" 1024 NI Mitac£170
- 15" 1024 NI Taxan£250
- 14" SVGA Compaq£199
- 14" 1024 Compaq£238
- 15" 151FS Compaq£323

£685

IBM APTIVA



IBM Aptiva provides the ideal solution for the business user and comes complete with software and SVGA colour screen.

- Intel 486SX-25, 486SX-33, 486DX2-66 or 486DX4-100 processor
- Intel overdrive upgradeable 4Mb RAM, max 64Mb/128Mb
- 170Mb, 270Mb or 540Mb local bus IDE hard disk
- VESA local bus technology
- 3.5" 1.44Mb floppy drive
- Integrated VESA local bus graphics
- 4 Drive bays & 4 slots parallel, serial and mouse ports
- 14" SVGA colour screen
- MS compatible mouse & 102 keyboard
- Rapid resume energy saver, password, PC DOS 6.3 & MS Windows 3.1
- Microsoft Works v3 & AptivaWare software
- 12 Month warranty extendable to 3 years.
- IBM helpline support.

486SX-25 170Mb£599
486SX-33 270Mb£699
486DX2-66 540Mb£899
486DX4-100 540Mb£999

Aptiva Options

- RAM upgrade per 4Mb£130
- 16-bit ethernet combi card£50
- Approved fax/data modem£40
- Double speed CD-ROM£80
- Quad speed CD-ROM£120

£599

MITAC 586



Mitac Pentium processor based system include enhanced PCI IDE drives and superb PCI graphics. Prices shown here include 8Mb RAM, 540Mb hard drives and superb SVGA screens:

- Intel Pentium 75, 90, 100 processor
- 8Mb RAM expandable to 128Mb
- 256K external cache
- 540Mb enhanced IDE hard disk
- Quad speed CD-ROM drive (shown) is £120 extra
- 3.5" 1.44Mb floppy drive
- PCI bus with 4 PCI slots
- 1Mb PCI bus graphics exp to 2Mb
- 14" SVGA colour screen
- PCI IDE hard and floppy controller
- Parallel, 2 serial & keyboard ports
- Expandable Mitac desktop case
- 5 drive bays and 7 slots
- 102 Enhanced keyboard
- Microsoft Compatible Mouse
- Select operating system from below.

Mitac P75 540Mb 8Mb 14"£899
Mitac P90 540Mb 8Mb 14"£999
Mitac P100 540Mb 8Mb 14"£1099

Mitac Only Options

- 15" Screen£110 Extra
- 850Mb hard drive£50 Extra
- 1GB hard drive£100 Extra
- Double speed CD-ROM£120
- Quad speed CD-ROM£70
- Video RAM upg. to 2Mb£50
- RAM upgrade per 4Mb£120
- MS DOS 6.22 & Windows 3.11£50
- MS DOS 6.22 & Windows 3.11 for workgroups£70
- 16-bit ethernet combi card£50
- Approved fax/data modem£40

£899

COMAQ PROLINEA 586



Compaq 586 systems use Intel Pentium 75, 90 and 100 processors and come in 3 case styles.

- Intel Pentium 75, 90 or 100 processor
- 8Mb RAM (16Mb on 720Mb models)
- 256K Cache
- Integrated 1Mb PCI Local bus graphics. (Pentium 100 has Qvision 2000+ Matrox 2Mb 64bit card) Triflex/PCI bus
- 420Mb or 720Mb PCI IDE hard disks
- User Friendly: plug & play bios, easy to open with sliding motherboard & swinging drive cage.
- Compaq keyboard & mouse
- MS DOS, Windows 3.1 & Compaq utilities
- CDS models include Quad speed CD & 16-bit business sound
- Slimline models: 3 bays & 3 slots
- Standard desktop: 4 bays & 4 slots
- Mini-Tower: 5 bays & 5 slots

Select screens from below

Slimline (3/3) Models
Pentium-75 (3/3) 420Mb (1781C2-A23)£1239

Desktop (4/4) Models
Pentium-75 (4/4) 420Mb (172902-A22)£1275
Pentium-90 (4/4) 420Mb (173002-A22)£1345
Pentium-90 (4/4) 720Mb (173002-A25)£1625

Mini-Tower (5/5) Models

Pentium-75 (5/5) 420Mb (173102-A22)£1319
Pentium-75 (5/5) 420Mb CDS (173102-A23)£1529
Pentium-90 (5/5) 420Mb (174102-A22)£1385
Pentium-90 (5/5) 420Mb CDS (174102-A23)£1599
Pentium-90 (5/5) 720Mb (174102-A25)£1665
Pentium-100 (5/5) 720Mb£2104

Options

- 14" 1024 NI Mitac£170
- 15" 1024 NI Taxan£250
- 14" SVGA Colour£199
- 14" 1024 Compaq£238
- 15" 151FS Compaq£323

£1239

COLLOSSUS FILE SERVER



The Colossus file server is a true powerhouse with 10 drive bays, 400W power supply, multiple fans and secure covered cable routing. Ideal for demanding requirements.

- Intel Pentium 75, 90, 100 or 120 processor
- 16Mb RAM expandable to 128Mb
- 256K external Cache
- Heavy duty server case with 10 drive bays
- Large 400W power supply
- Multiple fans and secured covered cable routing
- 3.5" 1.44Mb floppy drive
- PCI bus with 4 PCI and 3 ISA slots
- 1Mb 64-bit PCI bus graphics exp to 2Mb
- 14" SVGA 0.28dp colour screen
- PCI IDE hard and floppy controller
- Parallel, 2 serial & keyboard ports
- 102 Enhanced keyboard
- Microsoft compatible mouse
- 16-bit ethernet network controller (32 bit optional)

Select hard drive & Novell operating system

P75 Server 16Mb£1399
P90 Server 16Mb£1599
P100 Server 32Mb£2199
P120 Server 32Mb£2499

Server Options

- 850MB IDE hard drive£180
- 1GB IDE hard drive£250
- Adaptec 2940 PCI SCSI II controller£200
- 1GB SCSI II drive£300
- 2GB SCSI II drive£600
- 4GB SCSI II drive£1100
- RAM Per extra 4Mb£120
- Fitted dual speed CD£80
- 32-bit PCI network controller instead of 16-bit£120

£1399

DESKTOPS & NETWORKING

Popular networks can be divided into simple peer-to-peer (WorkGroup) networks or more complex client-server (Server based) networks. Frequently a combination of both is used.

PEER-TO-PEER

Peer-to-peer networks simply connect the PC systems together in your office/department and increase productivity by allowing you to:-
 -Share files, directories, hard disks and access information from your colleagues
 -Share peripherals such as laser printers, scanners, CD ROM drives and fax modems
 -Use electronic mail for faster communication

Usually all systems will include network interface cards linked via ethernet cables. Network software (Windows for Workgroups 3.11 or Novell Personal Netware) will be required for each user. Peripherals (printers, scanners, plotters), storage devices and modems can be connected to any PC and can be shared by all or selected users.

CLIENT SERVER NETWORKS

Server based networks are essential for sharing data eg accounts/order processing systems as well as other resources and provide better security. Peripherals, modems and storage devices are normally attached to the server or workstations dedicated for this purpose. Many solutions are available. For most uses we recommend industry standard Novell Netware based ethernet solutions. These accounts for over 70% of networks, are tried and tested and provide the best value.

SERVER

Usually a tower system with fast hard disk controller, 32 bit network card, large fast hard disks, plenty of RAM and large power supply. Server performance is more related to hard disk system, RAM and network card and not the processor speed. A Pentium 90 system with network card can be slower than an optimised 486 purpose-built server.

WORKSTATIONS

These need to be powerful 486 (or Pentium) systems with network card, and good performance. We recommend at least 8Mb RAM, Local Bus graphics and a 0.28dp screen if using Windows applications. Nowadays we strongly recommend a local hard disk in each workstation.

SERVER BACK-UP

An uninterruptable power supply with software monitoring

is essential for the server to allow it to shut down safely should there be a power failure.

TAPE BACK-UP

There are two options:-
 -Network wide back-ups of server and local PC drives with tape streamer (usually SCSI DAT drive) installed in server together with Cheyenne ARCServe server software
 -Fileserver back-up only via tape unit installed in a workstation.

COMMUNICATIONS

There are two options:-
 -A fax/data modem installed in the fileserver together with network fax software eg Cheyenne FAXServe software
 -Fax/Data modem installed in a workstation which functions as a dedicated fax server. This could also be used for remote support of the network using PC Anywhere software.

PERIPHERALS

These may be attached to the server, workstations which function as print servers or dedicated small network devices called print servers. Some network printers eg HP LaserJet with HP JetDirect card can also connect directly to the network without the use of a workstation/print server.

CABLING

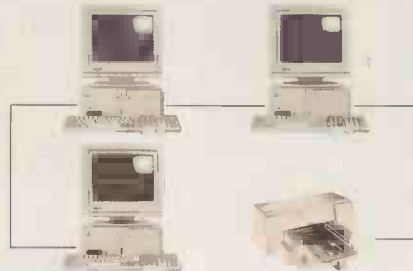
Thin co-axial ethernet for small networks. 10Base-T cabling provides better cable management and is recommended for larger networks.

APPLICATIONS

Popular network applications include wordprocessing, spreadsheets, databases, accounts and electronic mail. We can provide solutions from Lotus, Microsoft or Novell tailored to your requirements.

SERVICES

Purchasing the network components alone will not allow you to be functional with a networks system. Our experienced network services team will provide you with the complete solution tailored to your individual requirements. We can provide you with an initial quotation. Once you are happy with this, we can provide a more detailed plan taking account of your service requirements with final quotation and installation plan. This may involve a site survey. The simple example network prices shown here do not include service elements such as installation, cabling and training.



WORKSTATIONS

3 Mitac 486DX2-66 4Mb RAM, 540Mb 14" SVGA Workstations with 16-bit network card, MS DOS 6.2& Windows 3.11 for workgroups

APPLICATION SOFTWARE

Each includes Lotus software bundle comprising of:-
 -Lotus 1-2-3 v5
 -Lotus Ami Pro v3.1
 -Lotus Organizer v2
 -Lotus Approach
 -Lotus SmartPics
 -Lotus individual training for Ami Pro, 1-2-3 and Approach

NETWORK SOFTWARE

Peer-to-Peer software: Windows for WorkGroups 3.11

PRINTER

HP DeskJet 540 colour printer with autosheet feeder

CABLES

3 sets of 5m cables, connectors and two terminators.

Power Network: As above but with 486DX4-100 540Mb 8Mb RAM Workstations.

3 user£3299
 Additional users£1019

Additional Users
£849

£2799

Please call for latest price

COMPAQ SERVER NETWORK

MITAC SERVER NETWORK

GENERAL OPTIONS



SERVER

- Compaq Prosignia VS Fileserver with 1Gb SCSI II hard drive and 486DX2-66 processor
- 32-bit ethernet card, 8Mb RAM and SVGA colour screen

NETWORK SOFTWARE

- Novell Netware 4.1 5 User

WORKSTATIONS

- 3 Compaq Proline Workstations (486DX2-50 4Mb, 270Mb) with Compaq 14" SVGA screens

APPLICATION SOFTWARE

- Lotus software on each workstation including 1-2-3, Ami Pro, Approach, SmartPics, Organizer and Lotus training

PRINTER

- HP LaserJet 4 Plus 12ppm 600dpi laser printer with HP JetDirect card

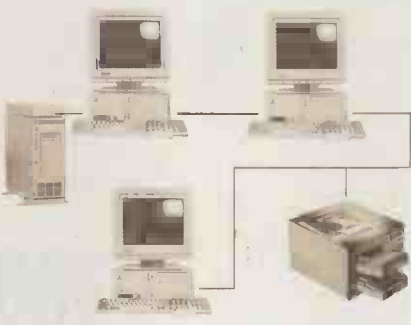
CABLES

- 5m cables, connectors and terminators

Additional Users
£998

£6799

Please call for latest price



SERVER

Colossus Pentium 90 Server (see specification opposite) with 1GB hard drive and 16Mb RAM

WORKSTATIONS

Mitac Pentium 75 Workstations (850Mb, 8Mb, 15" SVGA NI Colour, MS DOS 6.22 & Windows 3.11 for WorkGroups with 16-bit ethernet cards)

NETWORK SOFTWARE

Novell Netware 4.1 5 user

APPLICATION SOFTWARE

Lotus software suite including Lotus 1-2-3, Ami Pro, Approach, Organizer 2 and SmartPics

PRINTER

HP LaserJet 4Si 16ppm 600dpi network laser printer

CABLES

5m cables, connectors and terminators

Additional P75 Workstations
£1399

£8699

Please call for latest price

SERVER OPTIONS

Novell Netware 4.1
 - 5 user£479
 - 10 user£949
 - 25 user£1749

Cheyenne ARCServe 5 Tape backup software

- 5 user£249
 - 10 user£499
 - 25 user£899
 - 2Gb SCSI DAT tape drive only£689

Cheyenne FAXServe software

- 5 user£299
 - 20 user£499
 - 14.4 fax data modem (server modem)£199

Uninterruptable Power Supplies

- APC Smart-Ups 600£299
 - APC Smart-Ups 900£399
 - APC Smart-Ups 1250£599
 - PowerChute Plus for Novell£50
 - DCB interface cable£19
 - Mouse port interface cable£19

WORKSTATION OPTIONS

14.4 fax data modem£119
 PC Anywhere host/remote for DOS£99
 250Mb tape back-up unit£100
 700Mb tape back-up unit£230
 2Gb DAT back-up unit (drive only)£689

CABLING & ACCESSORIES

Lan Research Combi network card£50
 5m thin ethernet cable with connectors£15
 Terminators£5
 10BASE-T ethernet hubs
 - 8 port hub£299
 - 16 port hub£499

SERVICES

Prices will vary on individual requirements
Workshop Build
 Novell fileserver build and workstation build with
 -Network installation on server
 -Network configuration with creation of logins and user access
 -Application installation
On-site Build
 -Site survey (if not conducted earlier)
 -Site cabling
 -On-site hardware installations
 -On-site network implementation with possible links to mini/mainframe and ISDN
 -On-site application implementation
 -On-site training
 -Support: modem, hotline and on-site support

TDR20D

All prices exclude delivery and VAT (17.5%). Delivery:- systems £19, lasers and large items £15, software and small items £10. Visa /Access/ American Express /Switch and Government orders welcome. Prices, specifications and offers are subject to change and subject to our conditions of sale copies of which are available on request. Mail order only. No collections please. Goods are normally despatched within 7 days. All orders will be fulfilled within 28 days unless otherwise specified. E&OE.



Granville House, Blackburn Road, Simonstone, Burnley, Lancashire BB12 7GT

01282 **77 00 99**
 SALES LINES OPEN: Monday-Friday 9.00am-5.00pm
 FAX NO: (01282) 77 06 08
NETWORKING/VOLUME ENQUIRES ONLY

HP DeskJet 320



The portable DeskJet printer for the mobile user

- 600 x 300 dpi resolution
- Optional colour ColorSmart technology. Resolution 300 x 300 and speed 4-7 minutes per page. 256 levels of greyscale for dramatic black graphics
- Fast print speeds of upto 3 ppm
- 48K print buffer, Centronics

- interface, HP PCL 3 language
- Small size (310x65x147mm) and light weight (1.96Kg)
- Windows compatibility
- 3 year return to HP warranty
- Consumables - please call for prices

£169

With Sheet feeder bundle **£207**

HP DeskJet 540



The HP DeskJet 540 offers sharp, clear 600 x 300 dpi black printing and HP's ColorSmart technology

- 600 x 300 dpi resolution
- Fast print speeds of upto 3 ppm for fast, time-saving output
- 16K print buffer, Centronics interface, HP PCL 3 language and built-in Proprietary emulation
- Built-in auto-sheet feeder with capacity of 100 sheets
- Automatic envelope sensor: no need to make a manual
- Up to 50 transparencies at a time, and stacks of up to 20 envelopes

- 256 levels of greyscale for dramatic black graphics for Windows. Water-resistant ink for smudge proof printing
- 3 year return to HP warranty
- Consumables - please call for prices

£210

HP DeskJet 660C



The HP DeskJet 660C offers quality colour printing using

- ColorSmart technology parallel interface, HP PCL 3 language
- Built in auto-sheet feeder with capacity of 100 sheets
- 256 levels of greyscale for dramatic black graphics for Windows
- 3 year return to HP warranty
- Consumables - please call for prices

- All the features of DeskJet 540 plus HP's ColorSmart technology
- Resident colour and black cartridges, black and colour printing without switching cartridges
- 600 x 600 dpi resolution (mono), 600 x 300 (colour)
- Fast print speeds of upto 3 ppm for mono and an average of 4 minutes per page for colour
- 80K print buffer, Centronics

£299

HP DeskJet 850C **£395**

HP LaserJet 4 Plus



This 12 ppm, 600 dpi resolution printer gives your office the advantage of superior looking documents and a wide assortment of built-in scalable fonts

- 600 dpi plus HP Resolution Enhancement and Microfine Toner
- 12 ppm print speed (RISC CPU with cache)
- Two input trays
- 250 sheet output tray
- 2Mb RAM
- RAM expandable to 66Mb

- 1 year HP warranty
- Consumables - please call for prices

£1005

Postscript Model 4M Plus

With Adobe Postscript (takes up 1 SIMM slot) with autoswitching, 80 scalable fonts (10 TrueType, 35 Intellifont & 35 Adobe PS), 6Mb RAM (2Mb base RAM plus 4Mb SIMM 2 slots free) and network ready with integrated ethernet and Mac LocalTalk interface (in addition to the others with autoswitching)

£1331

HP LaserJet 4V



The new 16 ppm, 600 dpi resolution printer that sets a new standard for workgroup printers, offering A4/A3 paper size

- 600 dpi plus HP Resolution Enhancement and Microfine Toner
- 16 ppm print speed (33MHz RISC CPU)
- Two input trays (1 x 100 sheets and 1 x 250 sheets)
- 1 envelope handling capacity
- 250 sheet output tray

- 4Mb RAM expandable to 66Mb
- 1 year HP warranty
- Consumables - please call for prices

£1379

Postscript Model 4MV

With Adobe Postscript (takes up 1 SIMM slot) with autoswitching, 80 scalable fonts (10 TrueType, 35 Intellifont & 35 Adobe PS), 12Mb RAM (4Mb base RAM plus 8Mb SIMM-2 slots free) and network ready with integrated ethernet and Mac LocalTalk interface (in addition to the others with autoswitching)

£1979

HP LaserJet 4Si



The 16 ppm, 600 dpi, high speed, high volume printer for small businesses with large workloads, or networks supporting thousands of nodes in multiple environments

- 600 dpi plus HP Resolution Enhancement and Microfine Toner
- 16ppm print speed (Intel RISC CPU)
- Two input trays (2 x 500 sheets)
- 1 envelope handling capacity with 100 envelope power feeder option
- 500 sheet output tray
- 2Mb RAM expandable to 34Mb
- Network ready with

- integrated Ethernet and Mac LocalTalk interface (in addition to the others with autoswitching). Also includes 2 JetDirect slots
- 1 year on-site HP warranty
- Consumables - please call for prices

£2089

Postscript Model 4Si MX

With Adobe Postscript (takes up 1 SIMM slot) with autoswitching, 80 scalable fonts (10 TrueType, 35 Intellifont & 35 Adobe PS) and 10Mb RAM (2Mb base RAM plus 8Mb SIMM 2 slots free)

£2969

HP DeskJet 1200C/1600



The combination of high quality black text, using HP's Resolution Enhancement technology, plus full featured colour in a single, affordable printer satisfies the full range of printing needs in the office

- All the features of DeskJet 660C with 600x300 dpi black text and 300 dpi full colour printing using ColorSmart technology. Fast 7 ppm black and 1 ppm colour speed
- Operation with four print cartridges (cyan, magenta, yellow, and black) gives millions of colour with full Pantone support.
- Fully HP LaserJet compatible with Colour PCL5 language, slot for HP LaserJet cartridges
- 2Mb RAM expandable to 26Mb (4Mb expandable to

- 20Mb with 1200/PS model)
- Automatic 180 sheet feeder with 100 sheet output tray
- Memory 4Mb Max 100Mb upto 70Mb with PostScript upgrade installed. (6Mb Max 70Mb on HP 1600CM)
- Consumables - please call for prices

£639

HP DeskJet 1200/PS ... £999
HP DeskJet 1600C ... £839
HP DeskJet 1600CPS ... £1235

HP LaserJet 4L



This 4 ppm, 300 dpi resolution printer combines great print quality to offer the ideal printing solution for the desktop or small office

- 300 dpi plus HP Resolution Enhancement and Microfine Toner
- 4 ppm print speed
- One 100 sheet input tray and 50 sheet output tray
- 1 envelope handling capacity. A4, letter, legal, exec and envelope paper sizes
- 1Mb RAM
- RAM expandable to 2Mb via one memory slot.
- Bi-Tronics parallel interface

- HP Explorer software, One button control panel and Econmode feature to use less toner
- 1 year HP warranty
- Consumables - please call for prices

£360

Postscript Model 4ML

With Adobe Postscript as well as HP PCL5 with autoswitching, 80 scalable fonts, 4Mb RAM and Mac LocalTalk interface (in addition to Centronics with autoswitching)

£739

HP LaserJet 5P



This 4 ppm printer offers superb 600 dpi resolution print quality at a price and size that are perfect for the desktop, small office and workgroup

- 600 dpi resolution
- 6 pages per minute. Average 4000 pages.
- 1 internal bitmapped font and one cartridge slot
- One 250 sheet input tray
- 1 envelope handling capacity
- 100 sheet output tray
- 2Mb RAM with memory enhancement to 50Mb RAM
- Bi-Tronics parallel and serial interfaces

- Bi-directional parallel port compliant infrared
- PowerSave energy save feature
- 1 year HP warranty
- Consumables - please call for prices

£585

HP LaserJet 5MP **£739**

HP Color LaserJet



The new HP LaserJet that does colour! A printer that meets the demands of today's shared office environments

- 300 dpi plus 4 toner cartridges (Black, Yellow, Magenta and Cyan)
- HP ColorSmart produces sharp colour images in 16.7m colours
- 10 ppm print speed (mono) with 2 ppm Colour
- One input trays (1 x 250 sheets) with additional 250 sheet tray options
- 1 envelope handling capacity option
- 100 sheet output tray

- 8Mb RAM expandable to 72Mb Bi-Tronics parallel interface modular I/O slot
- HP Explorer software, eight button control panel and Econmode feature to use less toner. PowerSave energy save feature
- 1 year onsite HP warranty
- Consumables - please call for prices

£4199

Postscript Printing: We recommend Postscript SIMM, additional 4Mb RAM (at least), HP JetDirect card for network and rear feed tray options.

HP Scanners



HP's affordable colour / greyscale flat-bed scanner with impressive features and software bundle

- 400 dpi optical resolution (1600 dpi enhanced resolution) - Scan text, drawings and illustrations and photographic images
- Recognises over 16m colours and 256 levels of greyscale
- HP AccuPage technology via Calera WordScan OCR software recognises text down to 4 point
- TWAIN support, OCR aware, automatic brightness and contrast settings. Fast preview and final scan, powerful image editing tools, user selectable resolutions from 4% to 400% in 1% increments, on-line learning, and easy setup and installation

- Scans transparencies from 35mm to other media up to A4. Up to 50 pages at a time with optional document feeder
- PC bundle includes SCSI adaptor, cable, power cord, scanner, HP DeskScan II for Windows scanning utility, Calera WordScan OCR package and Aldus Photostyle SE image editing software
- 1 year HP warranty
- Consumables - please call for prices

£679

HP ScanJet 3P

Entry level flat-bed mono scanner with 256 greyscales and up to 1200 dpi enhanced resolution. Similar specification to the colour model but with 300 dpi optical (1200 dpi enhanced) resolution and 256 greyscale levels. Includes HP Picture place image editing and Calera WordScan 3. **£339**

HP Plotters



Leading inkjet technology coupled with 600 dpi resolution, excellent colour, fast speeds and ability to vary line thickness. HP's DesignJet range offers the best value

All models are available with A0 or A1 size, 600 dpi resolution in mono on plain paper. AutoCAD and Windows drivers included. RS232C and Centronics interfaces with autoswitching. One year on-site warranty

DesignJet 220: Desktop mono InkJet plotting with ability to take sheets only (Legs optional). 600 dpi and 2Mb RAM as standard.
DesignJet 600: Mono InkJet plotters with sheet or roll feed and legs as standard. 600 dpi and 4Mb RAM as standard
DesignJet 650: Colour and mono inkjet plotters with sheet or roll feed, legs as standard. 600 dpi (mono mode) and 300 dpi (colour). 4Mb RAM buffer expandable to 20Mb. Four ink cartridges with ink level indicators

DesignJet 220 A1	£1746	DesignJet 600 A0	£3920
DesignJet 220 A0	£2291	DesignJet 650 C A1	£3810
DesignJet 600 A1	£3279	DesignJet 650 C A0	£4510

HEWLETT-PACKARD

US ROBOTICS

SPORTSTER RANGE

Sportster 14,400 Fax

Operating at the 14,400 bps standard for business communications, the Sportster 14,400 is 50% faster than the 9600 bps modems and with error control and data compression through-put can easily reach 57,600 bps.

SPORTSTER 14.4 EXTERNAL



£121
£Call

SPORTSTER 14.4 INTERNAL

Sportster 28,800 Fax

The new Sportster 28,800 v.34 fax/data modem operates at the 28,800 bps standard for business communications, this modem is 100% faster than 14,400 bps modems. With error and data compression, throughput can easily reach 115,200 bps. External only. Complete with fax and data software.



£199

THE NEW LATEST VERSION

ZOOM RANGE

Zoom one of the leading fax modem manufacturers in the USA, produce a range of competitively priced BABT approved modems.



£89

ZOOM INTERNAL 14.4 MODEM

£99

ZOOM EXTERNAL 14.4 MODEM

£149

ZOOM INTERNAL 28.8 MODEM

£179

INTEL PCMCIA MODEM

High quality Intel PCMCIA type II fax and data modem complete with line adaptor module, 2m line cord, RJ-11 connector, excellent software and intel 3 year warranty.



- Modem: 2400 bps, CCITT v.22 bis, v.21; up to 9600 bps with V.42/V.42 bis, MNP 1-5
- Fax: up to 9600 bps send/receive, CCITT Group (V.29, V.27ter, V.21); Class 1 Hayes AT compatible
- Intel card manager software lets you insert and remove your card

without leaving your application
• Winfax Lite for Windows lets you send and receive faxes easily
• Hyperaccess comms software for Windows will communication needs

£99

INTEL 2496 PCMCIA MODEM

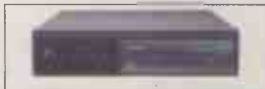
PACE

Pace Modems

PACE MICROLIN FX 34 INTERNAL **£254**
PACE LINNET 34 FX EXTERNAL **£254**
PACE MICROLIN FX 32 PLUS INTERNAL **£169**
PACE LINNET 32 PLUS FX EXTERNAL **£169**

Pace Message Desk

The new voice fax and data modem from Pace. The Pace Message desk features the same specification as the Pace V32bis plus: full voice messaging, fax-back and fax-forwarding, paging facilities and a wide range of other value-added message functions



£254
£Call

PACE MESSAGE DESK EXTERNAL

PACE MESSAGE DESK INTERNAL

APPROVED FOR CONNECTION TO telecommunication systems specified in the conditions for use subject to the conditions set out in them

All prices exclude delivery and VAT (17.5%). Delivery: Systems £19, Lasers and large items £15, software and small items £10. Visa /Access/ American Express /Switch and Government orders welcome. Prices, specifications and offers are subject to change and subject to our conditions of sale copies of which are available on request. Mail order only. No collections please. Goods are normally despatched within 7 days. All orders will be fulfilled within 28 days unless otherwise specified. E&OE.



MICROSOFT

CORPORATE SOFTWARE LICENCES AVAILABLE

Call for details!

OPERATING SYSTEMS

Windows 95£59
Windows 95 CD£59
Windows 3.1£Call
Windows 3.1 upg.....£42
Win for Workgroups 3.11£91
Win for Workgroups 3.11 upg ...£43
Windows NT£265
Windows NT Upg from 3.1£225
Windows Printing System£86
Windows Sound System 2£48
Win Sound System 2 +Card.....£132
MS DOS 6.22£37

LANGUAGES

MS Plus for Win 95£27
MS Plus for Win 95 CD.....£27
MS Delta Ver Cont system.....£235
MS Fortran v5.1 DOS/WIN.....£123
MS Fortran v5.1 DOS/Win Educ.£56
MS Fortran Powerstation.....£234
MS Macro Assembler v6.11.....£99
MS Quick Basic DOS£83
MS Test£399
MS Visual C++ for Win£58
MS Visual C++ Pro for Win£205
MS Visual C++ Pro CD v2.....£282
MS Visual Control Pack Win£79
MS Visual Tools Suite Win.....£188
MS Visual Basic Std DOS£80
MS Visual Basic Pro DOS£195
MS Visual Basic Std for Win£80
MS Visual Basic Prof Kit for Win.£195

APPLICATIONS

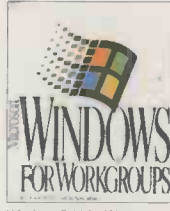
MS Money v3 for Win£25
MS Publisher for Win£63
MS Works DOS£85
MS Works 95 for Win£Call
MS Works 95 for Win upg£Call
MS Works v4 for Win£84
MS Works v4 for Win upg£52
MS Office Assistant£93
MS Schedule+ 95 for Win£71
MS Schedule+ 95 for Win upg.£53
MS Schedule+ for Win£89
MS Access 95 for Win£238
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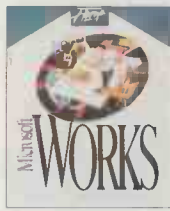
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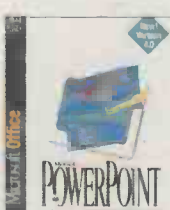
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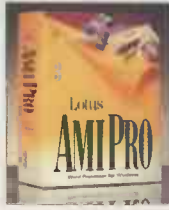
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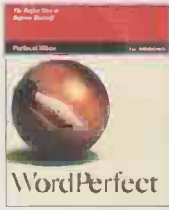
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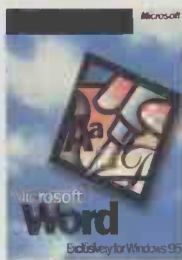
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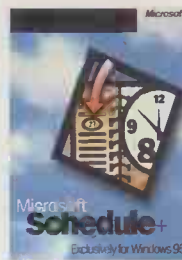
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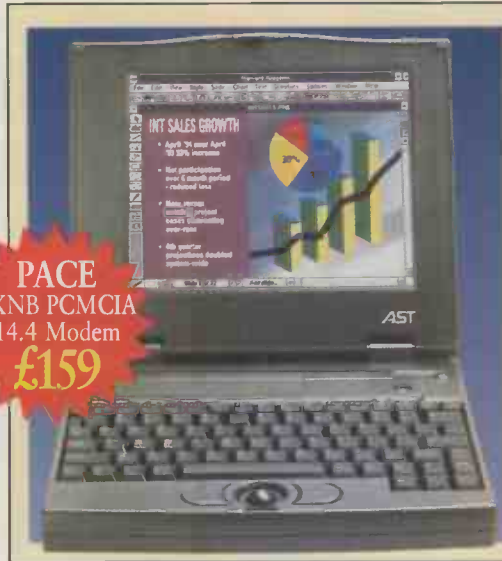
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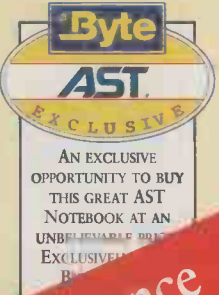
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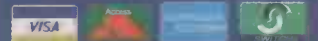
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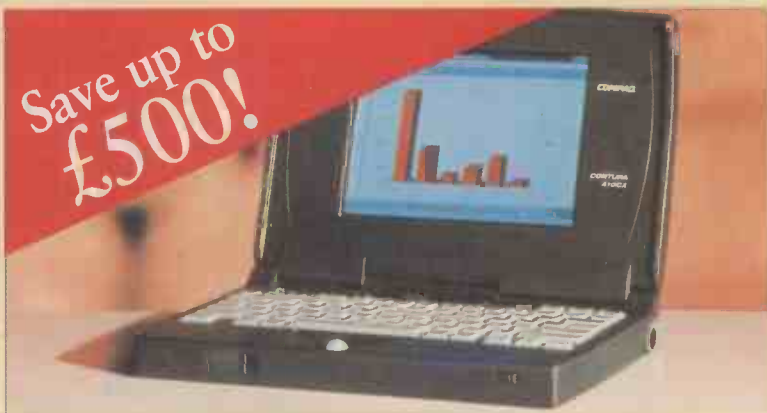
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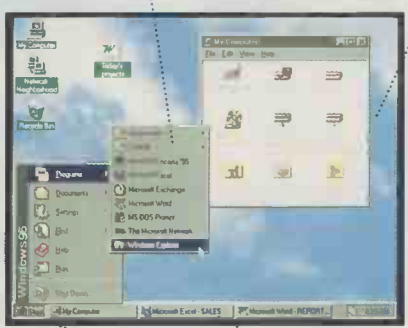
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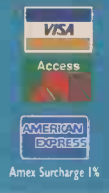
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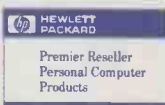
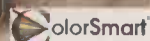
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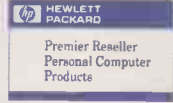
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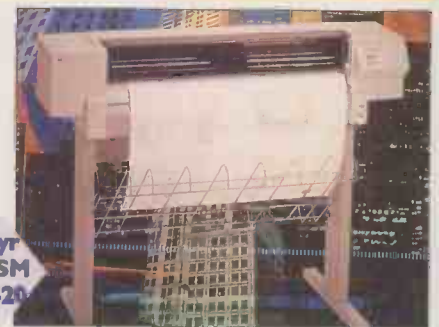
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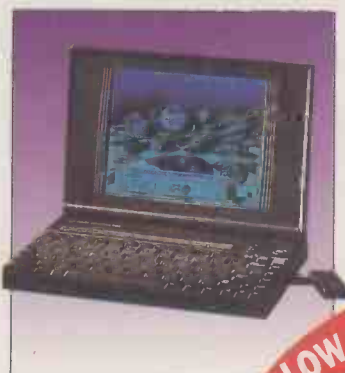
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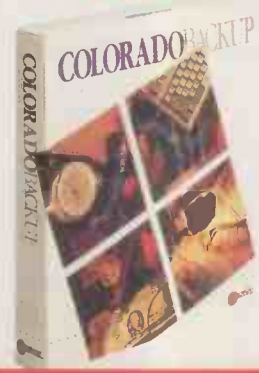
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Warranty (RT-B)	1yr	2yr	1yr	2yr
Price	£80	£115	£155	£199

NOW JUMBO 1360MB AVAILABLE CALL



The Tapes(b)

Colorado	3-pk	3M		each	5-pk
DT-250 fmc'd	£42	DC2120	unfmc'd	£9.75	£45
DT-350 fmc'd	£52	DC2120XL	unfmc'd	£14	£66
DT-740 fmc'd	£66	MC3000XL	unfmc'd	£21	£100

The Software £39(b)

Colorado Backup for Windows works with all Colorado tape drives and uses industry standard QIC and DDS formats. In addition, it supports most popular PC networks (upto Novell NetWare 3.x).

- Drag & Drop operation
- Automation capability
- Data Compression
- Runs in background
- Tape library facility
- Password Protection

NEW! HP OMNIBOOK 5000 P/90, 8Mb RAM, 1GB HD, TFT

NEW! T100 Travan Internal Drive, 400/300MB capacity uniform tape format with QIC-80/QIC-40 compatibility £119(a)



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RELIABLE PERFORMANCE - HP COMPUTERS

HP VECTRA PCs

This is the best-selling range of desktop PCs from Hewlett-Packard. It is the most affordable premium brand offering unrivalled value without cutting corners. Every machine carries a 3 year warranty with the first year having on-site maintenance by HP engineers. This warranty will also cover 14" or 15" HP monitors (optional) purchased with the computer.

The Economy range offers entry-level computing whilst the Standard range offers higher specification computing and greater upgradability.

Both ranges come pre-loaded with MS Windows for WorkGroups 3.11 giving easier and cheaper networking options for the small office or department. A range of high quality, flicker-free monitors are available to provide the ideal match for your requirements. All computers are EPA Energy Star compliant.



MONITORS

HP 14" VGA mono	£149(a)
HP 14" SVGA colour	£195(a)
HP 14" Ergo SVGA colour	£235(a)
HP 14" SVGA ES colour	£220(a)
HP 15" Ergo Ultra SVGA col	£342(a)
HP 17" Ergo UVGA col	£655(a)

ECONOMY RANGE

VE 4/50	4/270/DWWW	£730(a)
VE 4/50	8/420/DWWW	£915(a)
VE 4/66	4/270/DWWW	£760(a)
VE 4/66	8/420/DWWW	£945(a)
VE 4/100	8/420/DWWW	£1115(a)
VE 4/100	8/840/DWWW	£1200(a)
HP Supportpack - 3 yr OSM		£125

STANDARD RANGE

VL2 4/50	8/270/DWWW	£855(a)
VL2 4/50	8/540/DWWW	£930(a)
VL2 4/66	8/270/DWWW	£899(a)
VL2 4/66	8/540/DWWW	£949(a)
VL2 4/100	8/270/DWWW	£1040(a)
VL2 4/100	8/540/DWWW	£1095(a)
HP Supportpack - 3 yr OSM		£125(a)
Prices do not include VDU		

NETSERVERS

The HP NetServer range incorporates HP's unrivalled quality in design and manufacture, resulting in some of the most reliable computers in their clan - one of the first to offer 3 year on-site response within 24 hours at no extra charge.



In addition, the range offers a choice of chassis, upgrade capacity and technology to allow the best choice between leading edge performance, extended up-time features and price.

HP NETSERVER LC

- ☆ File/Print Applications
- ☆ Intel 486DX2 & Pentium® CPUs
- ☆ Fast SCSI-2, PCI, EISA
- ☆ 4 bay deskside case
- ☆ 3 year OSM by HP

HP NETSERVER LF

- ☆ Client/Server Applications
- ☆ Intel 486DX2 & Pentium® CPUs
- ☆ PCI, EISA & SCSI-2
- ☆ Drive array options
- ☆ 3 year OSM by HP

HP NETSERVER LM

- ☆ Scaleable Client/Server
 - ☆ Intel 486DX2 & Pentium® CPUs
 - ☆ EISA, Fast SCSI-2, & IDE
 - ☆ ECC Ram, Hot-Swap array options
 - ☆ 3 year OSM by HP
- Pentium is a trademark of Intel Corp

STANDARD SERVERS

LC 4/66-1050	8/1GB/-	£1659(a)
LF 4/66-1050	8/1GB/CD	£2299(2a)
LC 5/66-1050	16/1GB/-	£2055(a)
LH 5/75-1050	16/1GB HOT/CD	£3945(2a)
LH 5/100-1050	32/1GB HOT/CD	£5380(2a)
LM 5/66-1050	16/1GB/-	£3975(2a)

ARRAY SERVERS

LM 4/66-2000	16/2*1GB/HOT SWAP	£6199(3a)
LM 5/60-2000	16/2*1GB/HOT SWAP	£6075(3a)
LF 5/66-1Array	16/CHASSIS/CD	£3525(2a)
LH 5/75-1Array	16/CHASSIS/CD	£4975(3a)
LH 5/100-1Array	32/CHASSIS/CD	£6170(3a)
HP Remote Assistant (Requires Modem)		£595(a)

PERFORMANCE PCs



- Intel Pentium® Processor : 75, 90 or 100MHz
 - PCI bus architecture with local bus IDE & graphics
 - 8MB RAM standard : Expandable to 192MB
 - Network ready with MS Windows for WorkGroups 3.1 preloaded
 - VE entry level specification:-
270MB or 540MB HD, ISA slots, 256KB LZ cache option
 - VL standard level specification:-
420 or 840MB HD, PCI/ISA slots, 64 bit graphics, 256KB LZ cache.
- (Prices do not include monitor)

Model	CPU	RAM(MB)	HD(MB)	I/O Bus	Price
HP Vectra VE 5/75	P/75	8	270	ISA	£1039(a)
HP Vectra VE 5/75	P/75	8	540	ISA	£1099(a)
HP Vectra VL 5/75	P/75	8	420	PCI/ISA	£1195(a)
HP Vectra VL 5/75	P/75	8	840	PCI/ISA	£1280(a)
HP Vectra VL 5/90	P/90	8	420	PCI/ISA	£1379(a)
HP Vectra VL 5/90	P/90	8	840	PCI/ISA	£1463(a)
HP Vectra VL 5/100	P/100	8	840	PCI/ISA	£1585(a)

Note: Systems do not include a monitor.

HIGH CAPACITY BACKUP

WORLD LEADER IN DAT BACKUP



Conservative estimates state that: "After 1 year of use the data on your hard disk is worth 10 times the computer"

PROTECT YOUR INFORMATION

BACK IT UP

- ☆4Gb to 16Gb capacity (120m tape)*
 - ☆510Kb/s sustained transfer rate*
 - ☆8Gb in approx. 2 hours*
 - ☆Find any file in 40 seconds
 - ☆Netware & Unix Solutions Available
- Please call

3yr
OSM
£210

HP SureStore 6000*	Drive only	from £809(a)
HP SureStore 5000	Drive only	from £715(a)
HP SureStore 2000	Drive only	from £635(a)

HOTEL OFFER!

Simply purchase any one of -
 a) HP Printer (excluding HP Deskjets), Plotter or Scanner and its HP SupportPack
 b) A complete Compaq, IBM or HP Computer System
 c) Over £500 (excl. carriage & VAT) of Software or Network Products or Multimedia Products or Storage Products or Modems
 You must request your complimentary award with your order. Offer subject to availability. Its usage is governed by conditions as stated on the award. Conditions include paying for breakfast and dinner at the hotel, and some hotels list periods when reservations are not accepted. Only one award per order available whilst stocks last.



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The No. 1 Personal Computer maker



PROLINEA

High performance at entry level prices



The new Compaq Prolinea range boasts some key high-end technology from the DeskPro range as well as some new use-ability features, eg TriFlex/PCI architecture to realise optimum performance, PCI LB graphics and Enhanced IDE, Plug and Play compatible, Auto config for Compaq IDE HDs. MS-DOS 6.2 and MS Windows 3.1 are pre-loaded. All Prolineas carry a 3 year warranty. Pentium is a trademark of Intel Corp.

LOW PRICE

Model	CPU	RAM(MB)	HD(MB)	Case	Price
4/50	486DX2-50	4	270	3x3	£715(a)
4/66	486DX2-66	8	270	3x3	£899(a)
4/66	486DX2-66	8	420	4x4	£965(a)
4/100	486DX4-100	8	270	3x3	£1045(a)
4/100	486DX4-100	8	420	4x4	£1099(a)
5/75	Pentium-75	8	420	3x3	£1315(a)
5/90	Pentium-90	8	420	4x4	£1420(a)

CONTURA 420

Performance on the move

NEW



The new Compaq Contura 420 builds on the legendary Contura line to provide more performance and higher reliability with even greater ease of use features such as PCMCIA and a built-in trackball. Every Contura 420 has a range of docking options and rechargeable standard Duracell batteries

which can last up to 5.5 hours. MS-DOS 6, MS Windows 3.1 and Lotus Organiser are pre-loaded. All Contura 420s carry a 3 year limited warranty.

Contura 420	486DX4-75, 4MB Ram, 350MB HD, 10.4" col STN	£1595(a)
Contura 420C	486DX4-75, 8MB Ram, 420MB HD, 10.4" col STN	£1770(a)
Contura 420CX	486DX4-75, 8MB Ram, 420MB HD, 10.4" col TFT	£2330(a)

DESKPRO

The manageable choice for networks

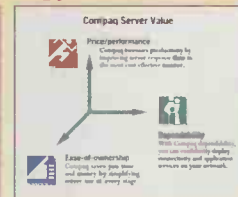


The new Compaq DeskPro range addresses the key issue facing PC networks - manageability. Every DeskPro is network ready (Ethernet) and features Compaq AssetControl - a unique means of identifying equipment spec down to serial numbers, revision numbers and configuration. MS-DOS 6.2, MS Windows and Network Setup Utility (Netware) are provided. All DeskPros carry a three year limited warranty. Asset management monitors are available separately.

Model	CPU	RAM(MB)	HD(MB)	Case	Price
4/66	486DX2-66	8	270	3x3	£999(a)
4/100	486DX4-100	8	270	3x3	£1165(a)
4/100	486DX4-100	8	420	4x4	£1255(a)
5/75	Pentium-75	8	420	3x3	£1495(a)
5/75	Pentium-75	8	420	4x4	£1520(a)
5/90	Pentium-90	8	420	4x4	£1590(a)
5/90	Pentium-90	16	720	5x5	£1950(a)

PROSIGNIA 300

Server technology at Workstation prices



The new Compaq ProSignia 300 is a breakthrough in price/functionality for servers. Compaq has used many of the features first used in the ProLiant and ProSignia servers to produce a budget server with qualities that matter.

☆ Error Checking and Correcting memory ☆ Intel Pentium CPUs

- ☆ 32 bit Ethernet and Fast-SCSI2 controllers on PCI bus
- ☆ 6 expansion slots and 5 drive bays in total
- ☆ 256KB write-back cache
- ☆ 3 year On-site repair warranty (via Compaq)

ProSignia 300 5/75	Pentium-75, 16, 1GB, CD-ROM	£2455(2b)
ProSignia 300 5/75	Pentium-75, 16, 2GB, CD-ROM	£2989(2b)
ProSignia 300 5/90	Pentium-90, 16, 1GB, CD-ROM	£2715(2b)
ProSignia 300 5/90	Pentium-90, 16, 2GB, CD-ROM	£3240(2b)

OTHER RANGES

We are authorised Compaq dealers and can supply from the existing ranges ie LTE Elite, Presario, DeskPro XE & XL, ProSignia VS and ProLiant. We are also able to offer lease finance (subject to status) for orders in excess of £1000
 Contura Aero from £745(a) LTE Elite from £1860(a)
 ProLiant from £4239(a) ProSignia VS from £1499(a)

COMPAQ WARRANTY

Please note that the on-site maintenance warranty service for Compaq products is through Compaq appointed Service Providers. This on-site maintenance service is also intended to address 'DOA' situations. Compaq notebooks do not carry an on-site warranty. Technomatic provide a 12 month RTB warranty as standard and can supply a 3yr on-site maintenance enhancement on certain products. Please call for details.

MONITORS

Compaq monitors are specified according to user choice and so are not included with the systems advertised. Asset management capable monitors are also available.

14" VGA colour	£170(a)	15" SVGA (AVI)	£285(a)
14" SVGA colour	£209(a)	17" SVGA (AVI)	£669(a)
14" 1024 (AVI)	£250(a)	20" QVision 240 (AVI)	£1590(2a)

THINKPADS

THE BEST TECHNOLOGY

- NEW: TP755CV range** - As TP755CE plus a detachable screen which can be used as an OHP tablet offering 64k colours.
- NEW: TP755DV range** - A combination of the TP755CD and CV, offering integral 5.25" CD-ROM drive and OHP screen.
- NEW: TP755CX range** - Probably the BEST notebook on the market - Intel Pentium processor, SVGA 64k colour, 10.4" TFT screen, Lithium Ion battery and all standard TP755 features
- NEW: TP701C range** - The amazing, full size folding keyboard sub-notebook ThinkPad with the 10.4" TFT screen.

THE SMARTEST NOTEBOOKS

Model	CPU	Screen	RAM	HD	Price
TP370c	4/75	10.4" TFT	4	340	£2315(a)
TP370c	4/75	10.4" TFT	4	540	£2515(a)
TP755c	4/75	10.4" TFT	4	340	£3339(a)
TP755c	4/75	10.4" TFT	4	810	£4079(a)
TP755CE	4/100	10.4" TFT	8	540	£3845(2a)
TP755CD	4/100	10.4" TFT	8	810,CD	£5279(2a)
TP755CV	4/100	10.4" OHP	8	540	£4785(2a)
TP755DV	4/100	10.4" OHP	8	810,CD	£5455(2a)
TP755CX	5/75	10.4" SVGA	8	1.2GB	£5295(2a)
TP701Cs	4/50	10.3" DSC	4	340	£2580(2a)
TP701C	4/75	10.4" TFT	8	540	£3899(2a)

REDUCED PRICES

As seen on TV



INCLUDES MONITOR

APTIVA

IT'S WHATEVER YOU WANT

The Aptiva - a modern, state-of-the-art range of computers designed for you, designed to perform, designed to be the best value package from IBM. Each Aptiva has class leading software - from PC DOS v6.3, MS Windows v3.1 and MS Works to IBM's Learning Library, Personal Desktop, Custom Tools & First Steps. Every Aptiva comes with free membership of Helpware with access to the best 24 hour, 365 day telephone helpline. Aptiva comes complete with keyboard, mouse & 14" SVGA screen.

STANDARD

Aptiva 768	4/50, 4, 270, Sp	£769(2a)
Aptiva 788	4/66, 4, 540, Sp	£885(2a)
Aptiva 792	4/66, 8, 540, Sp	£1055(2a)
Aptiva 798	P/60, 8, 540, Sp	£1345(2a)

MULTIMEDIA

Aptiva 855	4/50, 4, 270, Sp + MM1 - Call for spec.	£959(2a)
Aptiva 888	4/66, 4, 540, Sp + MM1 - Call for spec.	£1080(2a)
Aptiva 857	4/66, 8, 540, Mt + MM2 - Call for spec.	£1269(2a)

I B M



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TAXAN

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ERGOVISION 580+LR

- ◆ 15" FST Multiscanning Monitor
- ◆ Up to 1280 x 1024 Non-interlaced
- ◆ Horizontal Freq 30-65KHz
- ◆ 0.28mm Dot Pitch

£285



ERGOVISION 880LR

- ◆ 17" FST Multiscanning Monitor
- ◆ Up to 1280 x 1024 Non-interlaced
- ◆ Horizontal Freq 30-64KHz
- ◆ 0.28mm Dot Pitch

£515



ERGOVISION 885LR

- ◆ 17" FST Multiscanning Monitor
- ◆ Up to 1600 x 1200 Non-interlaced
- ◆ Horizontal Freq 30-82KHz
- ◆ 0.26mm Dot Pitch

£589

THE LEAN,
MEAN



GRAPHICS

GTS WINTURBO(a)

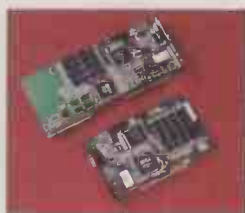
- ◆ Super Fast 64 Bit Windows Accelerator
- ◆ Powered by ATi Mach 64 Processor
- ◆ VESA DPMS Compatible
- ◆ 2MB & 4MB VRAM Versions Available
- ◆ Up to 1280 x 1024 Resolution
- ◆ Up to 100Hz Refresh Rate
- ◆ On-Screen Colour Calibration

2MB ISA £194 VLB £195 PCI £196

GTS WinTurbo Plus

4MB ISA £338 VLB £339 PCI £340

GTS WINTURBO
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NEW
LOW PRICES

COMMON FEATURES FOR ABOVE MONITORS

- ◆ Microprocessor Control
- ◆ Flicker Free Operation
- ◆ Low Radiation & Anti-Static CRT (MPR2)
- ◆ EPA ENERGY STAR Compliant
- ◆ VESA DPMS Compatible

3 YEARS
ON SITE MAINTENANCE
£49

NEW 400LR 14" SVGA Colour Monitor £185(a)



PCMCIA ME3000II-2 BNC/TP ETHERNET ADAPTER £99(a)

ETHERNET POCKET LAN ADAPTER

E3000II



- ◆ Superior performance using EPP mode
- ◆ Allows printing and networking together

£73(a)

BNC & TP
CONNECTORS

- ◆ Dual media with AutoDirect
- ◆ Power from mains or PS/2 mouse port
- ◆ Supports switchless hardware configuration
- ◆ Drivers for: ODI for Netware, NDIS 2.0 & 3.0 for Lan Manager & WinFrog, Packet for TCP/IP
- ◆ Diagnostic using s/w & LED
- ◆ Power cable & mains PSU included

ETHERNET COMBO ADAPTER

GE2000D

£29(b)



- ◆ Fully Novell NE2000 compatible
- ◆ Drivers for: IPX & ODI for Netware Windows for Workgroups NDIS for Lan Manager Packet for TCP/IP
- ◆ BNC & RJ45 connectors
- ◆ Jumper & Jumperless
- ◆ Auto-Setup hardware using software
- ◆ Auto-Detect media type
- ◆ Auto-Detect 8 bit or 16 bit Bus
- ◆ Includes diagnostic software
- ◆ Up to 35% performance improvement

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 EXCLUSIVE FROM
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US Robotics
WS3000 MKII
Desktop Modem

- ☆ V22bis, V22, V21, V23
- ☆ 2400bps, 1200bps, 300bps, 1200/75bps
- ☆ MNP 5 Data Compression
- ☆ MNP 1-4 Error Correction
- ☆ Hayes 'AT' Command Set Compatible
- ☆ Auto Speed Detect & Select
- ☆ 5 Year Manufacturers Warranty
- ☆ Fully BABT Approved
- ☆ Ideal for low volume comms user

ONLY £29 (a)

PC/AT modem cable with WS3000 £8
LIMITED STOCKS HURRY HURRY HURRY!



Sportster®

14.4 + FAX DESKTOP

£105 **LOW PRICE**

28.8 + FAX EXTERNAL

£159 **FREE DATATALK 4 DOS***

AMAZING VALUE BUNDLE

Sportster 14.4 Fax Modem + Panasonic CD-ROM Drive + IBM OS/2 32 bit operating system (CD) + Internet s/w + Internet Connection + IBM 32bit wordprocessor + IBM 32 bit spreadsheet + IBM Faxworks + Comserve Information Manager + Modem Cable + CD-ROM Interface & Cable **£199**
 Carr £12

WORLDPORT

NEW V34 PCMCIA £165



WORLDPORT MOBILE RANGE(a)

Dual Standard (28.8 + HST) + Fax PCMCIA £165
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Courier

LIMITED OFFER SPECIAL COMMS BUNDLE



COURIER PROFESSIONAL RANGE(a)
V34 + Fax Desktop Bundle (USR/MD/E250) £285*
 inc **FREE USR High speed Dual Serial Port**
FREE 25+9/25 Modem Cable
FREE Datatalk 4 DOS (Full Version) DS Fax (Win)
FREE Quiclink II Fax & Coms s/w
V34 + Fax Desktop Modem only £245
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USR HIGH SPEED DUAL SERIAL PORT
 Essential for all windows users **£49 (a)***
 faster than 9,600. 2 yr warranty

*While stocks last, free S/W must be requested at time of purchase

US Robotics®
 AUTHORISED RESELLER

5 year WARRANTY

MODEL	SPEED				ERROR CORR.	DATA COMP.	FAX	ASYNCHRONOUS	SYNCHRONOUS	DIAL UP	LEASE LINE	FORMAT							
	28800 (V34)	19200 (V32terbo)	14400 (V32bis)	9600 (V32)								2400 (V22bis)	1200 (V22)	1200/75 (V23)	300 (V21)	V42	MNP 2-4	V42bis	MNP 5	9600	14400 (V17)	DESKTOP (EXT)	PC CARD (INT)	POCKET	PCMCIA
SPORTSTER 28.8 + FAX	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SPORTSTER 14.4 + FAX		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
COURIER V34	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WORLDPORT 28.8	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WORLDPORT HST DUAL STD CELLULAR		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

APPROVED for Connection to telecommunication systems specified in the instruction for use subject to the Conditions set out in them.

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MicroSolutions **backpack**® PORTABLE SOLUTIONS

PARALLEL PORT DEVICES: Ideal for mobile user, convenient for desktop PCs, simple installation, just connect Backpack to your printer port and your printer to the Backpack. You don't lose print capability.

backpack® TAPE DRIVES

- Industry Standard Formats
- Supports EPP & IEEE 1284 ports
- DOS & Windows Backup s/w included
- Unattended backups • 2 yr manuf warranty
- Compact design and easily portable

Backpack TD 900MB **£309(a)**
Backpack TD 800MB Travan **£275(a)**
Backpack TD 340MB **£199(a)**

backpack® CD-ROM DRIVES

- 250ms access time (4x) • Photo CD comp
- Quad speed (4x), up to 600KB/S transfer rate
- Audio sockets for headphones & line out
- MPC II compliant with EPP
- CD-S Models available with 16bit built-in sound

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Backpack CD-S 2X inc sound **£285(a)**
Backpack CD 4X **£259(a)**
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NEW HIGH CAPACITY TRAVAN DRIVE



backpack® HARD DRIVES

- Compatible with DOS v3.1 and above
- Supplied device driver uses 5K
- Supports EPP & IEEE 1284 parallel ports
- Full drive single partition under all DOS versions
- Transfer speeds up to 600KB/S
- Can be daisy chained with other Backpacks

Backpack HD 420MB **£325(a)**
Backpack HD 850MB **£399(a)**
Backpack HD 1200MB **£515(a)**

backpack® FLOPPY DRIVES

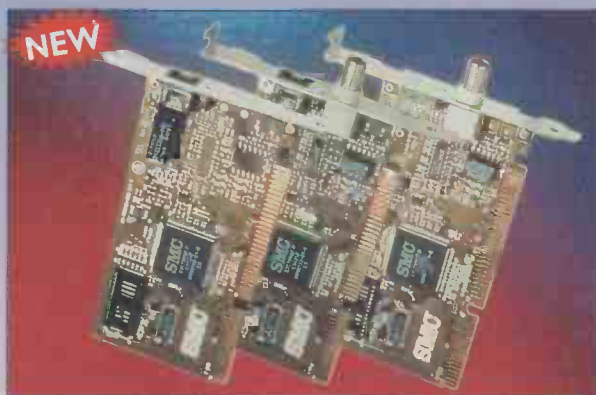
- Windows and Dos support
- Software drives supplied

Backpack FD 35 1.44MB **£115(a)**
Backpack FD 525 1.2MB **£125(a)**

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SMC

SMC: EZ ETHERNET NETWORKING



BEYOND PLUG & PLAY

- ◆ EZ Configuration : Auto or one step configuration
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- ◆ EZ Desktop Management : SNMP PC agent
- ◆ Compatible : Driver support for most popular nos
- ◆ Outstanding Performance : Unique multitasking data transfer
- ◆ Reliable : SMC lifetime warranty, MTBF of 400 years



LOW COST HUBS & REPEATERS

- ◆ Plug and Play, No configuration required
- ◆ Desktop models & Rack mountable, segmentable models
- ◆ Small footprint, compact
- ◆ Exceptional value and reliability

			1pk(b)	5pk(a)
Ether EZ	ISA	BNC	£59	£279
Ether EZ	ISA	TP	£61	£259
Ether EZ	ISA	BNC/TP	£66	£299

Also available 1pk(b)

Etherpower	PCI	BNC/TP	£99	
Ultra 32c	EISA	BNC/TP	£159	
Elite/A	MCA	BNC	£129	
Elite 10T/A	MCA	TP	£125	

Call for PCMCIA & Pocket Adapters

Model	TP	BNC	AUI	Price
Tiger TP12	12	1	1	£299(a)
Tiger TP6	6	0	1	£155(a)
Tiger TP6B	6	1	0	£165(a)
Tiger CX3	0	3	1	£219(a)

**AMAZING LOW
MULTITECH PRICES**



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ADMIN 0181-358 8100

PRICES EXCLUDE VAT @ 17.5%



M u l t i - T e c h

At Last...
A Multi-Tech
Modem For
The Home Office
and Small
Business.



MultiModem™

**INCLUDES
MULTIEXPRESS
FAX SOFTWARE
FOR WINDOWS**



**Announcing the amazing value
packed Multimodem 2834ZDX
from Multi-Tech Systems.**

Superior Performance. With blazing V34 data rates up to 28,800bps and fax speeds of 14,400bps, and with V42bis data compression data transfer rates of up to 115,200bps are achievable. Multi-Tech also gives you full backward compatibility to all ITU standards including V32bis (14,400bps) and the V32 turbo (19,200bps) standard.

Fully Featured. 10 LED indicators to monitor every aspect of your connection. Plus help screens, non-volatile memory and windows communications and fax software you need.

Unmatched Warranty. A 10-year warranty direct from Multi-Tech eliminates worry and makes the MultiModemZDX ideal for the home or small business.

BABT Approved - And it's a Multi-Tech!



TECHNO VALUE

ZDX 2834 **£165(a)**
ZDX 1932 **£109(a)**

**MULTI-TECH HIGH SPEED
SERIAL PORT £49(b)**
PC/AT MODEM CABLE 9/25 £9
FOR THE PROFESSIONAL COMMS USERS

MT2834 BLK DESKTOP NEW £395(a)
FREE HIGH SPEED SERIAL PORT

MT1432 BLK DESKTOP **£309(a)**
MT1432 MK POCKET **£345(a)**
MT1432 LTI PCMCIA **£199(a)**



APPROVED for Connection to telecommunication systems specified in the instruction for use subject to the Conditions set out therein.

ASTOUNDING VALUE

Government, Colleges, Schools, Hospitals, Local Councils, Large PLC etc, official orders welcome. Minimum credit card order value £20 (ex P&P & VAT). Goods are not sold on a trial basis. Please ensure the suitability of products with the manufacturer before ordering. All trademarks are acknowledged. Errors & omissions excepted.



TECHNOMATIC

Techno House, 468 Church Lane, London NW9 8UF

PRICES EXCLUDE VAT @ 17.5%

Hours of Business:

Mon-Fri: 9am to 5.45pm
Sat: 9.30am to 5pm
Callers welcome, please check availability.
Prices valid from 31/8/95

Hayes • Nokia • Techno Vision • Psion Dacom

Hayes **LOW PRICES** **2.8.8K V34**
Authorised Dealer **£175**

FREE MODEM CABLE

ACCURA 288 + FAX **£175(a)**
- up to 28,800 bps **NOW V34**

ACCURA 144 + FAX **£135(a)**
- up to 14,400 bps (V32 bis)

- Common Features**
- Full error correction & data compression
 - Up to 14,400 (V17) fax incl. Group 3 fax
 - FREE Hayes Smartcom LE data & fax Windows S/W
 - AutoFax Detect between fax & data calls
- ALSO NEW LOW PRICES ON OPTIMA MODELS - CALL NOW!**

NOKIA **MULTIMEDIA READY**
VALUEGRAPH 447V MONITOR

- ◆ 17" flat, square tube
- ◆ 0.28mm dot pitch
- ◆ 1024 x 768 at 80HZ
- ◆ Integral 2 watt speakers
- ◆ Digital controls
- ◆ Power saving
- ◆ MPR II

CALL FOR FULL RANGE

£475 (a)

DACOM **V34 + Fax** **Gold Card PCMCIA Modem** **V34 + FAX**
£189

"If you want a top of the line portable data communications solution, this product is the best you can get" - PC Magazine (January 1995)

Benefits of Psion Dacom Gold Card:

- ◆ Add fax to your notebook
- ◆ High-Speed file transfer
- ◆ Real remote LAN access
- ◆ Flash Upgrades available
- ◆ UK Market Leader
- ◆ Guaranteed compatibility
- ◆ Free lifetime technical support

Gold Card V34 + Fax **£189(a)**

- ◆ Ratified 28.8Kbps - The ultimate tool for intensive data transfer and remote LAN connectivity applications. Twice the speed of V32bis, up to 115.2Kbps.
eg 200Kbyte file-15.6 second transfer time

Gold Card V32bis + Fax **£157(a)**

- ◆ 14.4Kbps - Europe's leading PCMCIA Data + Fax modem, ideal for medium usage communications, BBS access and fax applications

TECHNO Vision MONITORS

14" £149(a) **15" £199(a)** **17" £359(a)**

17" £359(a) **AMAZING PRICES**

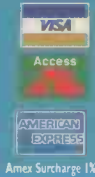
Common Features include:

- 0.28mm Dot pitch
- MPR II standard
- Power management
- Low radiation

	14"	15"	17"
Max Res (NI):	1024x768	1280x1024	1280x1024
Horiz Freq Khz:	up to 48	30-60	30-64
Vert Freq Hz:	50-90	50-90	50-100

1 YR WARR **£149** **£199** **£359**

**GREAT PRICES
SAVE £££'s**



Amex Surcharge 1%

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PRICES EXCLUDE VAT @ 17.5%



THE INTERNET SOLUTION

3400 PRO DESKTOP MODEM

- ◆ Data: V34 (28.8Kb/s) to V21 (300bps)
- ◆ Fax: 14.4Kb/s to 2.4Kb/s
- ◆ Compression: V42bis & MNP5
- ◆ Correction: V42 & MNP2-4
- ◆ Command Set: Hayes AT compatible

Package includes:

- ◆ Modem
- ◆ Telephone & power cables
- ◆ IBM PC/AT compatible modem cable
- ◆ Windows fax and comms software
- ◆ Easy install disk & user software
- ◆ Motorola telephone support
- ◆ 2 Year Motorola warranty

3400 ONLINE INTERNET SOLUTION

- ◆ 3400 PRO desktop modem (see left)
- ◆ Internet Software
 - Protocol software
 - File transfer software (FTP)
 - Worldwide web browser s/w
 - E-Mail s/w
 - Newsgroup s/w
- ◆ Internet phone software (Vocaltec)
 - Make cheaper international calls
- ◆ Internet membership option for instant access



£195



3400 ONLINE INTERNET SOLUTION £195

- EVERYTHING YOU NEED TO CONNECT TO THE INTERNET

3400 PRO DESKTOP MODEM £179



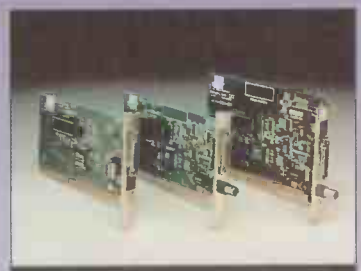
APPROVED for connection to telecommunication systems specified in the instruction for use subject to the Conditions set out in them.

EASY INSTALL
INCLUDES ANIMATED INSTRUCTION DISK



NETWORKING THE WORLD

*** STOP PRESS * ALL B VERSIONS ARE PLUG & PLAY**



NETWORK ADAPTERS



LINKBUILDER FMS II HUBS

ETHERLINK III: THE PRICE PERFORMANCE ADVANTAGE

- ◆ Parallel Tasking Ethernet Adapters
 - Performing multiple tasks at the same time
- ◆ Automatic self-tuning during operation
 - To set and maintain optimum performance
- ◆ High level of component integration
 - Improves reliability and reduces cost
- ◆ One step auto configuration utility
 - Trouble free installation
- ◆ Lifetime 3Com warranty

Full range of 3Com products, including LinkBuilder FMSII Hubs, available. Call for details

Adapter	IPk(b)	5Pk(a)
3C509 B BNC ISA	£65	£315
3C509 B TP ISA	£66	£309
3C509 B Combo ISA	£75	£349
3C579 B BNC EISA	£145	£699
3C579 B TP EISA	£144	£699
3C590 B Combo PCI NEW	£99	£479
3C529 B BNC MCA	£142	£699
3C529 B TP MCA	£139	£685
3C589 B Combo PCMCIA	£139	£695

CALL FOR 20 PACK PRICES & VOLUME DISCOUNTS

LinkBuilder FMS II 12 TP Port Hub	£375(a)
LinkBuilder FMS II 24 TP Port Hub	£675(a)
LinkBuilder TP/12	£259(a)

Government, Colleges, Schools, Hospitals, Local Councils, Large PLC etc, official orders welcome. Minimum credit card order value £20 (ex P&P & VAT). Goods are not sold on a trial basis. Please ensure the suitability of products with the manufacturer before ordering. All trademarks are acknowledged. Errors & omissions excepted.

Motorola • Nokia • Technovision



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PRICES EXCLUDE VAT @ 17.5%

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Mon-Fri: 9am to 5.45pm
Sat: 9.30am to 5pm
Callers welcome, please check availability.
Prices valid from 3/18/95

Printers

LASER PRINTERS (a)

HEWLETT-PACKARD	SPEED/RES	RAM/FONTS	LANG.	I/F	1 Year RHP	3 Year OSM	EPSON 1 year OSM							
HP LaserJet 4L	4ppm/ 300dpi	1Mb/ 26S	PCL5e	B	£365	£460	EPL3000 New	A4	4ppm	300	1MB	5e	B	£375
HP LaserJet 5P New	6ppm/ 600dpi	2Mb/ 45S	PCL5e	B,A,IR	£580	£710	EPL5200+	A4	6ppm	300	1MB	PS	P	£469
HP LaserJet 5MP New	6ppm/ 600dpi	3Mb/ 80S	PCL5e	B,A,IR	£735	£865	EPL9000		8ppm	600	2MB	5e	B,S	£1199
HP LaserJet 4 Plus	12ppm/ 600dpi	2Mb/ 45S	PCL5e	B,S	£975	£1145	EPL9000PS	NEW A3	8ppm	600	6MB	5e,PS	B,S,A	£1359
HP LaserJet 4M Plus	12ppm/ 600dpi	6Mb/ 80S	PCL5e	B,S,A,N	£1285	£1455	PANASONIC							
HP LaserJet 4V A3	16ppm/ 600dpi	4Mb/ 45S	PCL5e	B,S	£1370 ^(3xa)	£1595 ^(3xa)	KXP4430 2yr OSM	A4	5ppm	300	1MB	PS	PS	£449
HP LaserJet 4MV	16ppm/ 600dpi	12Mb/ 80S	PCL5e	B,S,A,N	£1985 ^(3xa)	£2210 ^(3xa)	KXP4440 2yr OSM	A4	10ppm	300	1MB	P4	PS	£695
HP LaserJet 4Si	1yr OSM 16ppm/ 600dpi	2Mb/ 45S	PCL5e	B	£2090 ^(3xa)	£2595 ^(3xa)	KXP6100 NEW	A4	6ppm	300	256KB	G	B	£269
HP LaserJet 4Si MX	1yr OSM 16ppm/ 600dpi	10Mb/ 80S	PCL5e	B,A,N	£2969 ^(3xa)	£3479 ^(3xa)	KXP6150 NEW	A4	6ppm	300	1MB	P4	B	£309

I/F: P=Parallel, B=Bi-directional Parallel, S=Serial, A=Appletalk, N-Ethernet
Lang- G=GDI (Win 3.1), P4=HP PCL4, PS=HP PCL5e, PS=PostScript, S2=PostScript Level 2

MEMORY UPGRADES?

We can offer a large range of memory upgrades
SEE PAGE 14

FLASH SIMM KITS

For HP LJ 4/4Plus/4Si

Download and store fonts, logos and template forms in your laser printer. Dramatically increase speed and return-to-app time. These kits contain everything to get started.

The Flash Simm, s/w and manual.

1MB £250 2MB £399 4MB £599

TONER CARTRIDGES (b)

HEWLETT-PACKARD	Price	4410/4430 Developer	£90
LaserJet II/III/IV	£46	4420	£26
LaserJet III/III/III/III	£46	4420 Drum	£57
LaserJet 4/4+/4M/4M+	£66	4430 Developer	£57
LaserJet 4/4M/4M+	£109	4400/5400 Drum	£55
LaserJet IIIi/4Si/4SiX	£75	NEC	
LaserJet 4L/4ML/4P/4MP	£42	S60/60P/62P/102/102P	£109
EPSON		610	£79
EPL 7100/7500/8100	£115	LEXMARK	
EPL 4000/4100/4300	£64	4039 Toner	£165
EPL 5000/5200	£83	Optra (7K)	£139
EPL 5600	£110	Optra (14K)	£189
PANASONIC		CANON	
4410/4430	£29	LBP 4	£49
4410/4430 Drum	£95	LBP 8 MKII/III	£54

COLOUR PRINTERS (a)

	Price	Cartridges	Blk	Colour
Canon BJC4000 (A4)	£238			
Canon BJC600e (A4) NEW	£339	£6	£7*	
Canon BJC800 (A3)	£1070	£14	£18*	
Canon BJC-70 NEW	£225	£9.29	£14	
Epson Stylus Colour (A4)	£355	£12	£23	
HP Deskjet 320** (A4 Port)	£168	£13	-	
HP DJ320 + CSF (A4 Port)	£185	£13	-	
HP Deskjet 540 (A4)**	£207	£15.50	-	
Colour kit only £27 if purchased with DJ540/DJ320				
HP Deskjet 660C (A4) NEW	£295	£20	£22	
HP Deskjet 850C (A4) NEW	£390	£18	£17.50	
HP Deskjet 1200C (A4)	£630	£17	£19.50*	
HP Deskjet 1200C/PS (A4)	£995	£17	£19.50*	
HP Deskjet 1600C NEW	£829	£18	£19.50	
HP Deskjet 1600CM NEW	£1219	£18	£19.50	
HP PaintJet XL300 (A3)	£1599	£14	£15*	

**Requires optional colour kit *Specify CM/Y Cart

**HEWLETT-PACKARD
COLOUR LASERJET
£4195(3xa)**

TEKTRONIX PHASER 340

The revolutionary low-cost colour printer offering up to 4ppm in full colour. Ideal for PC & Mac environments **£3650** (2a)

BLACK PRINTERS (a)

	Price	Cartridges	Blk
Canon BJ-30	£153		£10.79
Canon BJ-200ex LOW PRICE	£175		£16
Canon BJ230 (A3)	£239		£16
Canon BJ300 (A4)	£361		£11
Canon BJ330 TF (A3)	£405		£11
Epson Stylus 800+ (A4)	£179		£8.50
Epson Stylus 1000 (A3)	£325		£8.50
Epson SQ870 (A4,Cont)	£445		£17
Epson SQ1170 (A3,Cont)	£609		£17



DOT MATRIX PRINTERS

EPSON

Model	PIN	Col	Price	Blk	Rib	Model	PIN	Col	Price	Blk	Rib
FX870	9	80	£249	£4.50	LQ570+	24	80	£219	£5		
FX1170	9	136	£315	£6	LQ1070+	24	136	£295	£7		
LX300	9	80	£101	£4.50	LQ1170	24	136	£429	£7		
LQ100	24	80	£105	£5	DFX5000+	9	136	£1149	£22.50		
LQ300 NEW			£155		- Price subject to change						

PRINTER MEDIA (b)

HP	CANON	Price
LX JETSeries Trans A4 50 shts	BJ800C A4 Paper	£21
LX JETSeries Glossy A4 50 shts	BJ800C A3 Paper	£36
CX JETSeries Coated A4 200 shts	BJ800C Transparency CF101	£35
CX JETSeries Coated A3 200 shts	BJ600C Transparency CF102	£35
LJ Transparencies A4 50 shts	FARGO PRIMER A	
HP Labels various sizes	Thermal Paper	
EPSON	Std A4 500 sheets	£18
STYLUS COLOUR COATED PAPER	Premium A4 500 sheets	£19
360 dpi A4 200 shts	Special Long A4	£19
720 dpi A4 200 shts	Transparency A4 50 sheets	£34
Transparencies A4	A4 T-Shirt Transfer	£18

PRINTER CABLES (c)

Length	25M/36M	36M/36M	25M/25M
1.8m	£4	£6	£4
3m	£6	£8	£6
5m	£7	£10	£7
10m	£15	£17	£18

25M/36M is standard PC parallel cable 25/25 & 36/36 are for use with printer switches

PLOTTERS AND DIGITISING TABLETS

HP PLOTTERS



Size	A1	A0
DesignJet 230	C4694A £1485*	C4695A £1975*
DesignJet 250C	C3190A £1845*	C3191A £2449*
DesignJet 650C Col	C2858B £3749*	C2859B £4425*
DraftPro Plus	C3170A £2339*	C3171A £3129*

Draft Pro comes with three years On Site maintenance.

DesignJet prices includes one year OSM. 3 Year OSM option £420, £390 if bought with Plotter. Full range of accessories, including legs or bins, available. *Carriage on request.

PLOTTER MEDIA (a)

HP Paper A0 150 sheets	£64
HP Paper A1 200 sheets	£42
HP Paper 36" Roll	£29
HP Dj650C Paper 24"x150ft	£23
HP Dj650C Paper 36"x150ft	£29
HP Dj650C Paper A1 100 sheets	£43
HP Dj650C Paper A0 100 sheets	£83

HP PLOTTER PENS (c)

17825P, 17826P, 17725T, 17726T	£6.30
Ink Cartridges (c)Blk/CM/Y	
DesignJet 200/220	£16
DesignJet 600	£16
DesignJet 650	£20.40/£20.40

Summagraphics

INKJET PLOTTERS

	A1	A0
SummaJet Mono	£1819*	£2345*
SummaJet Colour	£2345*	£2625*
LEGS	£220*	£320*

Call for cartridges & paper, *Call for carriage

DIGITISERS (S=Stand Opt)

	A4	A3
SummaSketch III	£225(a)	£435(a)
SummaSketch FX	£275(a)	£495(a)
Summa Grid IV 1824 A2 Tablet (S)	£959*	
Summa Grid IV 2436 A1 Tablet (S)	£1279*	
Summa Grid IV 3648 A0 Tablet (S)	£1695*	
Manual A1/A0 Tablet Floor Stand	£195(a)	
Cursor: 4 Button	£99(a)	16 Button
MicroGrid Ultra 1724 A2	£2199*	
MicroGrid Ultra 2436 A1	£2649*	
MicroGrid Ultra 3648 A0	£2999*	

GENIUS TABLETS



HiSketch SP Model

1212 SP (12"x12")	£120(a)
1812 SP (18"x12")	£185(a)
1812D SP (18"x12") LCD coord disp	£210(a)

Features:-

- Windows 3.1 & ADI drivers
- Up to 19,200 bps data rate
- 5 to 90 pairs/sec sampling rate
- 1000 lines per inch resolution
- ± 0.01 inch accuracy
- Proximity sensing
- AutoCAD R10/11/12 compatible templates
- Multi-directional puck
- 3 button stylus

Plotters

ESSENTIAL FOR MODEM USERS

High speed serial card 2 x 16550 serial ports, 1 x enhanced parallel port, 1 x game port **£29^(b)**



SALES 0181-205 9558

FAX 0181-205 0190

ADMIN 0181-358 8100

PRICES EXCLUDE VAT @ 17.5%



A4 FLAT BED SCANNERS

NEW

HP SCANJET 3C

Now 600dpi enhanced to 2400dpi, 30bit colour & 10bit greyscale includes Corel PhotoPaint, Calera Wordscan & Deskscan II.

HP SCANJET 3P NEW
- 256 greyscales
- 300 dpi, enhanced to 1200 dpi

PC/AT **£239***
PS/2 **£246***
Mac **£247**

HP SCANJET 3C
NEW
PC/AT **£629(a)**
PS/2 **£630(a)**
Mac **£631(a)**

HEWLETT PACKARD

HP SCANNER OPTIONS 3C

SupportPack (3 yrs OSM)
Auto Document Feeder:
Transparency Adapter (3C ONLY)
PC/AT or PS/2 interface kit (inc. s/w)

3C
£135
£309 (50 shts)
£449
POA

HEWLETT PACKARD

XEROX EXT BRIDGE OC. S/W £65

EPSON A4, 24/30 BIT COLOUR SCANNERS

All bundles, except scanner only, come complete with software, interface (PC), cables and drivers.

GTX Bundle: Omnipage Direct, Photoshop LE
GTI Bundle: Photoshop V3.00 (full version).

Please specify clearly model and bundle when ordering.

Model	6500S	8500P	8500S	9000P	9000S
Scan Res.	300dpi	400dpi	400dpi	600dpi	600dpi
Output Res.	1200dpi	1600dpi	1600dpi	2400dpi	2400dpi
Colour Depth	24bit	30bit	30bit	30bit	30bit
Interface	SCSI	Parallel	SCSI	Parallel	SCSI
Scanner only	-	£429	-	£529	-
GTX-PC	£465	£495	£575	£599	£678
GTI-PC	-	-	£759	-	£859
GTX-MAC	£395	-	£509	-	£615
GTI-MAC	£565	-	£695	-	£799

Auto Document Feeder **£349(a)** Transparency Unit (up to 5"x5") **£439(a)**

Omnipage PRO **£325(a)** Direct Win **£72** Textbridge V3 PRO WIN **£269(a)** STD WIN **£65**

1 YEAR ON-SITE SWAP OUT ON FLAT BEDS

NEW LapCAT

Personal Document Scanner

- Multi-Function capabilities
- Easy to use scanning s/w
- Document management
- Text enhancement technology
- Flexible paper handling
- 1 year RTB warranty

LapCAT PC kit **£375(a)**
LapCAT Mac kit **£379(a)**

EPSON

MODEMS (Carr a)

Please indicate internal or external when ordering

APPROXIMATE connection to Intercommunications systems specified in the instructions. Use subject to the conditions set out in them.	V22bis	V32	V32bis	V32terbo	V34MFC	Voice	V42	V42bis	FAX	Internal	External
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IBM - For ThinkPad 750 & other PCMCIA Notebooks (OEM).

IBM PCMCIA Fax/Modem Quad Speed **79**

Robotics

5 yr. Manuf. warr. Free Hot Line Support. Sportster & Worldport have fax & comms software. Call for Mac models

Sportster 28.8 +Fax	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	159
Sportster 14.4 +Fax	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	105
Courier V34 Modem only	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	249
Worldport DS Cell Pckt	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	129
WP PCMCIA 28.8 + Fax	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	165
USR High Speed Dual Serial Port - 16550 AF 2 yr warr. (9F)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	49*

DIACOM 2 yr. Manuf. warr. Free Hot Line Support. WinFax Lite s/w & Compuserve

Goldcard v34+Fax PCMCIA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	189
Goldcard v32bis+Fax PCMCIA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	157

MOTOROLA 3400 Online is an Internet in a box solution including modem cable and all software.

Motorola 3400 Pro	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	179
Motorola 3400 Online	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	195

Hayes

FREE ULTRA 24 WITH EVERY OPTIMA 28.8

Accura 14.4 + Fax	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	135
Accura 28.8 + Fax v34	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	175
Optima 144 + Fax	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	249
Optima 28.8 + Fax v34	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	339
Optima PCMCIA144 + Fax	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	199

LIMITED STOCKS - NOW V34, 5YR WARRANTY

Bundle Offer 2 x Optima 288 + 2 x ESP II card **645***

Ultra 96	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	429
Ultra 144	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	489

Hayes ESP card - High speed Serial port card with processor:
PC/AT ESP II card 1 port **£59** 2 port **£89** MCA ESP card **£199**

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ZDX 2834 Desktop	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	165
ZDX 1932 Desktop	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	109
MT 2834 BLK Desktop	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	395

FREE Multitech High Speed Serial Card While Stocks Last

MT 1432BLK Desktop	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	299
MT 1432 MK Pocket	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	345
MT 1432LTI PCMCIA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	199

PAGE SPECIAL OFFERS WHILE STOCKS LAST

MobiFax 32+ Pocket	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	89*
Microlin FX Pocket	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	179
Microlin FX34 PC Card	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	149
Microlin NB 32+ PCMCIA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	195
Microlin NB 34 PCMCIA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	277
Linnet 32 Plus FX Desktop	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	157
Linnet Message Desk VFX	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	209*
Linnet 34 FX Desktop	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	239

MODEM ACCESSORIES

PC Modem Cables 2M 9F to 25M (COM1 card below) **£8**
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BABT APPROVED

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PRINTER ACCESSORIES

SWITCHES(b) See opp page for cables

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Reversible & Inexpensive Par Ser

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Laserjet 4 (C2080



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3C87SX-20, 25	£45
3C87SX-33	£45
3C87-40	£49

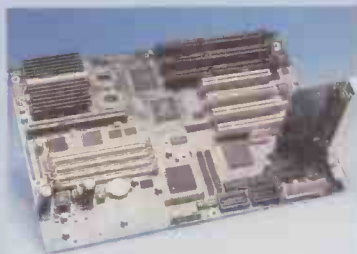
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Intel Pentium™ Motherboard - Designed and made by Intel

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SPECIAL OFFER

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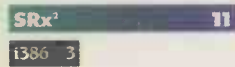


POWER UP TO 486

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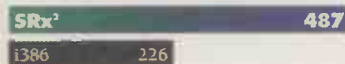


CPU—SORT (Iterations per second)



Performance increase = 267%

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- Single chip upgrade for 386SX & 386DX PCs
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*Limited stocks offer





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LJ/ET 4/4M/4SI/4SIMX.IIISI,				
DJ/ET 1200C	£139	£225	£415	
LJ/ET 4P/4MP/4V/4M+/4V/4MV/				
5P/5MP/COLOR.DJ1600C/CM	£139	£205	£385	

HEWLETT PACKARD 3rd party memory				
LASERJET IIIP/IIIP+/IIIIID/IIIP	£59	£89	£155	
LASERJET IIID	£65	£95	£159	
DESIGNJET 200/600/650C			£129	£259
PAINTJET XL300 (NEED				
EXRBOARD 669.00)	£49	£85	£129	£259
LJ/ET 4/4M/4SI/4SIMX.IIISI,DJ/ET				
1200C	£49	£85	£129	£259
LASERJET 4L	£65			
LJ/ET 4P/4MP/4V/4M+/4V/4MV/				
5P/5MP/COLOR.DJ1600C/CM	£45	£85	£129	£255

BROTHER 3rd party memory				
HL4/PS/VE	£79	£125	£185	
HL6 SERIES		£119	£195	
HLB-D/E/V	£79	£115		
HL10-V/DV/PS/DPS		£102	£179	
HL10-H	£49	£89	£129	£259

CANON 3rd party memory				
BP-4, LBP-4+, LBP-4Lite	£89	£125		
BP-8II, 8IIR, 8IIT	£65	£95	£159	
BP-8IIII/III+/IIIR	£99	£129	£169	
BP-8IV, LBP-4U, LBP-4i	£49		£119	

EPSON 3rd party memory				
PL-4000/4100/4300, ACTION				
ASER II	£62	£109	£159	£229
PL-5000/5200	£55	£89	£210	
PL5200+		£85		
PL 5600 (2 SOCKETS), 1600	£45	£85	£119	£249
PL7500			£249	
PL8000/EPL8100	£70	£111	£155	£205

KYOCERA 3rd party memory				
-800/A/T	£75	£109	£179	
820/850/1800/A/5000/1500	£65			
1000A	£79			
1200S/2000S/2200S/3000A/3300	£79	£115		
51500A (ECOSYS)	£79			

PANASONIC 3rd party memory				
XP-4410/4430	£89	£129	£199	
XP-4420/4450/4451	£69	£109	£179	
XP-4455		£119		
XP-4450	£69			
XP-4440/5410 EXP+MEMORY	£72	£109	£193	
XP-4440/5410 ADD ON				
MEMORY	£47	£84		
XP-4400, (KXP-5400 2MB ONLY)	£65	£95	£175	

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STAR 3rd party memory				
P4	£79	£119	£199	
P8	£79	£115	£195	
5-5/5EX/5TT EXPBOARD+				
MEMORY	£76	£131		
5-5/5EX/5TT ADD ON MEMORY	£55	£99		

SHARP 3rd party memory				
-9500PS	£59			
-9500/E/H/9700			£195	
-9400, 9460, 9600, 9600PS,				
-9660, 9700E	£65	£99	£179	

OKI 3rd party memory				
HL400	£69	£99		
HL400E/EX, 410E/EX	£69	£109	£179	
HL410, OL810	£75	£115	£185	
HL800, OL820	£69	£109	£179	
HL830, OL840	£89			

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72 PIN 70NS

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512x32	2Mb	£85
512x36	2Mb	£85
1x32	4Mb	£115
1x32 (EDO)	4Mb	£155
1x36	4Mb	£125
2x32	8Mb	£235
2x32 (EDO)	8Mb	£299
2x36	8Mb	£245
4x32	16Mb	£389
4x36	16Mb	£429

Call for 60 & 80NS

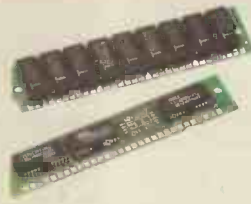
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44256-70NS (256K x 4)	£5.40
1Mb x 1-80/70NS	£4.90
1Mb x 4-80/70NS	£25

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1Mb x 9-60/70/80NS (9 chip)	£34
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4Mb x 9-70/80NS	£115
4Mb x 9-60NS	£119
256K x 9-80NS/70NS	£15

CACHE RAM & TAG RAM. (SRAMS)

8K x 8 20NS cache	£4.50
32K x 8 20NS cache	£7.00
32K x 8 15NS cache	£7.50
128K x 8-20 cache	£26

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0-16Mb Half Length 16-bit Card

0Mb card	£99
Card with 2Mb installed	£160
Card with 4Mb installed	£220

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IBM Original memory

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THINKPAD 755 DIMM		£225	£655	£1145
PS1/MP/2		£190	£375	
PS/2 95/XP/AMF/AMT		£295		
THINKPAD 750/755 DRAM				£1145
THINKPAD 340/360	£95	£199	£399	£999
PS/NOTE			£380	
APTIVA PC300		£180	£360	£720
Perf/PC700		£190	£375	£750
PS/2 SERVERS ONLY (ECC MEMORY)		£205	£415	£835

IBM

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T/PAD 700,720,750,755,CL575X	£169	£299		
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T/PAD 701 SERIES	£149	£275	£479	
PS/2 140SX,PS/NOTE 182,T/PAD 350	£89	£149	£285	£459
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PS/2 568,575SLC,568,575SLC,M575SLC	£85	£129	£259	
PS/VP 6381-FYI/FYE/K/YO/MYO/MI/YVO	£85	£119	£429	
PS/VP 6382, (C/K/F/W)	£129	£259	£429	
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PS/1 2133-G,S,W43/174/154,2155-G,S,W44	£136	£499		
PS/1 2133-G,S,W11/G,S,W13/81/111/145/146/147/148/3/551,2168-452/473/493/573, 2155-G,S,W14	£85	£129	£259	
PS/1 2133-571/642/652,2155-582/592/593	£85	£119	£249	£439
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PS/1 PRO 386SX 2123 (EXCEPT E31/E81)	£85	£139	£259	
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APTIVA				
TREKA	£87			
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COMPAQ

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CONTURA 3/20,3/25,3/25C	£75	£155	£259	
CONTURA 400/410 SERIES		£149	£275	
CONTURA 4/25,CX,EX		£155	£250	£549
CONTURA AERO		£140	£329	
CONCERTO, LTE ELITE		£159	£309	£579
LTE LITE 4/25,4/25C,4/25E,4/33C	£159	£299	£499	
LTE 386 LITE/20,25,25C,25E	£89	£185	£299	
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DP 386/33L,486/25/33L/50L,SP 486/E SERIES	£95	£295		
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PROLINEA 4/25,4/33,4/50,4/66,CD5				
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PROLINEA MT 4/33S,MT 4/50,MT 466	£85	£129	£259	
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DESKPRO XE 433S,450,466	£85	£129	£259	
DESKPRO XE 560,5/66M,5/60M				£495
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PROLINEA NET 1-25S/E/TR	£85	£129	£259	£439
PRESARIO CDS 633,CDS 860,660	£129	£259	£258	
DESKPRO XL 450,466				

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Contura 386	£80	£155	£255	
Contura 486		£155	£265	£995
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Contura 400		£190	£370	£880
LTE Lite 386	£140	£275	£515	£1575
LTE Lite 486		£220	£440	£1575
LTE Elite/CONCETO		£220	£440	£880
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PROSIGNIA/DESKPRO	£120	£195	£309	£765
DESKPRO XL 486		£360	£685	
NEW PROLINEA/DESKPRO		£185	£355	£655

TOSHIBA

3rd party memory				
T2000/SX/SXE,T2200SX,T1800,T1850C,				
T1000LE	£85	£159	£295	
T2100 SERIES,T2150		£165	£319	
T3100SX	£85	£159		
T3200SX	£85	£159		
T3200SXC	£85	£159		
T2400/T2450/T3600		£169	£299	£559
T3400		£169	£299	£559
T4400C/SX/SXC,T6400,T6600	£85	£159	£289	£539
1900,1910,1950C,1960,4500,4600,				
4700,4800,4850,4900,DYNAPAD T200		£169	£299	£599
DYNAPAD T100X		£159		
T5200/T5200C/T8500	£89	£345		

Memories for AST, Olivetti, Canon, NEC, Gateway are available, please call if the upgrade you require is not listed.

DELL

3rd party memory				
320N/IN+,212N LAPTOP	£95			
325N/NC NOTEBOOK	£99			
NL25,NL20 NOTEBOOK	£110			
316SX/LT,325SX,320LX/LT	£68			
LATITUDE 433M/IC,450M/CMX		£149	£279	£449



TECHNOMATIC

Techno House, 468 Church Lane, London NW9 8UF

PRICES EXCLUDE VAT @ 17.5%

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Mon-Fri: 9am to 5.45pm
Sat: 9.30am to 5pm
Callers welcome, please check availability.
Prices valid from 3/8/95

Xircom PCMCIA ETHERNET + MODEM II

Modem: V32TER, V32bis, V22bis + more } IN ONE
Fax: V17, V29, V27TER } TYPE II
Ethernet: BNC, TP, Combo } CARD
Supports all popular PCMCIA 2.0 & 2.1 PCs
Supports all popular networks inc Novell
CEM-10BC - BNC + TP £369 While stocks last
BABT APPROVED

COMMUNICATION SERVER(a)

US Robotics Fax Server 1 Port £929 2 Port £1149
US Robotics Comms Server £999
Comm Server Software
WinPort V5 1 modem £135
FaxPort V5 5 user £275
Novell Connect 2 port £279

PEER TO PEER NETWORKS

All Techno starter kits contain 5M BNC cable & terminators.
All Techno add-on kits contain 3M BNC cable. All starter kits contain everything necessary to connect stated no of PCs.

Microsoft Windows for Workgroups

Item Description	Full	
	Product	MLP
Windows for WG 3.11	£89	£86
Add-on for Win 3.1/W4WG 3.1	£42	£39
Add-on for MS-DOS	£41	£40

Techno W4WG Add-on Kits

For those users with MS Windows 3.1 installed
Techno W4WG 2 Stn Starter Kit £149(a)
Techno W4WG 1 Stn Add-on Kit £69(a)

Techno Hardware only Kits

For those users with MS Windows 3.11 installed
Techno 5 Stn Starter Kit H/W only £175(a)
Techno 2 Stn Starter Kit H/W only £66(a)
Techno 1 Stn Add-on Kit H/W only £35(a)

NOVELL Personal Netware

- Share files, directories, printers & CD-ROMs in Dos & Windows
- Universal network client
- Single Login to all resources

Personal Netware (PNV) £44(b)
Personal Netware 5 Pack £195(a)
Novell Dos 7 inc PNW £49(b)

Techno Personal Netware Kits

Techno PNW 5 Stn Starter Kits £209(a)
Techno PNW 2 Stn Starter Kits £89(a)
Techno PNW 1 Stn Add-on Kit £55(a)

LANtastic v6.0 EASY - SAFE AFFORDABLE



LANtastic is the most awarded networking in the world (over 100 awards) with 2.5 million users.

The LANtastic Starter Kit has everything you need to connect your first 2 PCs, and when you want to grow an Add-On Kit will add 1 user, alternatively you can use software on it's own with any NE2000 compatible card. What could be easier?

LANtastic works with all major platforms including the latest product LANtastic for OS/2 - the only network for WARP.

Installation is exceptionally easy, and if you are not fully satisfied Artisoft offers a 30 day money back guarantee.

Get networked with LANtastic and get the most from your PC investment.

LANtastic - Powerfully Simple Networking

NodeRunner 2000Si 1 node kit £99 2 node kdt . £180
AI software Win + Dos only £65 5 pack £245
NodeRunner 2000Si card only £69 5 pack £265
AI upgrade 1 user .. £29 5 user £79 10 user £125
LANtastic for OS/2 1 user £69 5 user £299
LANtastic Central Station II £Call
LANtastic Utility Pack £199
LANtastic Powersuite £Call

NETWORKING

FREE NETWORK SOFTWARE WITH EVERY NETWORK 3.12 OR 4.1

NOVELL NETWORK	5 User	10	25	50	100	250
Netware 4.1 CD ROM (a)	413	944	1493	2033	Call	Call
Netware 3.12 (a)	395	963	1443	1940	Call	Call

PRINTER SERVER(a)

Please verify exact version of protocol supported with manufacturer

CONNECTION	PROTOCOL								PRICE		
	PARALLEL	SERIAL	MODEM	NOVELL(IPX)	NETBIOS	WANG	WINDOW NT	TECP(UNIX)		APPLE TALK	DEC LAT
Intel Netport Express XL BNC/TP											£319
Intel Netport Express XL Token Ring											£449
Intel Netport Express EL BNC/TP											£259
Intel Netport Express EL Token Ring											£389
HP JetDirect Ex											£219
HP JetDirect Ex											£249
HP JetDirect J2552A MIO Lj4 Series											£289
EMULEX NetQue BNC/TP											£399
EMULEX NetJet MIO Lj4 Series											£369

UPS PROTECT AGAINST POWER FAILURE



SMART Series
• Microprocessor Controlled
• Made in USA
• SMNP Option
• Battery Saver
• 2 year swap out warranty

FREE WITH EVERY TRIPPLITE SMART 600



SU 600 VA £219(a)		BC250 VA £79(a)	
-Free Surge Bar		BC400 VA £115(a)	
SU 750 VA £229(a)		BC600 VA £149(a)	
SU 900 VA £349(a)		BC900 VA £250(a)	
SU 1250 VA £499(+)			

PowerAlert For: Netware £49 Unix £89 Dos/Win £55

American Power Conversion (APC) 2yr swap-out.

Smart-UPS (Line-interactive)	Back-UPS (off-line)
SU250 £169(a)	BK250 £83(a)
SU600 £210(a)	BK400 £119(a)
SU900 £369(a)	BK600 £159(a)
SU1250 £510(+)	BK900 £275(+)
SU2000 £910(+)	BK1250 £349(+)

Powerchute for Netware £55 For Unix £95 For Win £59

For VMS (Tape) £195 For Win NT £95 For HP/UX £119

+ = Call for carriage, volume discounts available

HUBS & REPEATERS

Model carr (a)	Ports			SMNP	Stackable	Price
	TP	BNC	AUI			
HP ADVANCE STACK HUBS + = 5 YEAR OSM						
Advance Stack 8U 8	-	-	-	Yes	No	£129
Advance Stack 16U 16	-	-	-	Yes	No	£249
Advance Stack 12+ 12	1	-	-	Yes	Yes	£399
Advance Stack 24+ 24	1	1	1	Yes	Yes	£699
Advance Stack 48+ 48	1	1	1	Yes	Yes	£1249
3COM						
L.Build FMS II	12	OPT	1	Yes	Yes	£375
L.Build FMS II	24	OPT	1	Yes	Yes	£675
SMC						
Tiger TP6	6	OPT	1	No	No	£155
Tiger TP6B	6	1	-	No	No	£165
Tiger TP12	12	-	1	No	No	£299
Tiger CX3	-	3	1	No	No	£219
Elite 3812TP	12	OPT	2	Yes	Yes	£399
Genius 1000/D						
	12	1	2	Yes	No	£199
Techno						
8TP Port	8	-	1	No	No	£99
4 Port Repeater	-	4	2	No	No	£339
2 Port Repeater	-	2	2	No	No	£185

NETWORK BACKUP SEE STORAGE PAGE

ETHERNET PRODUCTS(a)

GENIUS COMBO CARD
GE2000 Lifetime warranty, BNC & TP, NE2000 compatible, s/w & h/w configure, T Piece. See Taxan/Genius page for more info.

£29 (b)
5 pack £135(a)



B = BNC, A = AUI, T = TP, I = ISA, M = MCA, E = EISA, V = VLB, P = PCI

NETWORK BUS

3COM	BNC	AUI	TP	IPK	SPK	20PK
3CS09B	B A -	-	-	1-16	£65	£315
3CS09BTP	-	-	T	1-16	£66	£309
3CS09B-Combo	B A T	-	-	1-16	£75	£349
3CS29B	B A -	-	-	M-32	£142	£709
3CS29B-TP	-	-	T	M-32	£139	£709
3CS79	B A -	-	-	E-32	£145	£699
3CS79-TP	-	-	T	E-32	£144	£699
3CS90	B - T	-	-	P-32	£99	£475

SMC Ethercard Plus

Ether EZ BNC	BNC	AUI	TP	IPK	SPK	20PK
Ether EZ TP	-	-	T	1-8/16	£59	£279
Ether EZ Combo	B - T	-	-	1-8/16	£61	£259
Elite/A	B A -	-	-	M-16	£129	-
Elite 10T/A	-	-	T	M-16	£129	-
Ultra 32C EISA	B - T	-	-	E-32	£145	£799(6pk)
Etherpower PCI	B - T	-	-	P-32	£95	£465
Ultra Boot Rom Multi-Protocol	-	-	-	-	-	£29

Novell - Genuine Cards

NE2000 +	BNC	AUI	TP	IPK	SPK	20PK
NE2000T +	-	-	T	1-16	£49	£219
NE2000+3	B - T	-	-	1-16	£59	£279

D-Link Ethernet

DE220C	BNC	AUI	TP	IPK	6PK
DE220T	-	-	T	1-8/16	£55
DE220CT	B - T	-	-	1-8/16	£66
DES10CAT VLB	B A T	-	-	V-32	£199
DE320CT MCA	B - T	-	-	M-32	£99
DE400 EISA	B - T	-	-	E-32	£149
DE530 PCI	B - T	-	-	P-32	£99
DEDE220X Novell Boot Rom	-	-	-	-	£19

Intel EtherExpress (E.XP)

E.XP PRO 16C	BNC	AUI	TP	IPK	SPK	20PK
E.XP PRO Flash 16CB	-	-	T	1-8/16	£72	£319

Ethernet for Portables

Genius E3000D-II with printer	BNC	TP	DUAL
Multiplexer built-in & EPP support	-	-	£73
Xircom Pocket III	£185	£186	£199
SMC Elite Note	-	-	£159
D-Link DE600	-	-	£99
D-Link DE620 EPP Support	-	-	£129

PCMCIA

3COM 3C589B	BNC	TP	DUAL
Xircom PCMCIA - Performance range	£129	£135	£149
SMC Elite Card	-	-	£115
Genius ME3000II - LOW PRICE	-	-	£99
D-Link DE650	-	-	£125

*While stocks last

Boot ROM for NE2000 & clones TEC/INK/R09R £10(c)

Cables & Accessories

Length (m)	3	5	10	15	20	25	30	50
Thin	£6	£8	£12	£16	£20	-	£27	£35
TP	£9	£12	£17	£22	-	£30	-	-
100M Reel	Thin	£45(2xa)		300M TP		£169(2a)		

BNC T-Piece 5 Pack £15(c) BNC F-F Barrel 5 Pack £15(c)
BNC 50ohm Earthed Terminator 2 Pack £4(c) BNC M-M Barrel 5 Pack £17(c)
BNC Crimp Tool £19(b)
R/45 TP Connectors 20PK £20(b)
R/45 TP Crimp Tool £19(b)

AMAZING! HARD DRIVE PRICES

SEAGATE	1GB	IDE	£199
CONNER	2GB	SCSI	£599
MICROPOLIS	4GB	SCSI	£949



PHONE 0181-205 9558
FAX 0181-205 0190
TELEFAX 0181-358 8100
PRICES EXCLUDE VAT @ 17.5%



MONITORS (MULTISYNC COLOUR) Carr £8 for 14"15" £12 for 17"-21"

Resolution: A B C D E Price

TECHNOVision Affordable Monitors

TV14 0.28mm	72	72	60	-	-	£149
TV15 0.28mm	90	90	78	60	-	£199
TV17 0.28mm	100	90	76	60	-	£359



The Art of Vision

(1 year RTB warranty)

CALL FOR ON-SITE

400LR	14"	75	60	8	-	£189
410LR	14"	75	75	60ni	-	£199
420LR	14"	100	100	80	60	£239
580+LR	15"	100	100	80	60	£285
880LR	17"	100	100	80	60	£515
885LR	17"	100	100	100	76	£589
895LR	17"	120	120	105	79	£799
1080LR	20"	110	110	100	76	£879
2100LR	21"	120	112	84	72	£1499
Crystall Vision 200 Dualscan LCD Panel						£1249

PHILIPS

CALL FOR ON-SITE

14C	14"	60	56	87i	-	£185
15B	15"	100	-	72ni	-	£286
17A	17"	60	72	70ni	76ni	£685
17C	17"	100	72	60	60	£445
20T	20"	160	131	103	76ni	£1325
21B	21"	160	131	103	84	£1399

NEC PLUG & PLAY MONITORS

2V	14"	75	75	70	-	£229
XV15	15"	100	100	80	60	£279
XE15	15"	120	100	80	60	£390
XV17	17"	100	100	80	60	£559
XE17	17"	120	100	80	60	£679
XP17	17"	160	130	100	76	£919
XE21	21"	120	100	80	60	£1339
XP21	21"	160	130	100	76	£1759

SONY NEW

CPD 15 SFI	15"	£309
CPD 17 SFI	17"	£599
GDM 17 SEIT	17"	£809
GDM 20 SEIT	20"	£1405
GDM 20 SEV	20"	£1295

Panasonic

2YR OSM UK MAINLAND

TX-T1567	15"	£259
TX-D1751	17"	£605
TX-D1732	17"	£435
TX-D2051	20"	£1125
TX-D2151	21"	POA

A=640x480 B=800x600 C=1024x768 D=1280x1024 E=1600x1200 All frequencies are shown in HZ, as per manufacturers spec.

VDU Glass Filter to reduce glare & provide protection. TUV & SSI approved.
 Mirus ECO 14"-15" £35(b) CAD 16"-17" £59

GRAPHICS CARDS

MODEL	RAM	ISA	VLB	PCI
TAXAN 64 BIT ATI MACH ACCELERATOR				
WIN TURBO+ 64	V4MB	£338	£339	£340
WIN TURBO 64 (Upgradeable)	V2MB	£194	£195	£196
WIN BOOST + 64	D2MB	£134	£135	£136
WIN BOOST 64 (Upgradeable)	D1MB	£98	£99	£100
ULTRA PRO	V2MB	MCA £228	EISA £229	
DIAMOND				
STEALTH V64-2 VIDEO MPEG	V2MB	-	£255	£259
STEALTH V64-4	V4MB	-	£315	£316
STEALTH V64-2	V2MB	-	£219	£215
STEALTH D64-2	D2MB	-	£128	£129
STEALTH D64-1	D1MB	-	£90	£89
SPEEDSTAR 64	D1MB	ISA £105	ISA D2MB	£169
MATROX - NEW MILLENNIUM PCI				
MILLENNIUM	2MB VRAM	-	-	£255
MILLENNIUM	4MB VRAM	-	-	£369
IMPRESSION PLUS	V2MB	£265	-	£265
IMPRESSION PLUS LITE	V2MB	-	£199	£200
IMPRESSION PLUS 2MB VRAM UPGRADE				£165
MILLENNIUM UPGRADE	2MB	£150	4MB £270	6MB £380
MILLENNIUM MPEG HARDWARE PLAYBACK MODULE				£199
MILLENNIUM MPEG PLAYBACK & CAPTURE MODULE				£239
ORCHID				
KELVIN 64-2	D2MB	£124	£126	£133
KELVIN 64-1	D1MB	£98	£99	£99
STANDARD SVGA ISA	512KB	£29	1MB	£45
TRIDENT 9440 PCI	1MB	£59		

OVERHEAD PROJECTION PANEL



Key common features:

- Resolution 640 x 480
- Remote control
- TFT screen for crystal clear presentations
- 8.4" Screen size
- Carry case

Product	Colours	Display	Price
Campus 300	2.1M	Data only	£2199
Campus 700	16.7M	Data/Video	£2599
Impact 21	2.1M	Data only	£2399
Impact 24	16.7M	Data/Video	£3299
Prolite 400W Portable Projector			£599

Designed to fit impact panels **3M projection panels? Please call**

PC PARTS MICE

Microsoft(b)

MS Mouse V2 Serial & PS/2	£36
MS Mouse V2 5pk Serial & PS/2	£169(a)
MS Mouse V2 Bus	£48
MS Home Mouse Serial + 18 games	£26

Logitech(b)

Pilot II Mouse PC Serial	£17
Pilot II Mouse PS/2	£18
Pilot Trackman PC Serial New!	£27
Mouseman Serial (or PS/2)	£31
Mouseman Cordless Small	£49
Trackman II PC Combo	£42
Trackman Portable Ser + PS/2	£32
Trackman Voyager	£47

Hard Mouse Mat £4(c)
Genius(b)

Hi Mouse range includes mouse mat, 9-25 adaptor and Paintbrush IV	
Hi Mouse Serial Only	£19
Hi Mouse Serial & PS/2	£21
Mouse One Serial	£9
Hi Point Serial	£20

Clips on to keyboard, includes carry case and 9-25 adaptor, ideal for notebook user

KEYBOARDS

Microsoft Natural Keyboard £65(a)
KeyPro Programmable Keyboard £39

- 12 programmable function keys
- Built in LCD calculator
- Diagonal cursor keys
- Key-lock function* XT/AT compatible
- Angled template holder with 5 templates

CHERRY 102 Key AT Keyboard £37
 German made using high quality key switches

Mitsumi XT/AT Keyboard £25
Ergo Wrist Rest £4(c)



HAVE YOU SWITCHED EVERYTHING OFF? ARE YOU SURE? YOU CAN BE WITH COMMAND POWER CONSOLE



Command Power Console provides fingertip control of your computer & peripherals. Its master control and four individual power switches allow you to power up your entire system or control each component separately. It also provides spike surge suppression and noise filtering.

CABLES

(Cable only order Min £30 ex carr)
 Printer Cables : See page 13
 Printer Switches : See page 14
 SCSI Cables : See page 19
 Networking Cables : See page 17

Inside PC

Dual IDE Hard drive cable YCB/DS/H17Z	£8
Single IDE cable YCB/DS/H22Z	£6
Dual Floppy Drive cable YCB/DS/F08Z	£7
"Y" Power splitter cable YCB/DS/W10I	£8

Mains

Mians to PC 2m cable inc plug YCB/WR/M13Z	£6
Mains to PC 4m cable inc plug YCB/WR/M15Z	£9
PC to monitor 2m mains cable YCB/WR/M06Z	£7
4 way mains ext block surge protected YCB/WR/P06M	£19

Serial

Modem cable 2m 9f to 25m YCB/MD/Y16Z	£8
Modem cable 2m 25f to 25m YCB/MD/Y14Z	£9
File transfer cable Universal 9 & 25 each end YCB/MD/Y02Z	£18
- can be used with Laplink & similar programs	
PS/2 to AT serial port adapter GEN/PD/M06X	£5

Monitor

Monitor ext cable for SVGA 15pin 2m YCB/MP/L03I	£15
---	-----

Keyboard

Keyboard ext cable PC/XT/AT coiled YCB/PD/K09X	£7
Keyboard extension cable PS/2 coiled YCB/PD/K12I	£9
PC/AT keyboard to PS/2 system cable YCB/PD/K06X	£10
Carriage 5 cable	£6
Additional cable	£0.30

Monitors
Accessories



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Storage

PCMCIA DEVICES (a)

HARD DRIVES TYPE III			
CALLUNA HD			
10MB	£219	130MB	£POA
170MB	£325	260MB	£399

PCMCIA FOR DESKTOPS (a)	
Cardport ISA	£159
• 2 x Type III slots	
• 1 x ISA half card with rear slot	
• 1 x drive bay with front slot	
• Full s/w suite for card & socket	
Cardport Solo	£99
• 1 x Type III slot	
• 1 x drive bay with front slot	
• Full s/w suite for card & socket	
Cardport Uno	£89
• 1 x Type III slot	
• 1 x ISA half card with rear slot	
• Full s/w suite for card & socket	

PC PARTS (b)



High Speed Multi I/O Cards

- ◆ Enhanced IDE mode 3 (ATA-2) for VLB card
- ◆ Standard IDE mode for ISA card
- ◆ 2 x 1.6550 UART buffered serial ports
- ◆ 2 x 2.88Mb floppy disk support
- ◆ Multi-mode parallel port (standard, B0Dir, ECP, EPP)

IDE-4 ISA	£39(b)	IDE-5 VLB	£59(b)
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IDE-2 AT HD/FD/2S/1P inc cables	£14
IDE-3 VLB HD/FD/2S/1P card	£17
I/O-1 AT 2S/1P/1G	£14
I/O-2 XT/AT Dual Serial Port	£14
I/O-4 XT/AT Dual Parallel Port	£14

FLOPPY DRIVES (b)

Teac. 1.44Mb 3 1/2" FD + 5 1/4" Kit	£36
Teac 1.2Mb 5 1/4" Floppy Drive	£42
2 IN 1 : Dual Floppy Drive	£89
3 1/2" + 5 1/4" in half height frame	

CACHING CONTROLLERS (b)

IDE - OMB fitted			
• Support for Dos, Windows, NT, OS/2 Netware, SCO AT&T UNIX			
• Hardware disk mirroring (RAD 1)			
• Up to 4 drives supported • Fast ATA support			
• 4 x 30 pin Simm sockets (16MB max)			
• Auto configure & drive select			
TIC 101 ISA	OMB	£59	
TIC 20V VLB	OMB	£99	
TIC 30E EISA	OMB	£159	
TIC 40P PCI	OMB	£99	
SCSI - OMB fitted			
• Support for Dos, Windows, NT, OS/2 Netware, SCO AT&T UNIX			
• AHA 154X compatible			
• Supported by Corel SCSI (approved)			
• Hardware disk mirroring • S/W configuration			
• 4 x 30 pin Simm sockets (16MB max)			
TSC 101 ISA	OMB	£149	
TSC 20V VLB	OMB	£249	
TSC 30E EISA	OMB	£289	
TSC 40P PCI	OMB	£POA	

PCMCIA DEVICES (a)

HARD DISKS - TYPE III		
NEW LOW PRICES		
Maxtor 105Mb	£199	130Mb £239
Calluna Type III Drives		
105Mb	£219	170Mb £325
260Mb	£399	

PCMCIA FOR DESKTOPS

DOCKET SOCKET	£199
A standard Type III slot in a 3.5" drive bay. Inc. 5.25" adaptor & 16-bit interface with rear Type II slot.	
MAXTOR DESKRUNNER	
Provides 1 Type III front slot	£95(a)

IOMEGA ZIP DRIVES

Store 100MB on one 3.5" disk!

- Expand your data storage inexpensively
 - Each 3.5" disk holds 100MB
 - Zip Drive is compact and weighs 1lb
 - 1.25MB/s transfer rate
 - 29MS seek time
 - Drive comes complete with manual & s/w
- | | |
|-----------------------------------|---------|
| Zip Drive 100MB (SCSI) | £149(a) |
| Zip Drive 100MB (Parallel) | £150(a) |
| Zip-Zoom PC SCSI Interface | £69(a) |
| Zip PC Disks, 100MB formatted 5pk | £55(a) |

PANASONIC 5.25" OPTICAL DRIVES

LF7304 1.5Gb SCSI int drv	£1477(a)
LF7300B 1.5Gb SCSI ext drv	£1539(a)

PARALLEL PORT DRIVES (a)

BackPack Hard Disk Drives			
420Mb	£325	850Mb	£399
1.2Gb	£515		
BackPack Floppy Disk Drives			
1.44Mb	£115	2.88Mb	£169
1.2Mb	£125		
BackPack CD-ROM Quad speed £259			
Tape Drives - Also see Colorado section			
BackPack 1080 250Mb (QIC-80)	£219		
BackPack 900 Up to 900Mb (QIC 3010)	£349		

SCSI CONTROLLERS (b)

COREL SCSI - Support the widest range of SCSI card & devices in Dos, Windows & Netware.

COREL SCSI II S/w for Dos/Win v2 £65

COREL SCSI II Network Manager £267

ADAPTEC - INDUSTRY STANDARD SCSI

LOW PRICES	BUS TYPE ONLY	ASPI	
		S/W KIT	
1505	ISA		£42
1515	ISA		£65
1542C	ISA	£125	£165
1640	MCA		£235
2742T	EISA	£209*	£245
2842	VLB		£165
2940	PCI		£189

*Single Channel

ADAPTEC PARALLEL PORT ADAPTERS	
T358 MiniSCSI EPP (1Mb/sec)	£125

PCMCIA SCSI CONTROLLERS	
ADAPTEC PCMCIA SCSI card	£169
FUTURE DOMAIN PCMCIA SCSI 2G0	£185
FUTURE FAST SCSI-2 Ideal for Servers	
CACHING CONTROLLERS	
DPT ISA 16 Bus Mastering kit	£199
DPT EISA 32 High Performance kit	OMB £329
DPT PCI High Performance kit	OMB £299
DPT Caching Module Upgrade	OMB £299
DPT Disk Array Module Upgrade	OMB £299

SCSI ACCESSORIES

SCSI DEVICE CASES WITH PSU (a)

Includes: 50-way Centronics input & output, PSU, mains cable, fan, activity LED, SCSI ID switch, mounting screws.

Single	Dual	Quad
3.5" HH	£79	-
5.25" HH	£65	£99 £189

SCSI CABLES (c)		
INTERNAL (50-way IDC-IDC)	Length	
1 device 28cm	£6	2 devices 45cm £9
4 devices 1m	£22	6 devices 1.4m £32
EXTERNAL		
50-way Centronics each end	1m	£18
50-way Micro-D each end	1m	£45
50-way Centronics to Micro-D	1m	£38
25-way D to 50-way Centronics	1m	£25
TERMINATORS (50-way Centronics)		
Passive	£9	Active £29 Forced Perfect £69

TAPE BACKUP

COLORADO BACKUP SYSTEMS (a)	
NEW LARGER CAPACITIES	
Internal Tape Backup Solutions	
TRAVAN T1000 400MB/800MB	£119
Jumbo 350 170/340Mb (QIC-80XL)	£80
Jumbo 680 340/680Mb (QIC-3010)	£115
Jumbo 1360MB NEW	£229
KE-10 External Mounting Kit	£61
FC-20 Fast Controller card	£49
Full range of accessories & mounting kit - Call	
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Trakker 680 340/680MB (QIC-3010)	£199
Trakker Carrying Case	£39
Colorado Backup Software Win v2	£39
SK35 Colorado Backup for OS/2	£60
SU53J Unix/Xenix Backup s/w	£79

NEW HP SURESTORE DAT BACKUP (a)

HP's new Surestore range of drives gives the system user the flexibility to choose the correct drive and options to suit all needs. All network kits contain Cheyenne backup software, call for full details. Unix solutions also available.

	Int Drive	Ext Drive	Netware Bundle
Surestore 2000 2Gb	£625	£729	£935
Surestore 5000 4Gb	£695	£799	£1759
Surestore 6000 8Gb	£799	£899	£1849

NEW HP AUTOLOADER 48GB SURESTORE 12000e

CALL FOR FULL DETAILS £1999

HP Support Pak for Surestore £210(b)

(Provides 3 years, OSM direct from HP)

TECHNO DAT Drives Kits (a)	1 yr RTB warranty
TECHNO DAT Drives (HP)	INT £539
TEC 2Gb DAT (C35470)	£539
TEC 2-8Gb DAT (C35480)	£619
TEC 4-16Gb DAT (C1533)	£699
TEC 24-48Gb DAT Autoloader (C1553)	£1559

Cheyenne Backup Software (a)			
Arcsolv DOS	£89	Win OS/2	£135
Arcserve NLM			
No. of Users	5	10	25
	50	100	250
v4 for DOS	174	289	489
	619	699	815
v5 for Win	174	335	575
	695	795	995

EXABYTE HIGH PERFORMANCE TAPE DRIVES

- SCSI-2 Interface • Mini cartridge (DC2000 format)
 - 1Gb native, 2Gb compressed
 - 567Kb/sec data transfer rate, faster than DAT
 - Kits complete with PC card, s/w, cable & 1 cartridge
- | | |
|---------------------------------|---------|
| EXABYTE 2501 FS1G Internal Kit | £539(a) |
| EXABYTE 2501 FS1Ge External Kit | £649(a) |
| EXABYTE 2501 Bare drive, only | £399(a) |

TAPE CARTRIDGES

Colorado Formatted - 3 Pack(c)		
DT-120 (QIC-40)	£49	DT-250 (QIC-80) £42
DT-350 (QIC-80XL)	£52	DT-740 (QIC-3010) £66
3M QUALITY TPE CARTRIDGES		
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DC2120 (QIC-80)	£9	£40
DC2120XL (QIC-80XL)	£14	£66
MC3000XL (QIC-3010)	£20	£95
DC6150	£12	£55
DC6250	£15	£70
DC6525	£17	£80
Exabyte DC3000XL (1Gb)	£23	£105
4mm DDS DAT tapes - 5 tapes per pack		
3M (1 Tape)	SONY	HP
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2Gb 90m	£9	£55
4Gb 120m DDS-2	-	£75
		£79
HP DDS DAT Cleaning Kit - 2 tapes		£24

DISKETTES (c)

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	£6.00		£7.00
BULK DISCS 3.5" HD (1.44MB) FORMATTED			
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Magneto Optical Diskettes			
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IBM1GB	Pegasus	£309

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CF-850A	850	£145
CF-1275A	1200	£209
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CFA540S	540	£169
CFP1080S	1080	£329
CFP2105S	2GB	£549
CFP4207S	4GB	£949

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ST3660A	545	£109
ST3580A	850	£145
ST31220A	1050	£175
Fast SCSI-2		
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ST31230N	1050	£325
ST32430N Hawk	2100	£635
ST32550N B/cud	2100	£715
ST15230N Hawk	4000	£839
ST15150N B/cud	4000	£1049
ST410800N	9090	£1899

FUJITSU (a)

IDE		
M2682T	352	£95
M2684T	528	£119
FAST SCSI-2		
M26375A (2.5")	240	£175
M26845A	530	£135
M1606S	1GB	£329
M2915 NEW	2170	£699

MICROPOLIS (a)

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1991S (FH) 5.75"	9100	£1575

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Caddi Drives (a)					
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All display modes are supported up to 800x600 lines in 16.7 million colours. Pin sharp, perfect quality simultaneous display on both PAL projector and computer monitor. Each and every function is controlled with its unique remote control handset making it a dream for presentation work! Features include: Screen Freeze, Pan and Zoom, Brightness, Sharpness.

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Picture size 60" at 2m and 100" at 3.3m, with superb picture quality, with a resolution of 320 lines horiz. "As with all LCD projection systems the picture does look doty, akin to a picture superimposed on a fine mesh grid. The projection system gives no flicker and the picture is totally flat. The result is a persuasively realistic image, like watching a miniature cinema rather than a TV." What Home Entertainment April 1995.

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50 metres of loudspeaker cables are provided, with cables to connect the system to a computer.


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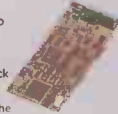
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"If you've been to a cinema sound demo recently the changes are you've experienced the full wrath of the T-Rex scene from Jurassic Park. Distant rumblings of the dinosaur make the cups of water on the car dashboard tremble as dino-brat, Tims looks on in disbelief. Notably, he doesn't ask his fellow passengers if they heard the rumbles - instead, he asks if they felt them!"
What Hi-Fi March 95. Power 60W, frequency response <20Hz-120Hz
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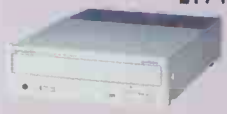
This card allows you to watch television programs, and track the stock market and share prices via teletext. Max VGA resolution 1024x768, requires no feature connector.
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TECHNO VALUE
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IDE SOUNDBLASTER 16 PRO IDE



TECHNO VALUE
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SOUNDBLASTER AWE32 VALUE



TECHNO VALUE
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Kit contents are subject to change.

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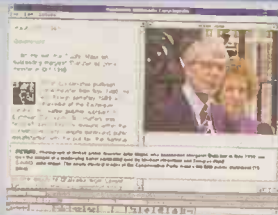
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 Ham Radio (Shareware Aug 94) WC
 MPC Wizard 4 (MPC,Test & setup) AE
 MUPH Game Interface (CH)
 Multimedia Menu (CH)
 Our Solar System (Intro plus only) CH
 SMTEL Artworks (Latest, best DOS,WC)
 Sound Sensation (CH)
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- **MORE SPACE** - Integrated Stacker 4.0 Compression. Increases hard disk capacity by up to 2.5 times, supports volumes up to 2GB & provides conversion from existing compressed disks.
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- **Unattended program backup scheduling**
- and a host of other Enhanced Features

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IB77 P29 3.5"
IB77 P30 CD

System Requirements

- Memory Requirements - 512KB minimum
- Works on any IBM compatible PC
- System Requirement - Intel 8088 or 80X86 or higher microprocessor or compatible
- Disk space - 6Mb to 18Mb depending on installation options selected

IBM PC-DOS v7
£59
(IB65 P36)

IBM WIN-OS/2 includes FREE Bonus Pak

- OS/2 Warp v3 with Win-OS/2 3.5" CD £99
- OS/2 Warp v3 with Win-OS/2 Upgrade £75

OS/2 WARP CONNECT

This new addition to the OS/2 Warp family brings you all the benefits of OS/2 Warp v3, including the Bonus Pak plus the most complete networking client for advanced network connectivity.

In addition to peer-to-peer connectivity, OS/2 Warp Connect includes client for Internet Access, Lotus Notes Express, LanServer Requester, Netware client, TP/IP as well as powerful features based on IBM LAN Distance for Remote access.

OS/2 Warp Connect also offers network admin, LAN bridging, security and more!

- OS/2 Warp Connect v3 £9
- OS/2 Warp Connect with Win-OS/2 v3 £12
- OS/2 Warp Connect Upgrade £7

Software Delivery Charge: New packaging for OS/2 Warp v3 (minimum order £40) includes £4.00 postage. All prices exclude VAT. All prices are subject to change without notice. All prices and carriage include VAT. Our standard terms & conditions of sale apply (available on request). In line with industry practice, we can only accept returned software if the shrink wrap seal is intact. All returns, including money back claims require a valid returns number and are subject to a small handling charge of 15% or a minimum of £20.



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LOTUS SMARTSUITE v3.1 FOR WINDOWS

The complete solution to Windows desktop

An Integrated Approach

Task-orientated integration- users focus their attention on the job at hand rather than Windows technology. To use Lotus SmartSuite applications together just use Lotus SmartCenter as your command centre to launch applications and switch between them - all at the click of a mouse. Or simply access SuiteAnswers for help with cross-applications tasks.



Now you can upgrade to Lotus SmartSuite v3.1 for Windows for only £158 if you currently own any WordProcessor, Spreadsheet, Database, Graphics package, Organiser.

FREE LICENCE UPGRADES

If you purchase any Lotus Desktop applications between 20.6.95 and 31.12.95 you will be eligible for a FREE Licence upgrade to the 32 bit version for Windows 95 when it becomes available (There will be an additional charge for disks and manuals).

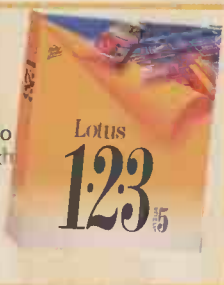


ANALYSE IT

LOTUS 1-2-3 V5.0 SPREADSHEET

Lotus 123 Spreadsheet has everything you need to make your everyday spreadsheet tasks easier. With Lotus 1-2-3, Lotus redefines spreadsheet productivity - again.

Upgrade/Trade-up **£88**

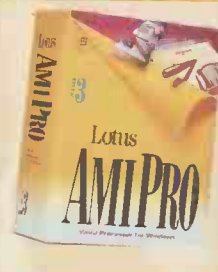


WRITE IT

AMI PRO V3.1 WORD PROCESSOR

Lotus Ami Pro Word Processor delivers powerful word processing capabilities to individuals, workgroups and mobile users. And it's the best word processor for Lotus 1-2-3 and Lotus Notes users.

Full Product **£84**



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APPROACH V3.0 DATABASE

Approach makes managing data as easy as Lotus 1-2-3! You don't have to be a programmer to use this relational database for tracking sales, invoicing and more.

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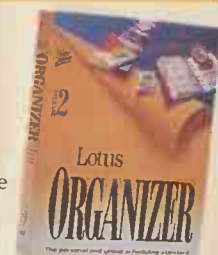


ORGANIZE IT

ORGANIZER V2.0 PERSONAL ORGANISER

Lotus Organizer is the personal and group scheduling standard. It's the easy way to make sure you and everyone you work with are on the same page at the same time.

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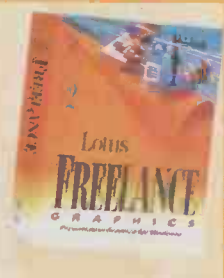


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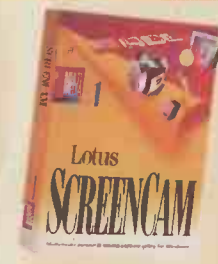


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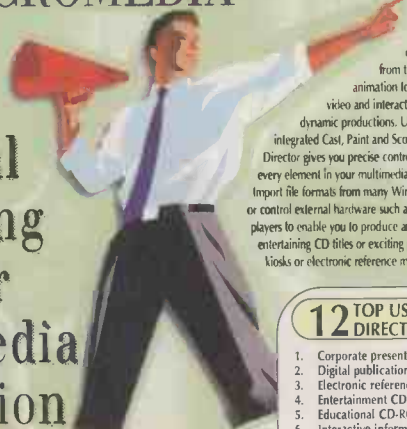
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12 TOP USES FOR DIRECTOR 4.0

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 2. Digital publications
 3. Electronic reference materials
 4. Entertainment CD-ROM titles
 5. Educational CD-ROM titles
 6. Interactive informational kiosks
 7. Simulations & visualisations
 8. Storyboards
 9. Product demos
 10. Kiosks
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10 TOP USES FOR CLARISWORKS v3

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Everything you need in one simple, easy-to-use package

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FileMaker Pro v2.1 for Windows

At last a database that provides power without programming Filemaker Pro is a database that can organise information in ways that are useful to you. You can use it to publish a catalogue, or to keep an inventory of all your belongings. In fact the uses of Filemaker are limited only by your imagination. What's more, it can do all without the help or expense of a programmer. Its ease of use, form design features, multiple layout features and workgroup capabilities makes this package immensely popular.



Includes 6 ready to run applications:

- Contact manager
- Lead tracking manager
- Project manager
- Expense manager
- Product manager
- Invoicing system
- Plus 75 cliparts

Limited Offer:
• Computer introductory membership
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On Registration Claris will send you CD with a mixture of 100 demonstrations & applications created using FileMaker Pro - a Claris T-shirt

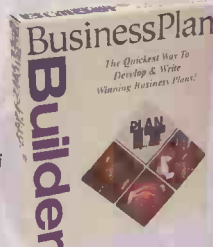
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The Quickest Way To Develop & Write Effective Business Plans!

Information and advice that has been time-consuming, difficult or expensive to get hold of, is now available with this new software.

Writing business plans is a tedious and time consuming job at the best of times. BusinessPlan Builder has been designed to take users through the process of developing and writing effective business plans by providing the structure, automating repetitive tasks and providing all the information necessary to write a winning business plan.

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GST

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Comes complete with a complete set of FREE utilities, font and clipart samples - in fact, everything you'll need to get started straight away.

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GS30 T56

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allCLEAR turns words into pictures for intelligent diagramming of business procedures

allCLEAR III for Windows is an intelligent flowcharting product that helps people define, visualise and manage their critical business processes. allCLEAR III allows you to choose the best way to create the exact diagram to fit your business process visually and verbally. Create your diagrams visually with drag and drop templates; verbally with text outlines; or use a combination of each. Whatever your choice, you focus on the process, not the graphics.

- Transforms written text from word processor, spreadsheet and/or database into diagram without drawing tools
- Create and edit by using text information and/or time-saving drag and drop templates
- allCLEAR III self-documents the information
- Provides simultaneous active viewing of text and diagram on split screen
- Generates automatic page connectors for multi-page diagrams
- Provides five viewing styles that can be applied to section of diagrams or entire diagrams
- Allows for diagram rotation
- Allows movement of multiple boxes at one time
- Features interactive runtime Viewer for step-through diagrams
- Open and work in multiple diagrams simultaneously
- Features on-line Quick Start tutorial
- Supports Lotus Notes via Notes F/X for workgroup sharing.



DIAGRAM TYPES

- Flow chart
- Fishbone Diagram
- Process flow diagrams
- Deployment chart
- Relationship diagram
- Star (Network) chart
- Procedure chart
- Org (hierarchical) chart

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Produce precision CAD drawings from the best Windows based CAD

Now the CAD software that was rated No. 1 by leading trade publications is available for Microsoft Windows. New EasyCAD for Windows - complete with a whole range of additional functionality. Fast, easy and amazing value, EasyCAD will turn your PC into a precision drawing tool with everything you need to create everything from simple office forms and layouts to complex architectural and engineering drawings.

Features:

- User programmable icons
- Transparent Zoom Icons
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- ★ Instant Access OCR™ from within your Windows™ application
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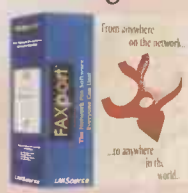
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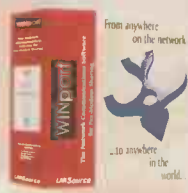
FAXport

FAXport is an integrated client and server network fax solution providing functions to send, receive, administer and manage network faxing.

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- Easy-to-use, fully-featured user interface
- Real-time access to send and receive logs
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Purchase WINport and FAXport separately, or integrate them for a complete network fax and modem sharing solution. WINport and FAXport support Windows, Windows for Workgroups, and Windows NT 3.5 clients, and most IPX, NetBios, or TCP/IP (winsock compliant) compatible networks

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WINport turns any PC into a Communications server and allows users to access a modem pool from anywhere on the network.

- Inbound and outbound dialing
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- Administrative console with exportable daily logs
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Build Powerful Database Applications without programming with **NEW**

Alpha Five Home & Business Edition **£39**
(Has everything in the Alpha Five except the XBasic programming language)

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FOR WINDOWS '95
The NEW 32 bit Automated System & Data-Protection Solution



This new version has been designed specifically for Windows 95. It works in the background constantly monitoring vital system resources and data integrity to ensure stability and reliability. In the event of a crash the Rescue disk gets you up and running. Already extensively Beta tested, this product is seen as an essential tool for Windows 95.

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- 32-bit Norton speed disk
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- DOS Mode recovery tools
- 32-bit Norton Disk Doctor
- Recovers lost data
- Norton rescue disk
- Unerase

Norton Antivirus
FOR WINDOWS '95

The Most Complete Windows '95 Virus Protection that detects, destroys and prevents viruses

- Windows '95 does not include virus protection, but all 3,000+ existing viruses are fully compatible with the new operating system. As a result, Windows '95-specific virus protection is required to be safe from viruses in Windows '95.
- Fully Windows '95 compliant (32-bit). It includes a 32-bit application.
- Provides the most effective virus prevention available with its exclusive virus sensor technology.
- Norton Anti-Virus operates unobtrusively in the background with no impact on productivity.
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Guaranteed to make file management and working in Windows 95 faster and easier

- Faster, more powerful file management and desktop navigation
- Use fewer steps and clicks to accomplish everyday system tasks
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Norton Pc Anywhere v2
FOR WINDOWS 3.1 & WINDOWS '95

Remote Computing & Communications Made Easier
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pcAnywhere Access Server v1.0 2-node	£220	pcAnywhere Access Server v1.0 2-node add-on	£99

TRADE-UP This upgrade program will search your system to confirm your upgrade eligibility for the following Windows 3.1 product (Full product supplied)

Norton Utilities for Windows 95 Trade-up from Norton Utilities, Norton Desktop or PC Tools	£49
Norton AntiVirus for Windows 95 Trade-up from Norton AntiVirus, CP AntiVirus, Norton Desktop or PC Tools	£29
Norton Navigator for Windows 95 Trade-up from XTree, Norton Desktop or PC Tools	£35



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7. **PerfectScript** - records automated process & plays them back.
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Standard (3.5")	£154*	£119*	£154	Standard Version Includes WordPerfect 6.1 Quattro Pro 6.0 Presentation 3.0 Envoy 1.0a InfoCentral 1.1 GroupWise 4.1
Standard (CD-ROM)	£264	£119	-	
Professional (3.5")	£348	£179	£205	Professional Version Includes WordPerfect 6.1 Quattro Pro 6.0 Presentation 3.0 Envoy 1.0a InfoCentral 1.1 GroupWise 4.1 Paradox 5.0 Visual AppWare 1.0
Professional (CD-ROM)	£354	£175	-	

The CD-ROM versions offer full electronic documentation and SpeechAware software from Novell and Dragon Systems. SpeechAware allows users to talk directly to WordPerfect and other Perfect Office applications with the appropriate hardware set-up.

*While stocks last

*Conditions

Purchase PerfectOffice (any version 3.5" or CD-ROM) between 1st July '95 and 30th September '95.
Purchase Windows '95 (upgrade only) between launch date and before 30th September '95.
Maximum of 5 product claims per postal address.
Maximum claim value £44.50 (inc VAT) per product (Windows '95) (no delivery charges to be re-imbursed).
Both purchases must be from Technomatic Ltd.
Purchase invoices must be dated between the dates above.
You receive a voucher from Technomatic with your PerfectOffice purchase.
You send your invoices for PerfectOffice, Windows '95, completed PerfectOffice registration card and voucher to Novell before 31st October '95 and you will receive a cheque for 50% of the cost of Windows '95 upgrade (inc VAT) but excluding delivery.
Purchase made under Novell's volume licencing agreement do not qualify for this offer.

1

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The Perfect Way to Create Better Documents

2

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5

**InfoCentral™
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6

**GroupWise™
4.1**
The Perfect Way to Share Information (One user client software only)

7

Paradox 5.0
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- 15,000 multimedia elements
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- 60 different languages spoken
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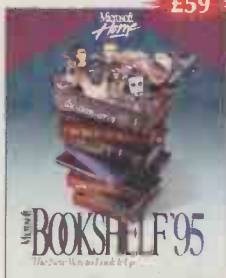
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- 150 audio clips
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Includes

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- Experience Indian customs and cultures
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- 80 video clips showing dogs at work and play



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- and more!

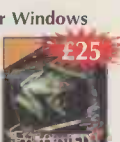


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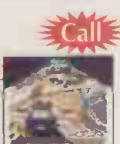


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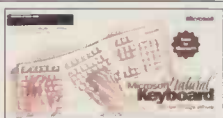
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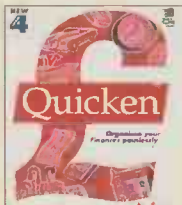
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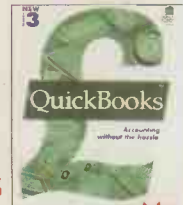
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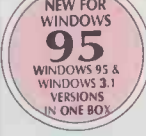
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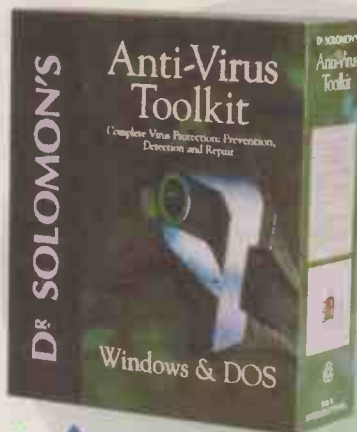
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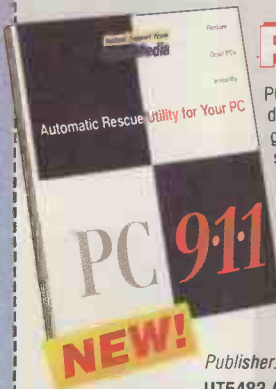


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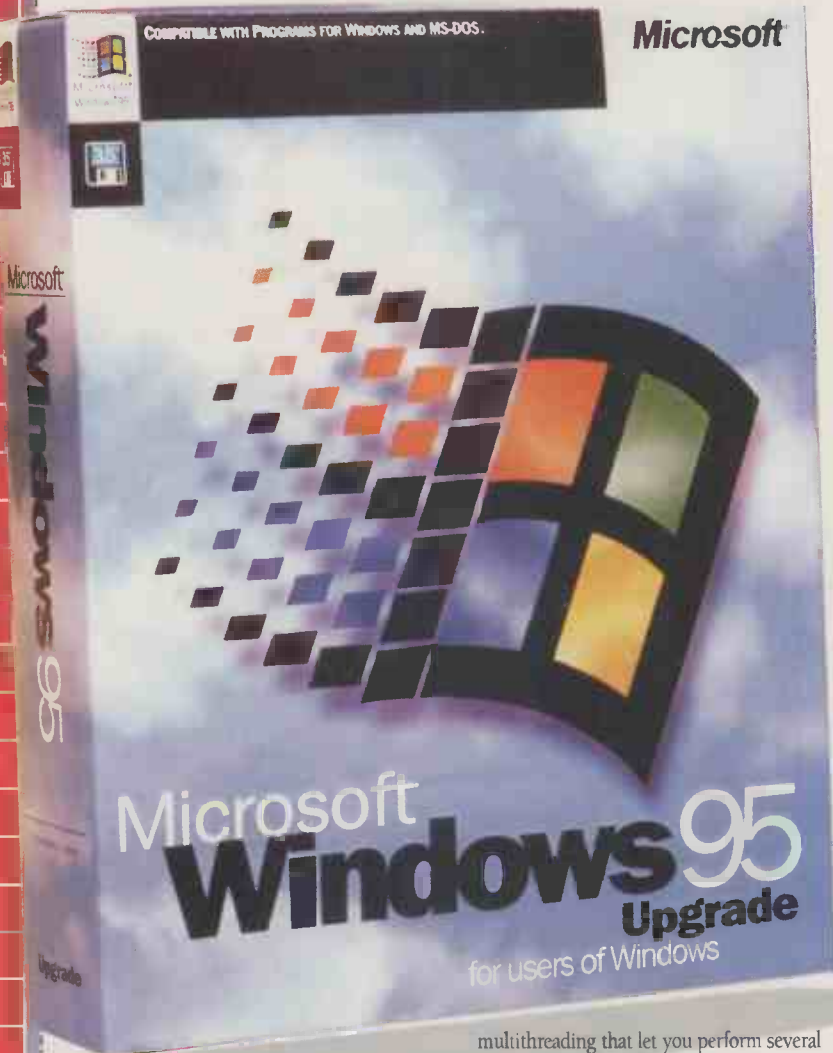


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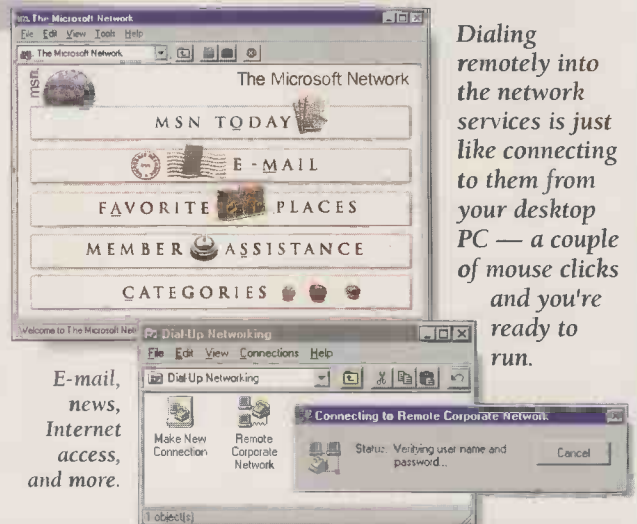
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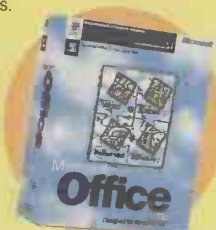
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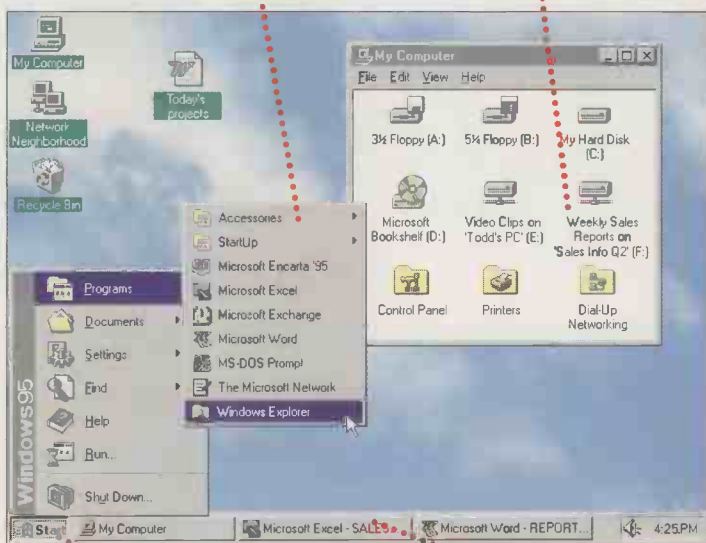
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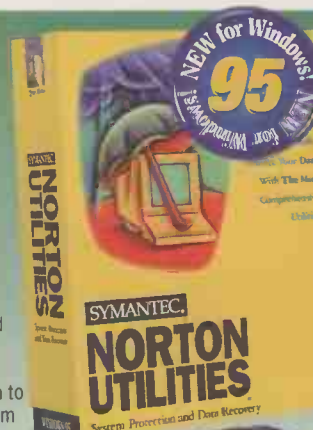
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LONG FILE NAMES

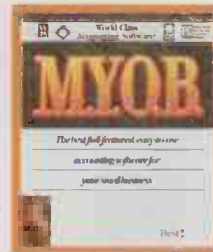


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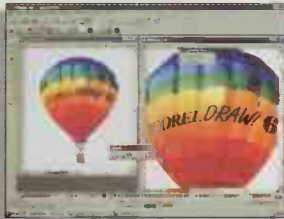


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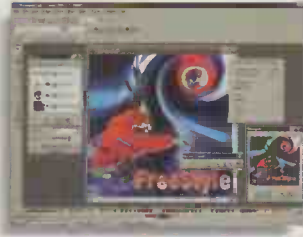
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Manufacturer: Cyrix

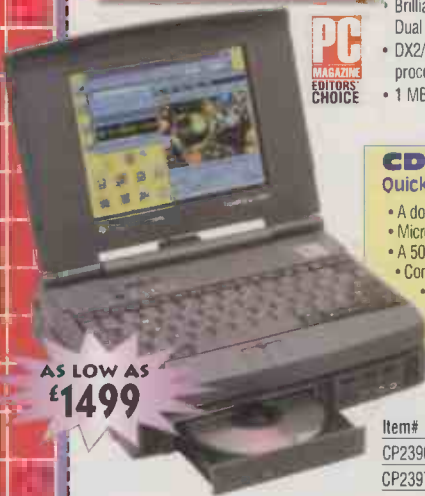
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Manufacturer: Microtek

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Requires: 386 PC or higher, 4 MB RAM, Windows 3.1.



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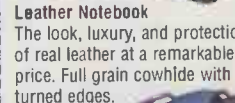
IN3760: ScanMaker Scooter.....

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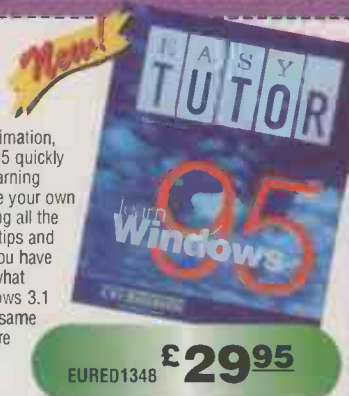
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Publisher: Pacific Micro

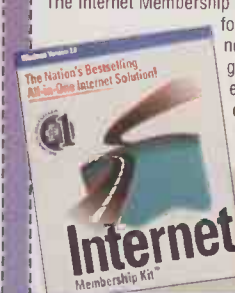
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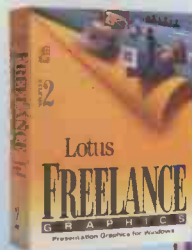
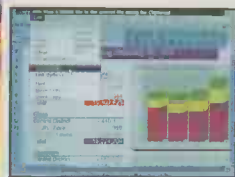
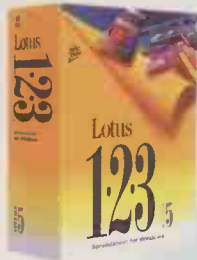
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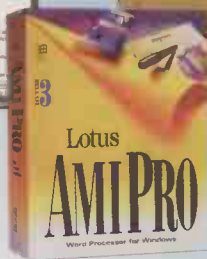
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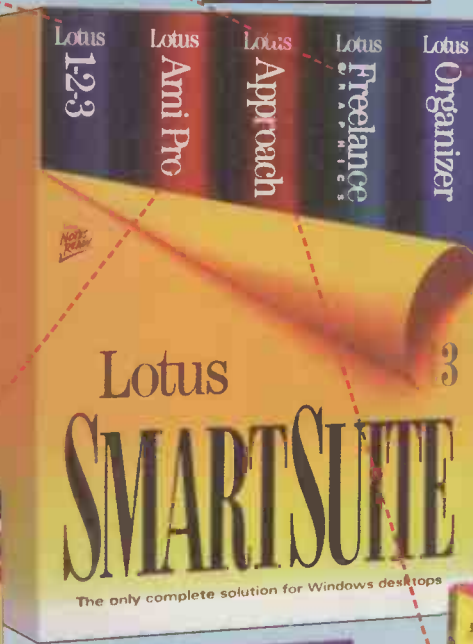
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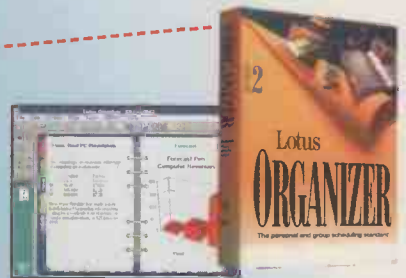
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Publisher: Spry

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Internet Office Professional

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Publisher: Xerox Imaging Systems

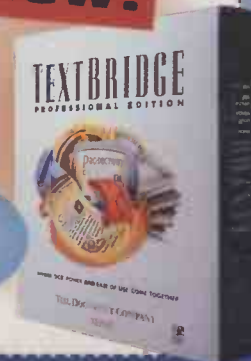
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PC-Install

PC-Install for Windows is an easy-to-use installation program for Windows developers who distribute applications or data files to end users. Display custom graphics, titles, messages, and prompts! Provide user selectable file sets to allow for partial or file subset installations. Check system parameters including video, memory, CPU, and/or available disk space. Control installation during execution based on user input or system configuration. PC-Install allows you to install to or from multiple directories making it ideal for installing from CD-ROMs or over networks. Request any type of user input during installation such as name or serial number. Check .DLL and .VBX file versions, modify AUTOEXEC, CONFIG, and .INI or any other text files, and locate existing files for upgrades. *Publisher: 20/20 Software*

ONLY £89⁹⁵

PC-Install for Windows UT6553 (3.5")	£99 ⁹⁵	PC-Install Combo 3.0 for DOS and Windows UT6246 (3.5")	£119 ⁹⁵	PC-Install 3.0 for DOS UT6247 (3.5")	£89 ⁹⁵
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SyQuest 3.5" Removable Drives

Multiply your storage capacity, infinitely!



The removable SyQuest 3.5" disks give you the power to expand your PC's storage virtually without limit! Now you can get the SyQuest 270 in a special promotional bundle with the Shark — a complete parallel port connection kit for SCSI peripherals, at a super package price! Spinning at 3600 rpm, a whopping 270 MB can be stored on this compact 3.5" drive. The SyQuest d2 Series is rated at 100,000 hours (MTBF—Mean Time Before Failure). Comes complete with cartridge and power cable. Shark Adapter, CoreSCSI for DOS, Windows Drivers for OS/2 2.x, and Windows NT, and more, available based upon model purchased. *Manufacturer: d2 Electronic*



ITEM#	Description	SPECIAL PROMOTION!	(£) Price
EURDR0777	Bundle (CoreSCSI 2.0 software, SyQuest 270, cartridge, and Shark)		499
MED0141	(3.5") 270 MB SyQuest Cartridge		49 ⁹⁵
EURAC1578	Shark		109

The Tray Cradle II

Want to improve the quality of your hand scans by about 100%? Get The Tray Cradle II. It enables accurate full-page scanning of both sides of a 21.25 cm document to produce the same high-quality image that you could only get otherwise from a full-page scanner. The Tray is compatible with all 10 cm black-and-white, greyscale, and colour hand scanners. An alignment grid is included to help square up small documents, photos, and more. If you do any regular amount of scanning at all, but just don't have the budget for a flatbed scanner, this is what you've been waiting for! *Manufacturer: Lyra Group*



AC18374
£19⁹⁵

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- Item availability and price subject to change without notice.
- The price in effect when we receive your order will be the price that is charged.
- We supply only UK versions with the full support of the UK supplier, whenever possible. For products which are not yet distributed in the UK, we carry US versions.
- All prices exclude V.A.T.
- Not responsible for errors or omissions.

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ESTABLISHED 12 YEARS

Evesham Micros has been established for 12 years and now has four operating locations with a total annual turnover exceeding £45 million. It has risen to a position of strength in the computer market, with sustained growth and a secure financial status.

PCDMA

We are a founder member of the Personal Computer Direct Marketers Association; a collaboration of manufacturers who adhere to a professional code of practice. This assures you of our pledge to provide a high standard of service. Additionally, the Payment Protection Plan provides peace of mind if you pay by cheque.



READY TO RUN

All systems are fully formatted and pre-installed with DOS and Windows. Comprehensive documentation is of course supplied, including all software disks and manuals, as is a mouse. Any peripherals and upgrades you buy with your PC will, wherever possible, be fully configured and tested.

DYNAMIC BURN-IN

A rigorous burn-in procedure repeatedly tests all key components. Only after passing this and a final QC inspection do we ship the goods.

READY TO SHIP

We endeavour to build and despatch all orders as quickly as possible. To this end, we try to maintain a buffer stock of popular configurations which can be either shipped immediately or purchased from one of our showrooms. These models are highlighted in the pricing information. Custom and other configurations are built to customer order and take a little longer, but we aim to despatch as quickly as possible. If you contact us we will give you a realistic estimate of the current delivery situation.

"Ready to ship"

Evesham



The Vale PC

'486 PCs

We offer a range of '486 desktop PCs from the modestly priced *Popular* models to the top of the range *Premier*.

PENTIUM MODELS

Cost effective Pentium computing is now available from the *Popular* range. In the *Platinum* range we offer a computer optimised specifically to provide state of the art Pentium performance.

NOTEBOOKS

The *Voyager* offers a unique blend of style, performance and practicality, while the *Voyager 11* brings a new dimension to mobile computing with it's Pentium processor and built-in multimedia facilities.

FILESERVERS AND NETWORK INSTALLATION

In addition to stand-alone PCs we specialise in the installation and support of a wide variety of network installations. Please see the "Network Solutions" section on page 7 of the advert.

VIRUS CHECKED

For your peace of mind all Vale PCs are thoroughly virus checked and have Iris Anti-virus software installed.



With our special Internet access package, reaching a whole world of information from your Vale PC is very easy. Please see page 6.



Vale computers ordered for despatch on or after 24th August can have Windows 95 installed at no extra cost. Existing customers who have purchased a Vale PC since 1st July can upgrade to Windows 95 for £39+VAT.



While all machines are supplied with software installed, we also enclose the original installation disks and manuals, plus our own PC Manual and guide to WINDOWS.

NO DEPOSIT PERSONAL FINANCE

APR 18.5%

Available with all purchases over £1000, subject to status. Please see the examples on the following pages. Written quotations are available on request. Interest rate correct at time of going to press but may vary.



Corporate Sales

Evesham Micros has a proven track record of supplying some of the country's leading organisations - please see our corporate sales feature on page 7.





Service Department

NO CHARGE UNTIL SHIPMENT

If you pay by credit card, payment is not processed until the goods are shipped. Beware of suppliers who charge your credit card weeks before they ship your order!

INSTALLATION/TRAINING

We can now offer a personal installation and training option for your new Vale PC. One of our local installers will deliver the PC to your premises or home, set it up for you and include a period of familiarisation training. This option costs £50.00. More in-depth training can be negotiated directly with the installer.

ON-SITE MAINTENANCE

All PCs (except the *Voyager* notebooks) based on the UK mainland, including the Isle of Wight, Northern Ireland and the Republic of Ireland have the benefit of on-site maintenance for the first year, covering both parts and labour. The length of cover can be extended to 2 or 3 years if desired (see the "Options" section of each page for price details).



30 DAY MONEY BACK GUARANTEE

We are so confident that you will be delighted with your Vale PC that should you, for any reason at all, be unhappy with your purchase, we will COLLECT it and refund your money in full. You will NOT pay any carriage or restocking charges (UK mainland only).

LIFETIME WARRANTY

We also offer a lifetime warranty on labour, so if a problem arises at any time in the future you will only pay for the parts necessary to repair it.

LIFETIME TECHNICAL SUPPORT

As an owner, you will be privileged with access to our exclusive VALE HOTLINE telephone support number. Our award winning staff are both friendly and knowledgeable and have a full individual record of your system. Lines open 9am until 5-30pm Monday to Friday, and 10am until 4pm Saturday.



Technical Support

To further improve our support service we have now installed a bulletin board for Vale customers offering latest drivers and technical information.

Micros

Quality Assured



ISO 9002 (BS 5750)

Having gained several major Product and Customer related awards in '95, it seems the BSI are not the only ones to recognise our efforts in Quality Customer Service.



The readers of 'Personal Computer World' have just voted us "Best Hardware Supplier". We were also runner up for "Best After Sales Service" and "Best Telephone Support".



For the last 2 years Evesham Micros have swept the board when it comes to Service Awards. Our efforts to provide the best possible service have once again been rewarded – the readers of 'Computer Shopper' magazine have voted Evesham Micros "Best Customer Liaison" for 1994.



In the 1993 'PC Direct HITS AWARDS' we won both "Customer Service Excellence" and "Service and Support Excellence" categories as voted by their readers. In 1994 we did it again winning the prestigious "Service Excellence" award. We are especially proud of all these accolades as they were nominated by readers who have actually dealt with our company. They also voted us their favourite suppliers for several other products:

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Popular **PCI**

**FULL SPEC
PENTIUM
FOR ONLY £1049^{+VAT}**

Pentium PCI becomes a Popular model.

The Vale Popular offers proper PCI implementation in a highly upgradeable package at a budget conscious price.

Quite simply most PCs in this price range do not compete with the performance, features and quality of components offered with the *Popular PCI*. The motherboard is a bang up to date integrated design that incorporates a fast PCI hard disk controller, a ZIF socket for processor upgrades and 256kb cache RAM coupled with the latest energy saving technology.

The Vale Viewsonic 6E monitor is non-interlaced in all modes including 1024x768. More importantly it is able to display SVGA mode (800x600) at 72Hz refresh rate which is flicker free and does so while using the

full screen area (most budget monitors shipped with low cost systems have a huge border which uses up a large percentage of total screen area). It meets the stringent MPR II safety requirements as well as surpassing the EPA Energy Star power saving standard, so you can be assured of a relaxing flicker-free display that is kind to your eyes.

The 1Mb Diamond Stealth SE PCI video card bestows the Popular with astonishingly fast video performance for such a moderately priced computer (see the graph on page 5).



Windows 95

Vale computers ordered for despatch on or after 24th August can have Windows 95 installed at no extra cost. Existing customers who have purchased a Vale PC since 1st July can upgrade to Windows 95 for £39^{+VAT}



POPULAR MODELS

486DX2-66 4Mb RAM	528Mb £799 ^{+VAT}	Media '95 £969 ^{+VAT}	Lotus Office £1019 ^{+VAT}
486DX4-100 4Mb RAM	£849 ^{+VAT}	£1019 ^{+VAT}	£1069 ^{+VAT}
PENTIUM 75 8Mb RAM	£1049 ^{+VAT}	£1219 ^{+VAT}	£1269 ^{+VAT}
PENTIUM 90 8Mb RAM	£1139 ^{+VAT}	£1309 ^{+VAT}	£1359 ^{+VAT}

Prices highlighted in yellow indicate "Ready to Ship" models which we try to keep in stock for immediate despatch. Multimedia models feature double speed CD-ROM drives (see below).

- ◆ Integrated motherboard with Flash BIOS
- ◆ ZIF socket for processor upgrades, including Pentium OverDrive®
- ◆ On-board fast PCI hard disk controller
- ◆ 528Mb IDE hard disk (1Gb available at extra cost - see "options" section below)
- ◆ 4Mb RAM (486 models) or 8Mb RAM (Pentium models) - expandable to 128Mb
- ◆ 256kb external processor cache
- ◆ 2xPCI, 1xPCI/16-bit & 4x16-bit expansion slots
- ◆ 1 EPP parallel port and 2 serial ports with 16550 UART
- ◆ 1Mb Diamond Stealth SE PCI video card
- ◆ Fully non-interlaced 14" MPR II monitor (0.28mm dot pitch)
- ◆ 3.5" 1.44Mb Floppy Disk Drive
- ◆ TÜV approved Power Supply with low noise fan
- ◆ EPA Energy Star compliant
- ◆ Low profile desktop case - 486 models
- ◆ Standard desktop or mini-tower case - Pentium models (see Premier range)
- ◆ Mitsumi Mouse and 102-key Mitsumi keyboard
- ◆ Includes MS-DOS 6.22, Windows for Workgroups 3.11, and Iris Anti-virus software (3 month license). Full manuals and disks supplied
- ◆ "Introduction to Windows" manual supplied
- ◆ 30 day moneyback guarantee
- ◆ 1 year On-Site Maintenance for parts and labour
- ◆ Lifetime technical support hotline
- ◆ Lifetime labour warranty



**NO DEPOSIT
PERSONAL FINANCE**

Example: Popular 486DX2-66
Media '95 PC (Cash price £1138.58 inc VAT).

£40.69^{inc VAT}
per month. No deposit.
36 monthly payments.
APR 18.5%. Total payable
£1464.84 inc VAT.

A Vale Popular Media '95 PC

**FULL SCREEN
DISPLAY IN
ALL MODES**

Pentium and OverDrive are registered trademarks of Intel Corporation



Media '95

- ◆ MS Encarta
- ◆ MS Works
- ◆ MS Golf
- ◆ MS Scenes
- ◆ MS Money
- ◆ MS Dangerous Creatures
- ◆ PhotoCD software



With double speed CD-ROM drive

With quad speed CD-ROM drive

£170^{+VAT}

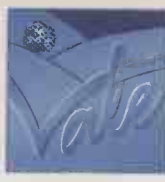
£220^{+VAT}

TWO GREAT MULTIMEDIA OFFERS AVAILABLE WITH ANY VALE PC:

Like the Vale PCs they are fitted to, our multimedia kits are quality conscious!! We definitely do NOT offer any old CD-ROM drive along with a so called "compatible" sound card, a pair of nasty cheap speakers and some end of line software.

- ◆ Choice of Panasonic double speed or Toshiba quad speed CD-ROM drive;
- ◆ Genuine Creative Labs SoundBlaster 16 sound card (for great sound and total compatibility);
- ◆ Zyi2 amplified stereo speaker system for crystal clear audio;
- ◆ Choice of Microsoft Media '95 software or Lotus Multimedia Office.





Premier PCI

"Recommended" January 1995

In a group test with PCs from Compaq, Elonex & Hewlett Packard.

"Without hesitation we recommend the Vale Premier from this group."
Vale Premier Media '95 PC



The "Recommended" option for serious performance.

If you are looking for a top specification 486 the Vale Premier PCI has class beating credentials.

The secret of success is quality. The Vale Premier range offers high performance, high specification computers that have received top ranking reviews and phenomenal sales success. We have been meticulous in our choice of components in an effort to offer the best value for money. The specification is identical to our equally well received Platinum range with the exception of motherboard and processor.

The Vale EcoScan 15 that is supplied with the Premier and Platinum ranges is a superb quality micro-processor controlled 15" monitor. It's dark non-glare FST screen with 'Edge-to-Edge' display gives as much as 30% greater useable picture area than most 14" models. Complete control over all display adjustments is obtained via an ingeniously simple digital push button system, with on-screen representation of the settings. As it complies with the stringent Swedish MPR II safety standards and can display up to 1024x768 at a flicker-free 72Hz refresh rate it is especially kind to your eyes.



Our careful selection process even includes the keyboard and a Logitech mouse! The keyboard with the Premier & Platinum ranges is a full 102-key unit with proper tactile switches and a sturdy metal base. It has consistently impressed reviewers: "...almost traditional in its weight and touch. A deeply desirable device." Computer Buyer, June 1994.

"Recommended" March 1995

"When you take into consideration the price and the one year on-site warranty, the Vale offers excellent value for money."
Vale Premier

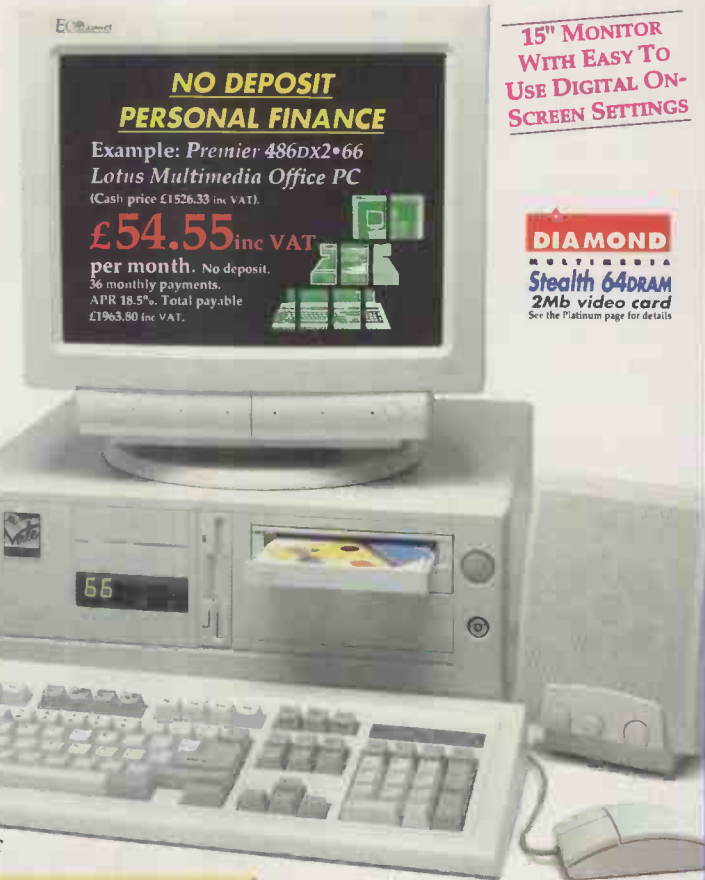


- ◆ Integrated motherboard with Flash BIOS
- ◆ Type 3 ZIF socket for processor upgrades, including Pentium OverDrive®
- ◆ On-board fast PCI hard disk controller
- ◆ 528Mb IDE hard disk (see the "options" section below for larger sizes)
- ◆ 8Mb RAM (expandable to 128Mb)
- ◆ 256kb external processor cache
- ◆ 2xPCI, 1xPCI/16-bit & 4x16-bit expansion slots
- ◆ 1 EPP parallel port and 2 serial ports with 16550 UART
- ◆ 2Mb Diamond Stealth 64DRAM 64-bit PCI video card
- ◆ Microprocessor controlled 15" non-interlaced 0.28mm dot pitch monitor
- ◆ 3.5" 1.44Mb Floppy Disk Drive
- ◆ TÜV approved Power Supply with low noise fan
- ◆ EPA Energy Star compliant
- ◆ Choice of desktop or mini-tower case
- ◆ Full-tower case available at extra cost
- ◆ 102-key tactile keyboard
- ◆ Logitech Mouse
- ◆ Includes MS-DOS 6.22, Windows for Workgroups 3.11, and Iris Anti-virus software (3 month license). Full manuals and disks supplied
- ◆ "Introduction to Windows" manual supplied
- ◆ 30 day moneyback guarantee
- ◆ 1 year On-Site Maintenance for parts and labour
- ◆ Lifetime technical support hotline
- ◆ Lifetime labour warranty

NO DEPOSIT PERSONAL FINANCE

Example: Premier 486DX2*66 Lotus Multimedia Office PC
(Cash price £1526.33 inc VAT)

£54.55 inc VAT per month. No deposit.
36 monthly payments.
APR 18.5%. Total payable £1963.80 inc VAT.



15" MONITOR WITH EASY TO USE DIGITAL ON-SCREEN SETTINGS

DIAMOND MULTIMEDIA Stealth 64DRAM 2Mb video card
See the Platinum page for details

A Vale Premier Media '95 PC

PREMIER OPTIONS

- 16Mb RAM instead of standard 8Mb£240.00 +VAT
- 32Mb RAM instead of standard 8Mb£576.00 +VAT
- 1Gb IDE hard disk instead of 528Mb IDE.....£60.00 +VAT
- 1Gb SCSI hard disk instead of 528Mb IDE.....£329.00 +VAT
- 2Gb SCSI hard disk instead of 528Mb IDE.....£680.00 +VAT
- Diamond Stealth 64VideoVRAM card (2Mb).....£100.00 +VAT
- Diamond Stealth 64VideoVRAM upgrade to 4Mb.....£130.00 +VAT
- Diamond Motion Video Player accessory for Stealth 64VideoVRAM (gives MPEG decoding and includes upgrade to 4Mb).....£249.00 +VAT
- Internal high density 5.25" 1.2Mb Drive£49.00 +VAT
- Full-Tower case£50.00 +VAT
- Second year on-site maintenance£69.00 +VAT
- Second and third year on-site maintenance£149.00 +VAT

MONITOR UPGRADES

- 15" Idek Iiyama SVGA colour (up to 65kHz scan, 1280x1024 max)£50.00 +VAT
- 17" CTX SVGA colour, see Platinum page£229.00 +VAT
- 17" Panasonic TX-D1732 SVGA colour.....£299.00 +VAT
- 17" Idek Iiyama Vision Master SVGA colour (see Platinum Triton page) PC Magazine "Editors' Choice" April 1995.....£349.00 +VAT
- 20" Tatung SVGA£699.00 +VAT
- 21" Idek Iiyama SVGA colour (up to 92kHz scan, 1600x1200 max)£1149.00 +VAT

PLEASE SEE PAGE 6 FOR VALE ACCESSORIES

PREMIER MODELS

	528Mb	NEO 195	Lotus Office
486dx2*66	£1029+VAT	£1249+VAT	£1299+VAT
486dx4*100	£1079+VAT	£1299+VAT	£1349+VAT

Prices highlighted in yellow indicate "Ready to Ship" models which we try to keep in stock for immediate despatch. Multimedia models feature quad speed CD-ROM drives (see below).

BUSINESS FINANCE

Example: Lease the Premier 486DX2*66 Lotus Multimedia Office PC for
£45.98+VAT per month.
3 year term, payable quarterly.



We offer a full range of multimedia packs and products, any of which can be specified with your Vale PC, see page 9 of our advert for full details. Please note that bundled software does not feature full retail packaging. When ordering double speed CD-ROM installations in Vale computers the Panasonic CR-571 enhanced IDE drive may be used.



- ◆ Lotus 1-2-3, Lotus AmiPro, Lotus Approach, Lotus Screencam, Lotus Smartpics
- ◆ Software Toolworks Grolier Encyclopaedia for 1995 - version 7
- ◆ FIFA International Football, Superooice, Dragon Lore, MegaRace, Theme Park
- ◆ Professor Windows, Professor Training Suite, Professor Multimedia, Typing Tutor
- ◆ Pilot Multimedia including 'Interlude' and 'Get Organized'

Lotus Office



With double speed CD-ROM drive
£220+VAT

With quad speed CD-ROM drive
£270+VAT

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Platinum PCI



January 1995
Vale Platinum
Media '95 PC

Vale Platinum... the Editors' Choice – twice!

Four 1995 magazine accolades already – stunning success for a stunning performer.

A true giant killing act, the Vale Platinum has already received four magazine accolades this year including the highly prestigious PC Magazine "Editors' Choice" on two occasions!! This is no mean feat; both times computers from 30 different manufacturers, including the giants of the industry, were compared and examined in minute detail. The only computer to earn the title "Editors' Choice" was the Vale Platinum. At our attractive prices there is no need to compromise.

- ◆ Pentium® processor, upgradeable via Intel socket 5
- ◆ Integrated motherboard with 2x PCI, 1xPCI/16-bit & 4x16-bit expansion slots
- ◆ 256kb external CPU write-back cache ◆ 8Mb RAM (expandable to 128Mb)
- ◆ Fast PCI IDE hard disk controller
- ◆ Flash BIOS ◆ EPP and ECP capable printer port
- ◆ Two 16550 compatible UART driven high speed serial ports
- ◆ Diamond Stealth 64DRAM 2Mb 64-bit video card
- ◆ Microprocessor controlled 15" non-interlaced monitor (as Premier range)
- ◆ Full Microsoft Windows 95 'plug and play' support
- ◆ 3.5" 1.44Mb Floppy Disk Drive ◆ TÜV approved Power Supply with low noise fan
- ◆ CPU cooling fan ◆ EPA Energy Star compliant
- ◆ 102-key tactile keyboard (as Premier range) ◆ Microsoft mouse
- ◆ Includes MS-DOS 6.22, Windows for Workgroups 3.11, and Iris Anti-virus software (3 month license). Full disks and manuals supplied
- ◆ "Introduction to Windows" manual supplied
- ◆ Choice of desktop or mini-tower case ◆ Full-tower case available at extra cost
- ◆ 30 day moneyback guarantee
- ◆ 1 year On-Site Maintenance (next working day response) for parts and labour
- ◆ Lifetime technical support hotline ◆ Lifetime labour warranty



"The Platinum took the top spot in our performance tests. The Diamond Stealth video system had a chance to show its true colours...Not only is the Platinum a top class machine, it's also good value for money."
February 1995 Vale Platinum P90



"The Evesham Vale Platinum delivers excellent performance, a good feature set and an affordable price—a combination which is the hallmark of a PC Magazine Editors' Choice. In a market where compromise is all too common, the Evesham Vale Platinum is a winner."
January 1995 Vale Platinum P90



"The combination of an excellent multimedia platform and high all-round DOS and Windows performance, at a good price, makes the Vale Pentium an excellent multimedia PC, and a worthy Editors' Choice" May 1995 Vale Platinum P90



A Vale Platinum plus P90 PC with optional CD-ROM drive

PLATINUM OPTIONS

16Mb RAM instead of standard 8Mb .....£240.00 +VAT	Second and third year on-site maintenance.....£149.00 +VAT
32Mb RAM instead of standard 8Mb .....£576.00 +VAT	MONITOR UPGRADES
1Gb SCSI hard disk instead of 1Gb IDE.....£269.00 +VAT	15" Idek iiyama SVGA colour (up to 65kHz scan, 1280x1024 max).....£50.00 +VAT
2Gb SCSI hard disk instead of 2Gb IDE.....£430.00 +VAT	17" CTX SVGA colour, see Platinum page.....£229.00 +VAT
Diamond Stealth 64VideoVRAM card (2Mb).....£100.00 +VAT	17" Panasonic TX-D1732 SVGA colour.....£299.00 +VAT
Stealth 64VideoVRAM upgrade to 4Mb.....£130.00 +VAT	17" Idek iiyama Vision Master SVGA colour (see Platinum Triton page) PC Magazine "Editors' Choice" April 1995.....£349.00 +VAT
Diamond Motion Video Player accessory for Stealth 64VideoVRAM (gives MPEG decoding and includes upgrade to 4Mb).....£249.00 +VAT	20" Tatung SVGA.....£699.00 +VAT
Internal high density 5.25" 1.2Mb Drive.....£49.00 +VAT	21" Idek iiyama SVGA colour (up to 92kHz scan, 1600x1200 max).....£1149.00 +VAT
Full-Tower case.....£50.00 +VAT	
Second year on-site maintenance.....£69.00 +VAT	

PLATINUM MODELS

PENTIUM 75	Standard	Medi 95	Lotus Office
528Mb	£1169 ^{+VAT}	£1389 ^{+VAT}	£1439 ^{+VAT}
1Gb	£1229 ^{+VAT}	£1449 ^{+VAT}	£1499 ^{+VAT}
2Gb	£1419 ^{+VAT}	£1639 ^{+VAT}	£1689 ^{+VAT}
PENTIUM 90	Standard	Medi 95	Lotus Office
528Mb	£1259 ^{+VAT}	£1479 ^{+VAT}	£1529 ^{+VAT}
1Gb	£1319 ^{+VAT}	£1539 ^{+VAT}	£1589 ^{+VAT}
2Gb	£1509 ^{+VAT}	£1729 ^{+VAT}	£1779 ^{+VAT}

PENTIUM 120 Add £240^{+VAT} to the price of P90 models
PENTIUM 133 Add £330^{+VAT} to the price of P90 models
 Prices highlighted in yellow indicate "Ready to Ship" models which we try to keep in stock for immediate despatch. Multimedia models feature quad speed CD-ROM drives (see pages 3&4).



NO DEPOSIT PERSONAL FINANCE

Example: Buy the Platinum P90 Lotus Multimedia Office PC (1Gb)
(Cash price £1867.08 inc VAT).

£66.72 inc VAT per month.

No deposit. 36 monthly payments. APR 18.5%. Total payable £2401.92 inc VAT.

BUSINESS FINANCE

Example: Lease the Platinum P90 Lotus Multimedia Office PC (1Gb) for

£56.25^{+VAT} per month.

3 year term, payable quarterly.



Why Diamond Video Cards ?

The highly acclaimed Stealth range has won many press accolades including the coveted PC Magazine "Editors' Choice". Now a new range of stealth cards is available, giving a wide choice of graphics performance. They are all based around S3 chipsets for superb Windows acceleration as well as class leading DOS performance, and come with the renowned InControl Tools utility for setting up the Windows environment. Remember that Diamond are continually striving to optimise the performance and compatibility of their video cards; and you therefore have the assurance that driver support is ongoing.

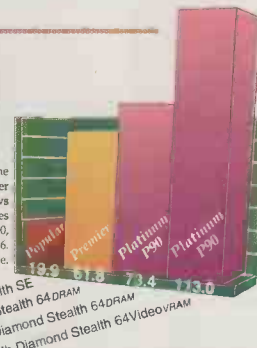
STEALTH SE (Vale Popular). The latest addition to the range continues the tradition of delivering the best price/performance available. It displays 24-bit True Colour at 640x480 with 1Mb DRAM or at 800x600 with 2Mb DRAM.

STEALTH 64DRAM (Vale Premier and Platinum). The Stealth 64DRAM is the world's fastest DRAM accelerator, its S3 Vision864 controller setting a new standard in affordable 64-bit graphics performance. Supplied with full AutoCAD drivers.

STEALTH 64VideoVRAM (Option). The new Stealth 64VideoVRAM is the ultimate graphics and video accelerator. It is supplied with full AutoCAD drivers and its 2Mb high speed VRAM can be expanded to 4Mb, giving 24-bit colour at 1280x1024! It has driver support for all popular video formats, including MPEG – you can scale video playback up to full screen, or view video clips in full-motion (up to 30 fps). The optional Motion Video Player accessory provides hardware MPEG decoding, allowing full-screen full-motion video, as well as accepting video input from camcorder, VCR, laserdisc etc.



Source: PC Labs Winmark 3.1. The figures represent megapixels per second over a variety of Windows related tasks. Last two figures produced on a Vale Pentium P90, all others on a Vale 486sx2-66. Figures vary with processor type.



May 1995



Day Month 1995

Pentium is a registered trademark of Intel Corp.



Platinum Triton PC

The Platinum Triton – The Hyper-formance Pentium

Intel's new Triton chipset unleashes the full potential of the Pentium processor family. Their engineers have been able to introduce several new technical advances that other manufacturers are currently unable to offer. In order to capitalise on these benefits and offer the ultimate quality we are using Intel's own Advanced Endeavour motherboard. The latest high speed EDO-RAM combined with the option of Pipeline-Burst Cache are just two of the features that go to provide the ultimate in Pentium performance. As with every Vale computer we have paid great attention to detail in component selection, convincing us that Pound for Pound we doubt it is possible to build a better PC.

The Platinum Triton offers the following enhancements over the award winning standard model:

- ◆ Genuine Intel Advanced Endeavour motherboard (256k Asynchronous cache) manufactured in Europe
- ◆ 8Mb Extended-Data-Out (EDO) RAM
- ◆ Pipeline-Burst cache (option)
- ◆ Integrated sound using the Creative Labs Vibra 16 chipset
- ◆ Support for Native Signal Processing
- ◆ Enhanced IDE mode 4 hard disk controller and drive
- ◆ Latest Windows keyboard

BUSINESS FINANCE

Example: Lease the *Platinum Triton P120 Lotus Multimedia Office PC (2Gb)* for

£76.78^{+VAT} per month.

3 year term, payable quarterly.



Windows 95

Vale computers ordered for despatch on or after 24th August can have Windows '95 installed at no extra cost. Existing customers who have purchased a Vale PC since 1st July can upgrade to Windows '95 for £39^{+VAT}.



PLATINUM TRITON MODELS			
PENTIUM 90	Standard	NEO 195	Lotus ^{Lotus Office}
	1Gb	£1469 ^{+VAT}	£1689 ^{+VAT}
	2Gb	£1659 ^{+VAT}	£1879 ^{+VAT}
PENTIUM 120	Standard	NEO 195	Lotus ^{Lotus Office}
	1Gb	£1709 ^{+VAT}	£1929 ^{+VAT}
	2Gb	£1899 ^{+VAT}	£2119 ^{+VAT}
PENTIUM 133 Add £90 ^{+VAT} to the price of P120 models <small>Prices highlighted in yellow indicate "Ready to Ship" models which we try to keep in stock for immediate despatch. Multimedia models feature quad speed CD-ROM drives (see pages 3&4).</small>			

PLATINUM TRITON OPTIONS

- 16Mb EDO RAM instead of standard 8Mb£264.00 +VAT
- 32Mb EDO RAM instead of standard 8Mb£624.00 +VAT
- 1Gb SCSI hard disk instead of 1Gb IDE£269.00 +VAT
- 2Gb SCSI hard disk instead of 2Gb IDE£430.00 +VAT
- Upgrade to 256k Pipeline-Burst cache£50.00 +VAT
- Upgrade to 512k Pipeline-Burst cache£100.00 +VAT
- Diamond Stealth 64VideoVRAM card (2Mb)£100.00 +VAT
- Stealth 64VideoVRAM upgrade to 4Mb£130.00 +VAT
- Diamond Motion Video Player accessory for Stealth 64VideoVRAM (gives MPEG decoding and includes upgrade to 4Mb)£249.00 +VAT
- Internal high density 5.25" 1.2Mb Drive£49.00 +VAT
- Full-Tower case£50.00 +VAT
- Second year on-site maintenance£69.00 +VAT
- Second and third year on-site maintenance£149.00 +VAT

MONITOR UPGRADES

- 15" Idek iiyama SVGA colour (up to 65kHz scan, 1280x1024 max)£50.00 +VAT
- 17" CTX SVGA colour, see *Platinum* page£229.00 +VAT
- 17" Panasonic TX-D1732 SVGA colour£299.00 +VAT
- 17" Idek iiyama Vision Master SVGA colour (see *Platinum Triton* page) PC Magazine "Editors' Choice" April 1995£349.00 +VAT
- 20" Tatung SVGA£699.00 +VAT
- 21" Idek iiyama SVGA colour (up to 92kHz scan, 1600x1200 max)£1149.00 +VAT

NO DEPOSIT PERSONAL FINANCE

Example: Buy the *Platinum Triton P120 Lotus Multimedia Office (2Gb)* PC (Cash price £2548.58 inc VAT).

£91.08^{inc VAT} per month.

No deposit. 36 monthly payments. APR 18.5%. Total payable £3278.88 inc VAT.



April 1995 Idek iiyama Vision Master 17 monitor



Intel Triton chipset
16-bit sound
8Mb EDO RAM
1Gb mode 4 IDE hard disk
Pipeline-Burst cache option
£1469^{+VAT}

Our new Windows keyboard has three extra keys that are programmable for use with Windows 3.xx but really come in to their own in Windows 95 as Application keys.

A Vale Platinum Triton P90 PC with optional Idek iiyama 17" monitor and CD-ROM drive.



Vale PC Accessories

INTERNET ACCESS

This package is the affordable way to enhance your PC with communications ability. Send and receive faxes, and access online information services and the Internet. Apart from your PC and a phone socket, everything you need is included:

- Pace FAX/modem: either MobiFax 144 (V32bis: 14400bps) or microlin fx34 (V34bis: 28800bps modem, 14400bps FAX)
- Software to access Internet facilities
- 21 days free subscription to an internet service provider
- "The Net" guide book
- FAX software

V32bis package£119^{+VAT}

V34bis package£195^{+VAT}



TAPE STREAMER BACKUP UNITS

Regular backups are essential to ensure the safety of your data; why not take the advantage of having a tape streamer fitted into your *Vale*? It is more economical than using multiple floppy disks, as well as being faster and far more convenient. Quoted capacities are with compression software (supplied). All units are supplied with full backup software.



OMEGA 250Mb
£89.00^{+VAT}

OMEGA 700Mb
£139.00^{+VAT}

TEAC 1Gb
£399.00^{+VAT}

DC2120 Tapes for above£15.00 +VAT

Tapes for above£22.50 +VAT

QIC-143 Tapes for above£25.00 +VAT

LOTUS SMARTSUITE 3

A complete software suite providing the latest versions of leading Windows applications.

- Ami Pro 3.1
- 1.2.3. 5.0
- Organiser 1.1
- Approach 3.0
- Freelance 2.1



£199.00^{+VAT} Via voucher redemption

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CALL US NOW ON (01386) 765500 • Evesham Micros



Voyager



January 1995

"it's toughness, excellent performance and good display make it a machine that we must honour with the PC today best buy award."
Vale Voyager 486dx2+66 Dual Scan Colour

The Vale Voyager, with its flexibility, Windows performance and sound capabilities, is one of the most powerful and stylish notebooks on the market.

Its completely modular construction enables it to be tailored to the user's exact needs, now and in the future.

'Dual Scan' Colour display Offers near TFT quality at sensible cost.



A Vale Voyager with the supplied carrying pouch

DISPLAY

A choice of display types is offered - LCD mono, Dual Scan colour and TFT colour. All are 9.5" VGA with 64 greyscale (mono model) or 256 colours (colour models). The display driver is 1Mb 32-bit VESA local bus video.

CPU & RAM

Low power consumption CPUs are used to maximize battery life. The motherboard is CPU upgradeable, supporting any 486 up to the DX4-100. 4Mb RAM is fitted as standard, and can be upgraded to 20Mb.

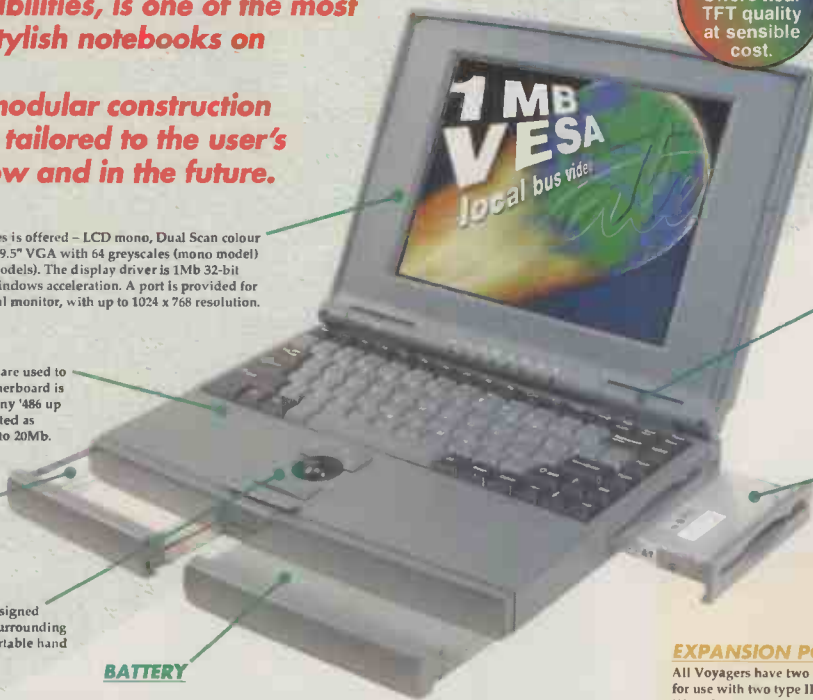
HARD DISK

The hard disk is removable, offering the ultimate in upgradeability and data security.

TRACKBALL

A 19mm ergonomically designed trackball is built-in. The surrounding surface makes for a comfortable hand rest whilst typing.

BATTERY



BUILT-IN AUDIO

The Voyager has a built-in microphone and speaker, with digitized audio recording/playback capability. A Yamaha music chipset (SoundBlaster and Windows Sound System compatible) allows for sound generation. There are sockets for external speakers and microphone. With this audio performance, the addition of a CD-ROM drive makes the Voyager truly 'Multimedia ready'.

3.5" FLOPPY DRIVE

VOYAGER

EXPANSION PORTS

All Voyagers have two PCMCIA ports for use with two type II cards or one type III card. Rear panel connectors include serial port; EPP parallel port; SVGA monitor; and PS/2 mouse, keyboard or keypad. A further port enables fast connection to a docking station.

QUALITY & STYLE

Voyager notebooks measure 286 x

226mm. The Voyager is just 34mm thick and weighs 2.4kg (mono model), while the Voyager II colour models are 49mm and 2.9kg. The quality of fit and finish is amongst the best we have ever seen.

WARRANTY

Voyagers feature 12 months 'return to base' warranty covering parts, with a lifetime warranty on labour.

Monochrome

	250MB	340MB	528MB
486DX2+66	£949 ^{+VAT}	£999 ^{+VAT}	£1039 ^{+VAT}
486DX4+75	£999 ^{+VAT}	£1049 ^{+VAT}	£1089 ^{+VAT}
486DX4+100	£1029 ^{+VAT}	£1079 ^{+VAT}	£1119 ^{+VAT}

Dual Scan Colour

	250MB	340MB	528MB
486DX2+66	£1269 ^{+VAT}	£1319 ^{+VAT}	£1359 ^{+VAT}
486DX4+75	£1319 ^{+VAT}	£1369 ^{+VAT}	£1409 ^{+VAT}
486DX4+100	£1349 ^{+VAT}	£1399 ^{+VAT}	£1439 ^{+VAT}

TFT Colour

	250MB	340MB	528MB
486DX2+66	£1739 ^{+VAT}	£1789 ^{+VAT}	£1829 ^{+VAT}
486DX4+75	£1789 ^{+VAT}	£1839 ^{+VAT}	£1879 ^{+VAT}
486DX4+100	£1819 ^{+VAT}	£1869 ^{+VAT}	£1909 ^{+VAT}

VOYAGER OPTIONS

Additional primary NiMH battery	£89 ^{+VAT}
Upgrade from 4Mb to 8Mb RAM	£169 ^{+VAT}
Upgrade from 4Mb to 12Mb RAM	£299 ^{+VAT}
Upgrade from 4Mb to 20Mb RAM	£699 ^{+VAT}
Docking station	£349 ^{+VAT}
Cigar lighter adaptor	£49 ^{+VAT}
Additional PSU	£49 ^{+VAT}

DOCKING STATION



With a docking station on your desk the Voyager becomes a true "desktop replacement". The docking station has two drive bays (1x3.5" & 1x5.25"), three ISA expansion slots (2x full length & 1x 1/2 length), as well as permanent ports for monitor, keyboard, PS/2 mouse, serial, parallel, speaker, microphone and audio line-in.

RAM UPGRADES

Make the most of the power of your notebook by specifying extra RAM - up to 20Mb for the Voyager or up to 40Mb for the Voyager II.



PCMCIA MODEMS

A FAX/modem is the gateway to a world of communications, whether sending and receiving faxes or connecting to the internet information superhighway.



Corporate and Network Sales



Established for over 12 years, Evesham Micros has gained consistent industry recognition for its quality of product and service and has a proven track record of supplying some of the country's leading organisations - a wide spectrum of businesses, government bodies and educational establishments. Each of our branches has dedicated account managers who can support your I.T. needs. Whether your needs are large or small, they are ready to discuss your requirements and advise on the ideal solution - we can offer PCs for Windows applications or CAD/CAM, right through to complete network solutions. We are able to react quickly to the market, therefore we can offer your company the latest technology at competitive prices.



Network Solutions

Whatever your networking requirement, we can provide the complete solution. From a simple two user peer to peer system to a Wide Area Network, we can install and support the entire installation - from initial concept to user training. All our installations are supervised by a Novell Certified Network Engineer, thus assuring our clients of the very best in networking expertise. Why not contact our Corporate Sales staff at your nearest Evesham Micros branch to discuss your requirements.



5 Station Solution



£4999.00+VAT
Not including cabling and installation

- 1 Fileserver:
 - ◆ Vale Pentium P90 Fileserver (as left)
- 4 Workstations:
 - ◆ 4x Vale Popular 486DX2+66
 - ◆ 528Mb hard disk
 - ◆ Ethernet card suitable for 10Base2 or 10BaseT

We fully appreciate that no two network requirements are exactly the same. While the above is an example of one of our solutions, we will be delighted to quote for your individual needs.

Voyager II PCI

With Pentium processor performance, PCI bus colour graphics, built-in sound card, and the option of an internal CD-ROM drive, the Voyager II notebook takes multimedia applications in it's stride.



Removable battery.

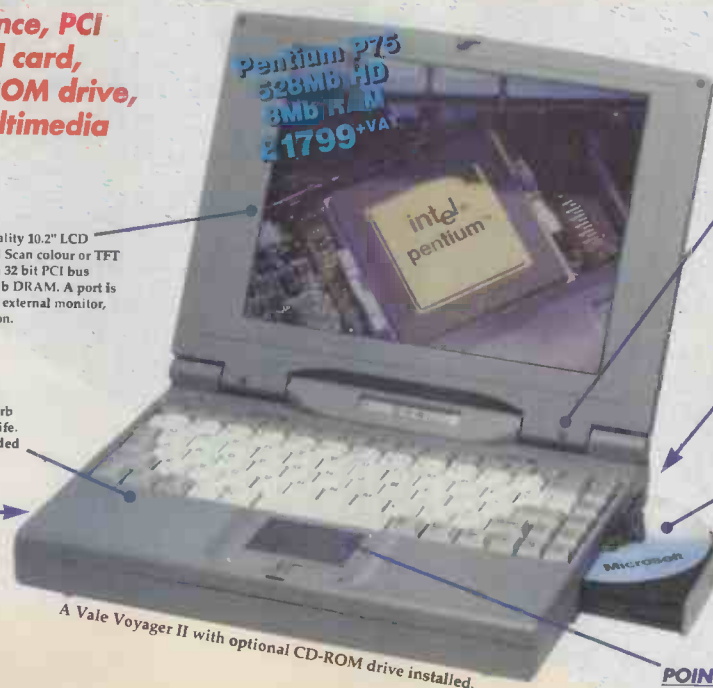


Upgradeable hard disk.

DISPLAY
The Voyager II has a high quality 10.2" LCD display, with a choice of Dual Scan colour or TFT colour. The display driver is a 32 bit PCI bus Windows accelerator with 1Mb DRAM. A port is provided for connection to an external monitor, with up to 1024 x 768 resolution.

CPU & RAM
Designed to use 3.3V Pentium processors, the Voyager II offers superb performance with maximum battery life. 8Mb RAM is fitted, and can be upgraded to a maximum of 40Mb.

HARD DISK
The enhanced IDE hard disk is driven by a PCI local bus controller, and can be removed for upgrading.



A Vale Voyager II with optional CD-ROM drive installed.



BUILT-IN AUDIO
The Voyager II really is multimedia ready. It has a 16 bit stereo sound card built in, together with stereo speakers. This can easily be expanded via the jacks for external speakers and microphones.

3.5" FLOPPY DRIVE
The built in floppy drive slides out to allow fitting of the optional CD-ROM drive.

CD-ROM DRIVE
The optional double speed CD-ROM drive replaces the floppy drive to make the Voyager II a self contained multimedia workstation. An external floppy drive is available for simultaneous use with the CD-ROM drive.

POINTPAD™
The built in Pointpad™, with palm rest, controls the cursor effortlessly and accurately.

FEATURES

KEYBOARD
Voyagers use full function 86-key keyboards. Unlike many notebooks, they have a good solid feel.

BATTERY
Voyagers use NiMH batteries for fast recharging and long life: up to 3-4 hours use with the Voyager 486DX2-66 mono model, and 2 hours with the Voyager II colour models. They can be easily

removed and replaced by a second unit. Extensive power management features include doze, sleep and 'suspend to disk' modes. The latter quickly saves your working environment to disk when the lid is closed, allowing you to re-load it later.

DOS & WINDOWS
Voyagers are supplied with MS-DOS 6.22 and Windows 3.11 installed and ready to run.

ACCESSORIES

- PCMCIA V32 bis FAX/Modem£222+VAT
- PCMCIA V34 bis FAX/Modem£299+VAT
- PCMCIA Ethernet card£179+VAT
- External keyboard£29+VAT
- Soundplus speakers/microphone/earphones system£19+VAT
- ZyFi2 amplified speakers£29+VAT
- Total care warranty£see panel

Dual Scan Colour

	528MB	1GB
Pentium P75	£1799+VAT	£2119+VAT
Pentium P90	£1889+VAT	£2209+VAT

TFT Colour

	528MB	1GB
Pentium P75	£2269+VAT	£2589+VAT
Pentium P90	£2359+VAT	£2679+VAT

VOYAGER II OPTIONS

- Internal double speed CD-ROM drive£179+VAT
- External 3.5" floppy drive (parallel port)£69+VAT
- Additional primary NiMH battery£59+VAT
- Upgrade from 8Mb to 16Mb RAM£299+VAT
- Upgrade from 8Mb to 24Mb RAM£499+VAT
- Cigar lighter adaptor£49+VAT
- Additional PSU£49+VAT

TOTAL CARE WARRANTY

Our optional "Total Care" package replaces the existing warranty with 2 year care. If your Voyager should need attention during this period we will collect it and return it to you when repaired. Typical turn-around is 3 working days. This cover is just 12.5% of the cost of the notebook (without accessories) - for example, £118.63+VAT for the 486DX2-66/250MB mono model.

CARRYING CASES

VALE CARRY CASE £30.00+VAT
A versatile, padded case with carrying handle and detachable shoulder strap. Ideal for protecting your Voyager "out in the field".



EXECUTIVE CASE £59.00+VAT

- Computer compartment (16.5" x 10.5" x 2.5")
- Cellular 'phone and power supply pockets
- Diskette and file pockets, pen and business card holders



Combining modern design with classic styling

TECHNOLOGY CASE £39.00+VAT

- Computer compartment (15.5" x 10.5" x 3.5")
- Printer/FAX compartment (12.75" x 9" x 2")
- Cellular 'phone and power supply pockets
- Diskette and file pockets, pen and business card holders



The Vale Fileserver

This is just an example of the type of fileserver we can supply. We will be happy to quote for your individual requirements.

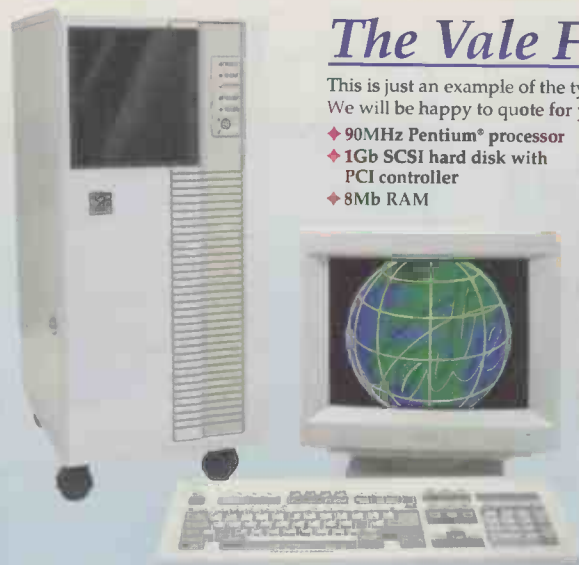
- ◆ 90MHz Pentium® processor
- ◆ 1Gb SCSI hard disk with PCI controller
- ◆ 8Mb RAM
- ◆ 256kb cache
- ◆ 1Mb PCI video
- ◆ 14" SVGA monitor
- ◆ 32-bit PCI ethernet card

With the full-tower case (see first page).

£1649+VAT

With the purpose designed case (illustrated) featuring redundant PSU system.

£1949+VAT



A Vale Fileserver with the purpose designed case.

Fileserver Upgrades

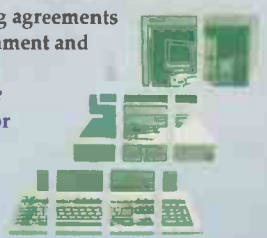
- Upgrade to P120 Processor£240.00 +VAT
 - Upgrade to P133 Processor£330.00 +VAT
 - 2Gb SCSI hard disk instead of 1Gb£350.00 +VAT
 - 4Gb SCSI hard disk instead of 1Gb£749.00 +VAT
 - 16Mb RAM instead of standard 8Mb£240.00 +VAT
 - 32Mb RAM instead of standard 8Mb£576.00 +VAT
 - Upgrade to Adaptec PCI 2940 SCSI controller£169.00 +VAT
- OTHER UPGRADES ARE AVAILABLE FOR, HARD DISK, RAM, DAT INSTALLATION, CD-ROM ETC. PLEASE CALL FOR DETAILS

BUSINESS FINANCE

We offer very flexible leasing agreements to limited companies, government and educational establishments. For example: Lease the Vale Fileserver (standard case) for

£58.37+VAT per month.

3 year term, payable quarterly. Full written details are available on request.



Evesham Micros (01386) 765500 Evesham Micros (01386) 765500 Evesham Micros (01386) 765500 Evesham Micros

TWO GREAT MULTIMEDIA BUNDLES

OFFERED WITH A VARIETY OF PACKS

Microsoft

MEDIA '95

Microsoft Encarta '95 The complete multimedia encyclopaedia, harnessing the power of your computer to take you on a journey of discovery and learning.

Microsoft Works The integrated productivity suite: Word Processor, Spreadsheet, Database, Graphics, Communications.

Microsoft Golf Experience the true-to-life challenges of the game of golf.

Microsoft Scenes Superb screen saver.

Microsoft Money All you need to take control of your finances.

Microsoft Dangerous Creatures See extraordinary creatures come to life in more than 100 exciting narrated videos.

PhotoCD software.



Lotus MULTIMEDIA Office

Superb Lotus Suite:

- Lotus 1-2-3
- Lotus AmiPro
- Lotus Approach
- Lotus Screencam
- Lotus Smartpics



Top Games Titles:

- Supervoice, Dragon Lore, MegaRace, Theme Park, FIFA International Soccer



Grolier Encyclopaedia:

- Software Toolworks Grolier Encyclopaedia for 1995 - version 7



Plus:

- Professor Windows, Professor Training Suite, Professor Multimedia, Typing Tutor
- Pilot Multimedia including 'Interlude' and 'Get Organized'

See the CD-ROM drives (below and right) for details of the complete packs. When ordering please quote pack number. We recommend a minimum 486sx33 system for these packs. Please note that bundled versions of software and sound cards are not full retail packs, and the software features on-line documentation.

PANASONIC CD-ROM DRIVE

CR-562 Double Speed, multi-session drive

limited offer at only **£62.99+VAT**

Includes cables and driver software

- Double speed 300kb/sec data transfer rate
- Multi-session mechanism - compatible with Kodak Photo CD Standard
- Motorised loading tray - no need for a caddy
- High speed 320ms access
- White book (CDi) compatible for video CDs
- MPC compatible
- Mounts in 5.25" drive bay
- Output from audio CDs via headphone socket
- Requires SoundBlaster or compatible card with Panasonic CD Interface

February 1994
April 1994



- 1E** £70.00 +VAT
CR-562 with AT-bus driver card
- 1F** £99.99 +VAT
CR-562 bundled with Soundplus 16 card

- 1c** £139.99 +VAT
CR-562 with genuine SoundBlaster 16 ASP card

SPECIAL OFFER! "Software Toolworks Grolier Encyclopaedia for 1994 - Version 6" with any of our multimedia packs for only... **£15+VAT**

PANASONIC CR-562 MULTIMEDIA PACKS

Complete multimedia packs featuring the Panasonic CR-562 with a genuine SoundBlaster 16 sound card, ZyFi 2 active speakers, and either of our two software bundles. The speakers can be upgraded to ZyFi 2 PROs for a surcharge of £20+VAT.

Microsoft

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CR-562 with Media '95 pack, ZyFi2 speakers and Soundplus 16 card
- 7B** £190.00 +VAT
CR-562 with Media '95 pack, ZyFi2 speakers & genuine SoundBlaster 16 ASP

Lotus MULTIMEDIA Office

- 9C** £200.00 +VAT
CR-562 with Lotus Multimedia Office, ZyFi2 speakers and Soundplus 16 card
- 9B** £240.00 +VAT
CR-562 with Lotus Multimedia, ZyFi2 speakers & genuine SoundBlaster 16 ASP

CREATIVE CREATIVE LABS, INC.

- SoundBlaster 16 Value pack..... **£67.00+VAT**
with Panasonic only CD-ROM interface
- SoundBlaster 16 MCD card..... **£99.00+VAT**
with Panasonic/Sony/Mitsumi CD-ROM interfaces
- SoundBlaster AWE32 Value card..... **£135.00+VAT**
Integrated design combining SB16 with WaveBlaster, bringing the power of Advanced WaveEffects Synthesis. Has IDE CD-ROM interface and 512kb RAM (not upgradeable) for sampling.
- SoundBlaster AWE32 card - as above but with Advanced Signal Processing chip, and 512kb RAM (upgradeable to 28Mb with SIMMs)..... **£179.00+VAT**
- MIDI Kit..... **£59.00+VAT**
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CD-ROM SOFTWARE

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Alone in the Dark 2.....	£32.00+VAT	Microsoft Bookshelf.....	£69.00+VAT
Beneath a Steel Sky.....	£32.00+VAT	Mozart Multimedia.....	£35.00+VAT
Cinemania '94.....	£36.00+VAT	Musical Instruments.....	£35.00+VAT
Corel Photo CD Access.....	£15.00+VAT	Quantum Gate.....	£29.50+VAT
Critical Path.....	£29.50+VAT	Rebel Assault.....	£31.50+VAT
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MS Dinosaurs.....	£36.00+VAT	Sam & Max.....	£31.50+VAT
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Golf.....	£29.50+VAT	Slm City.....	£31.50+VAT
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JFK Assassination.....	£29.50+VAT	MS Stravinsky.....	£35.00+VAT
Navis Beacon MPC version.....	£32.00+VAT	T.F.X.....	£29.50+VAT
Mega Rock, Rap & Roll.....	£49.00+VAT	The Animals.....	£35.00+VAT

Special Offer! - The following titles are available with any purchase of a CD-ROM drive, Sound card or our special bundles (see right). Please note that they are not full retail packs.

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World Atlas.....	£15.00+VAT	Grolier PreHistoria.....	£15.00+VAT
Chessmaster 3000.....	£15.00+VAT	Secrets of Luftwaffe.....	£15.00+VAT
CorelDraw 3.....	£15.00+VAT	Sherlock Holmes.....	£15.00+VAT
Software Toolworks Grolier Encyclopaedia for 1994, Version 6.....	£15.00+VAT		

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TOSHIBA XM-5302B ENHANCED IDE DRIVE



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PC Magazine May 1995



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Lotus Office MULTIMEDIA

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- 6B** £335.00 +VAT XM-5302B with Lotus Multimedia Office, ZyFi 2s and SB AWE32 value
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3H £74.99 +VAT Soundplus 16 sound card with QS-123 joystick, ZyFi 2 active speakers and Monkey Island 2

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March 1995

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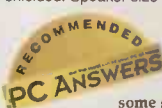


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March 1995

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FlightMAX £25.00+VAT

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THE FLIGHTSTICK IS CONSISTENTLY REVIEWED AS THE BEST QUALITY JOYSTICK IN ITS CLASS

Test fly a Flightstick with your favourite simulator and you will know the meaning of control. Whether you're a novice or experienced combat pilot, flying skills will be improved and enemy kill rate will increase. Excellent construction - looks and feels like the real thing! Includes throttle control and 7ft long connection cable. Requires game port.



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THE ULTIMATE COMBAT STICK FOR COMPUTER PILOTS!

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UPGRADES & ACCESSORIES

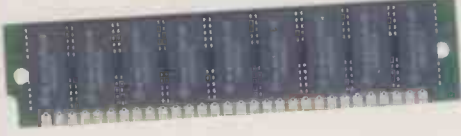
PROCESSORS



- 486dx2-66£59.00^{+VAT}
Heatsink and fan recommended
- 486dx4-100£109.00^{+VAT}
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Motherboard support for 3.3V
required.
- Pentium P75£169.00^{+VAT}
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- Pentium P90£259.00^{+VAT}
Heatsink and fan recommended.
- Pentium P120£489.00^{+VAT}
Heatsink and fan recommended.
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- PC Magazine "Editor's Choice" April 1995

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- Diamond Stealth 64DRAM PCI Bus (2Mb)£125.00^{+VAT}
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- Diamond Stealth 64VideoVRAM PCI Bus (2Mb)£219.00^{+VAT}
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Optimal installation kit
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Pocket LAN adaptor

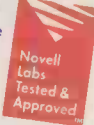
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Fully Novell authorised and tested.

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PC Today, December 1993
Omega Tape250 Parallel Port Unit



250Mb Version

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- Eight selectable scanning resolutions between 100 and 800dpi
- Variable brightness control ● Built-in scan speed indicator
- Includes "iPhoto Plus" top professional Windows based image scanning and photograph re-touching software, and "Perceive Personal" OCR software



WHAT PC? BEST BUY

with internal interface card **£59.00+VAT**

or with 'parallel port' interface (see bottom right) **£109.00+VAT**

Requires '386 CPU or above with Colour Monitor, at least 4Mb RAM, Windows 3.1 or higher, Hard Drive and Mouse.

Personal Computer World

"...I have found the quality of photographic and line-art scans to be good, and with Picture Publisher thrown in, this is extremely good value for money..."

Personal Computer World, September 1994



EVESHAM MICROS LTD
256 Greyscale Handy Scanner

EVESHAM MICROS LTD
256 Greyscale Handy Scanner

"Superb quality results time after time. The ease of use is commendable and the bundled software offers brilliant value for money... We therefore recommend the Mustek without hesitation."

What PC?, August 1993

TRY BEFORE YOU BUY



To help with your choice of scanner we have prepared a sample disk pack for each of the three units featured on this page.

Each sample pack contains several images (including the Car and Child) scanned in various modes to provide an exact representation of each unit's capabilities – before you buy.

A fact sheet is also included containing loading instructions, scanning info., and printed originals produced by the scanner of your choice for comparison.

Please state which scanner you are interested in (greyscale, colour or flatbed). Supplied on 3 1/2" disks.



Cost Per Pack **£5.00+VAT**

including delivery – refundable on purchase of a scanner.

FLATBED A4 COLOUR SCANNERS

- 600dpi unit, giving 1200dpi via interpolation, or;
- Very fast 800dpi single-pass unit, giving 1600dpi via interpolation
- Line art, 8-bit grey and 24-bit colour modes
- 12 built-in halftoning patterns
- 216mm x 356mm scan area
- SCSI expansion card interface supplied
- Both units include powerful OCR software and 'iPhoto Plus' Image Scanning and Photograph re-touching software

new fast single pass model



"Excellent value for money. The works for only £700."

PERSONAL COMPUTER

December 1993

Personal Computer World

April 1993

"The MFS6000C is a quality piece of hardware... Superb results."

"The Mustek MFS-1200CX provides a good set of features at the lowest price in the test group...if you need an inexpensive high-resolution scanner, then the Mustek MFS-1200CX should be on your shortlist."

PC MAGAZINE

October 1994

External SCANNER INTERFACE

Connect your scanner to your printer port!

This compact in-line interface box does away with the need to install an expansion card for your scanner, by simply plugging into the Parallel port. It is ideal for anyone who wants to transfer their scanner quickly between computers, as well as notebook owners and those who have simply run out of expansion ports. Compatible with the Mustek Black & White, Greyscale, & 24-bit Colour hand-held scanners.



only **£59.00+VAT**

600/1200dpi **£299.00+VAT**
single pass
800/1600dpi **£499.00+VAT**
Transparency adaptor.....£179+VAT
Sheet feeder.....£299+VAT

Requirements: '386 or higher, Windows 3.1 or higher, Mouse, Hard Drive and 256 colour SVGA graphics or higher. 600dpi unit needs at least 4Mb RAM, 800dpi unit needs at least 8Mb RAM.

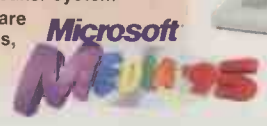
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- 1Mb PCI video card
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- ◆ PhotoCD software



RAM upgrades: £120+VAT per 4Mb

PRINTERS

LEXMARK WINWRITER 200

Using the Microsoft At Work standard to guarantee ease of use and Windows '95 compatibility, WinWriter 200 is the laser printer with a certain future.

PC Plus GOLD
"The WinWriter produces good quality prints with clean, clear banding on graphics."
March 1995 PC Plus (at an RRP of £459).

PC PRO
"Lexmark has paid attention to all the important basics, removed the frills and offers irresistible value-for-money."
January 1995 PC PRO (at an RRP of £479).

RAM upgrade to 1.5Mb .£80+VAT
4500 page toner unit (only 2.4p per page)...£109+VAT
On-site warranty until the year 2000 for only ..£99+VAT



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- 4ppm print speed
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4Mb RAM upgrade for LaserJet 4	£169.00+VAT

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Personal Computer Products

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- Star XB24-200 £346.00+VAT
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- EPSON**
- Epson LX300 £100.00+VAT
 - Epson LQ570+ £215.00+VAT
 - Epson Stylus Colour £369.00+VAT
- Cut Sheet feeders are available for most printers. Please call for price / availability

- PANASONIC**
- Panasonic KX-P2135 £139.00+VAT
 - Panasonic KX-P2624 £399.57+VAT
- CANON**
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 - Canon BJ-200EX (Epson compatible) £195.00+VAT
 - Canon BJ-230 £275.00+VAT
 - Canon BJ-C600E £419.00+VAT
 - Canon BJ-C4000 £259.00+VAT

This product can seriously **SAVE** you money...

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3. Discoloured and/or slightly damaged cases	Canon BJ-C600 Category 2	£339.00+VAT	800dpi handscanner Category 2	£49.00+VAT
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DOT MATRIX	TI microWriter PS65 (PostScript) - new	£499.00+VAT	1200dpi A4 colour scanner Category 2	£359.00+VAT
Panasonic KX-P2135 Category 2	OTHERS		Sony CDU33A CD-ROM drive, internal unit (new)	£49.00+VAT
NEC P22Q Category 2	Triumph Adler notebook, 486sx25, 120Mb HD, mono screen	£499.00+VAT	Longshine 10Base2 network card (new)	£35.00+VAT
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38 Pages!

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**QUALITY!
QUALITY!
QUALITY!**

Being the largest direct supplier means we buy memory direct from world class manufacturers.

Powermark plc only supply factory original memory.



Certificate no. FS 26535

MEMORY LANE

Do you remember...?

- ... The LOGO programming language
- ... Watching a Turtle draw graphics
- ... 75/300 BAUD modems

MEMORY



WELCOME TO POWERMARK - Part 10

I'm passionate about my company and I do feel that it is important that you know about the culture and ethos of the organisation that you are dealing with.

Mark Simon

Mark Simon
Chairman

Here are just some of the things that make Powermark so different:

- Every 3 months we have a fancy dress day, where we donate to charity £1 for every megabyte of memory supplied on that day.
- Our Powermark Academy term ends each March. Prizes include a weeks holiday in the sun for two, video recorders and gift vouchers.



MATCHED MEMORY

THE LARGEST DIRECT MEMORY SUPPLIER

Every month Powermark plc supply thousands of memory upgrades to thousands of satisfied customers, making us the largest direct supplier of memory in the United Kingdom.

"Adding memory to your computer is undoubtedly the easiest, most cost effective way of increasing the performance of your system"

More and more applications demand large amounts of memory to work effectively. By increasing the standard memory in your PC you can:

- Radically increase the performance of your system
- Run multimedia applications at optimum speed
- Keep fonts and desktop accessories in RAM for instant access
- Run more than one application at a time, enabling true multi-tasking

DON'T JUST TAKE OUR WORD FOR IT...

"There's no question that you need more memory to run Windows or OS/2 than you ever did to run DOS."

The amount of memory made an even greater difference when we tried features like dragging and dropping between applications. The system was very slow with 4MB, significantly faster with 8MB, and faster still with 12MB.

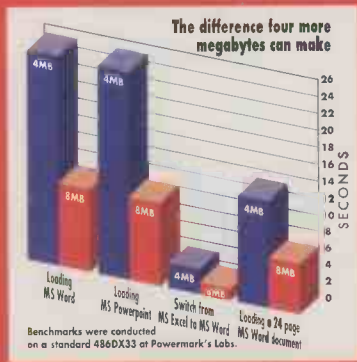
On the basis of our tests, 8MB - not 4MB - is the minimum amount of memory you'll need to run Windows 3.1 satisfactorily. With 12MB, you'll get optimal performance in many cases."

PC Magazine, February 1995

"Possibly the greatest upgrade you can offer a flagging PC is an increase in memory."

The difference in speed between 4MB and 8MB is enormous, as is the jump from 8MB to 16MB. Anyone attempting to run Windows 3.1 in less than 4MB should upgrade now."

Personal Computer World, January 1995



Benchmarks were conducted on a standard 486DX33 at Powermark's Labs.

MATCHED MEMORY SIMM KITS

If you're unsure about upgrading then our Matched Memory SIMM Kits are for you. They're guaranteed to be totally memory matched. That means speed, voltage, refresh, parity and physical characteristics are all matched to give optimum performance to your system.

- full installation instructions
- anti-static wrist strap
- dedicated support hotline
- our famous double guarantee - full lifetime warranty and the Powermark Promise - our 14 day 'no-quibble' money back guarantee

If your PC is not listed then call us. Our Memory Database has the upgrade path for almost every PC supplied in the UK over the last five years.

UPGRADING IS EASY

With most memory upgrades it's just a case of:

- switching off PC
- removing lid
- locating SIMM sockets
- installing SIMMs
- closing lid
- switching back on

HANDLING MEMORY

Static can degrade a DRAM, shortening its life. That's why we include an anti-static wrist strap in every Matched Memory SIMM Kit. If you're buying loose SIMMs then do ask for an anti-static wrist strap. For multiple installations we can supply complete ESD (Electro Static Device) protection equipment.

PRICE INSTABILITY!
CALL FOR LATEST OFFERS ON MEMORY BEFORE ORDERING

REGULAR SIMMS

30 PIN SIMMS

- 5 year warranty on all SIMMS listed here

Type	Capacity	Speed	
256K x 9	256K	100ns	£12
256K x 9	256K	80ns	£12
1M x 8	1MB	80ns	£33
1M x 9	1MB	80ns	£33
1M x 9	1MB	70ns	£31
1M x 9 (9cs)	1MB	70ns	£33
1M x 9	1MB	60ns	£36
4M x 8	4MB	80ns	£125
4M x 8	4MB	70ns	£115
4M x 9	4MB	80ns	£128
4M x 9 (9cs)	4MB	70ns	£115
4M x 9	4MB	60ns	£125
16M x 9	16MB	70ns	£579
16M x 9	16MB	60ns	£599

GOLD EDGED SIMMS

- Specified by many PC manufacturers
- Longer MTBF

1M x 9	1MB	70ns	£41
1M x 9	1MB	60ns	£45

72 PIN SIMMS

- 10 year warranty on all SIMMS listed here

Type	Capacity	Speed	
256K x 36	1MB	80ns	£59
256K x 36	1MB	70ns	£59
512K x 32	2MB	70ns	£82
512K x 36	2MB	70ns	£82
1M x 32	4MB	80ns	£125
1M x 32	4MB	70ns	£125
1M x 36	4MB	80ns	£129
1M x 36	4MB	70ns	£129
1M x 36	4MB	60ns	£145
2M x 32	8MB	80ns	£249
2M x 32	8MB	70ns	£249
2M x 36	8MB	80ns	£275
2M x 36	8MB	70ns	£275
2M x 36	8MB	60ns	£279
4M x 32	16MB	70ns	£399
4M x 36	16MB	70ns	£429
4M x 36	16MB	60ns	£499
8M x 32	32MB	70ns	£949
8M x 36	32MB	70ns	£849
8M x 36	32MB	60ns	£949
16M x 36	64MB	60ns	£Call

72 PIN EDO SIMMS

- Call for full details

1M x 32 EDO	4MB	-	£156
2M x 32 EDO	8MB	-	£299

NEW! 72 PIN DIMMS

1M x 32	4MB	70ns	£171
2M x 32	8MB	70ns	£327
4M x 32	16MB	70ns	£529

DELIVERY CHARGES
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See page 11

EARLY BIRD Order Bonus
See page 25



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- LITE ELITE SERIES**
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- CONTURA 400 C/CX, 4100, 4100C/CX**
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 8MB Module £299
 16MB Module £574
- CONTURA 3/25/20/25C, 4/25**
 4MB Card £159
 8MB Card £299
- CONCERTO 4/25, 4/33**
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 16MB £1215
- AERO 4/25/33**
 4MB £159
- PRESARIO 425, 633, 833, 850, 866 / 800 SERIES**
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 8MB £279
- PRESARIO 700/900**
 16MB Module £499
- PROSIGNIA 500**
 8MB Kit £289
 16MB Kit £539

HOW MUCH MEMORY DO YOU NEED?

Operating System	Minimum Requirement	Comfort Level	Optimum Performance
Windows 3.1	4MB	8MB	16MB
Windows 95	8MB	12MB	20MB
Windows NT	12MB	16MB	32MB
Windows AS	16MB	32MB	48MB
OS/2 Warp	4MB	12MB	20MB
Apple System 7.5	8MB	12MB	16MB

Source: manufacturers' figures

LIFETIME WARRANTY ON ALL MATCHED MEMORY

MATCHED MEMORY UPGRADES FOR ESCOM

- FULL DESKTOP RANGE**
 4MB Kit £159
 8MB Kit £289
 16MB Kit £499

MATCHED MEMORY UPGRADES FOR DELL

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 4MB Kit £139
- 325/D/P, 333/D/P**
 2MB → 6MB £139
 2MB → 10MB £289
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 8MB Module £299
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 8MB Module £515
 16MB Module £619

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- Hauppauge WINTV Celebrity **save £10**
- Dashboard 95 and Sidekick 95 Combo **save £10**
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- Any Hard Disk Drive Over 500MB **save £6**
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- Keytronics Protouch Windows 95 Keyboard **save £7**
- Cyrix Processors **call for special savings**
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- Taxan 15" Monitors **save £10**
- Taxan 17" Monitors **save £20**
- Taxan 20" And 21" Monitors **save £35**
- Taxan GTS WinBoost 1MB **save £5**
- Taxan GTS WinBoost 2MB **save £7**
- Taxan GTS WinTurbo 2MB **save £7**
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is for you. It's fast, it's simple and it's convenient. Just drive into our loading bay at the rear of Premier House and your computer will go directly to our on-site labs for instant upgrading by our fully qualified engineers.

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Graphics or Video Card	£26
Multimedia Kit	£39

Save £££s with combo orders!

TURN THE PAGE FOR MORE

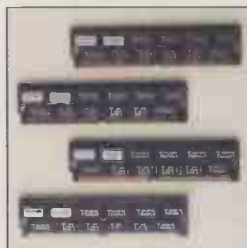
MEMORY



MATCHED MEMORY UPGRADES FEATURE

MATCHED MEMORY UPGRADES FOR AMSTRAD

PC1286/PC1386/PC3286/PC3386/PC5286	
1MB → 4MB	£132
ALT286/386SX	
1MB → 4MB	£149
1MB → 4MB (Zero-wait state)	£199
NC100	
256K Card	£58
512K Card	£89
1MB Card	£129
NC200	
2MB Card	£149
PC7286, 7386	
2MB	POWERCUT! £62
4MB	£129
PC7486 SLC	
8MB Kit	£249
16MB Kit	POWERCUT! £459
PC9486	
4MB Module	£149
16MB Module	£499
ANB386SX	
4MB Module	POWERCUT! £179
386SX25 MEGA PC	
4MB Kit	£139
16MB Kit	£469
NEW! PC95551	
8MB Kit	£289
16MB Kit	£529



MATCHED MEMORY UPGRADES FOR ZENITH

SUPERSPORT SX	
2MB Module	£127
TURBOSPORT 386E	
2MB Kit	£424
MASTERSPORT SL/SLe, 620NL	
2MB Module	£109
Z-NOTE L SERIES, 320, 325	
1MB	£114
2MB	£408
Z-SERVER/STATION/425/433/450	
8MB Module	£289
Z-SPORT	
4MB	£179
Z-SELECT SERIES	
8MB Module	£279

LIFETIME WARRANTY ON ALL MATCHED MEMORY

MATCHED MEMORY UPGRADES FOR PACKARD BELL

LEGEND 200/316SX	
2MB Kit	POWERCUT! £72
4MB Kit	POWERCUT! £144
LEGEND 600, 900	
4MB Kit	POWERCUT! £129
8MB Kit	POWERCUT! £279
486 VLB, EXECUTIVE, ELITE RANGE	
8MB Module	£289
FORCE RANGE	£Call
XL410/416/486	
16MB Kit	POWERCUT! £459

MATCHED MEMORY UPGRADES FOR HP

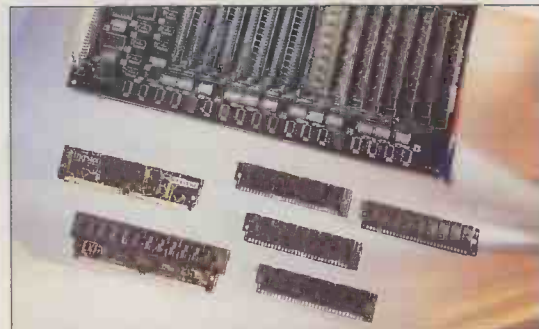
• Authorised HP dealer	
VECTRA 386/25 PC, 486 PC, 486s/20	
4MB Kit	£159
8MB Kit	£336
HP VALUELINE 486, NETSERVER SERIES	
8MB	£299
16MB Module	£599
HP95	
512K Card	£89
1MB Card	£149
HP OMNIBOOK RANGE	£Call

MATCHED MEMORY UPGRADES FOR OLIVETTI

PCS386SX	
1MB → 2MB	POWERCUT! £64
1MB → 4MB	POWERCUT! £129
1MB → 6MB	POWERCUT! £209
1MB → 8MB	£272
PCS40, 44	
4MB Kit	£159
8MB Kit	£299
M290	
2MB Kit	POWERCUT! £74
4MB Kit	POWERCUT! £149
M486/CP386	
2MB Kit	£99
4MB Kit	£168
PCS 11, 33	POWERCUT!
2MB Kit	£66
8MB Kit	£269
M300-30	
4MB Kit	£159
8MB Kit	£299
M400-10/40/60	
4MB Kit	£156
16MB Kit	£539
MODULO & SUPREMA RANGE	
8MB Module	£289
16MB Module	£529
32MB Module	£1199

BEWARE

Beware of low grade 5 volt notebook memory that reduces battery life by up to 40%. Powermark plc only supplies 3.3 volt devices from market leaders with manufacturers' approvals.



MATCHED MEMORY UPGRADES FOR TOSHIBA

T1000/E/XE/LE, T1800, T1850C, T2000SX, T2000SX, T2200SX, T2200SX	
2MB Card	£89
4MB Card	£159
8MB Card	£299
T3300SL	
2MB	£66
T1200XE	
2MB Card	£93
T1600/T5100	
2MB Card	£75
T2100	
4MB Card	£149
8MB Card	£299
T2400CS/T3600	
16MB	£649
T2450 CT/2400 CT	
8MB Card	£359
T3100SX	
2MB Card	£89
4MB Card	£169
T3200SX/C	
4MB Module	£162
8MB Module	£329
T3200	
3MB Card	£169
T4400, T6400 SX/C, DX/C	
4MB Card	£165
8MB Card	£329
T1900, T1910, T1950CT, T1960, T3400CT, T4500, T4600, T4700CT, T4800CT	
8MB Module	£329
16MB Module	£629
T4850/4900	
8MB	£325
T5200/C & T8500/6400/6600	
2MB Module	£89
8MB Module	£345
DYNAPAD T100X	
6MB Card	£269
DYNAPAD T200, T200CS	
8MB Module	£Call
16MB Module	£Call

MATCHED MEMORY UPGRADES FOR TANDON

POSITIVE 386SX25, 386DX40, 486SX25, 486DX33	
4MB Kit	POWERCUT! £129
16MB Kit	£499

MATCHED MEMORY UPGRADES FOR GATEWAY

PC 4SX-33	
4MB Module	£149
16MB Module	£475
PC 4DX-33V, PC 4DX-66V	
4MB Module	£149
16MB Module	£479
32MB Module	POWERCUT! £999
PC 4DX2-66P/V	
16MB Module	£499
32MB Module	£1199
PC P5-60, P5-66, P90, P100	
NEW! EDO KITS	
8MB Kit	£299
16MB Kit	£499
32MB Kit	£1099
64MB Kit	£2299
PC 4D-66, PC 4D-100	
8MB Kit	£299
32MB Kit	POWERCUT! £999

MATCHED MEMORY UPGRADES FOR ELONEX

PC386SXM, SXB, 386/16, B/33	
2MB Kit	£64
4MB Kit	£139
8MB Kit	£249
PC386 V/E, 486 V/E	
4MB Kit	POWERCUT! £139
8MB Kit	POWERCUT! £279
16MB Kit	POWERCUT! £469
WS RANGE	
4MB Kit	£139
8MB Kit	£269
16MB Kit	£499
PC433M, 450M, 466M	
4MB Kit	£129
8MB Kit	£279
16MB Kit	£469
LT386SX/P	
2MB Kit	£64
4MB Kit	£139
PC-500 SERIES, PC-560M	
8MB Module	POWERCUT! £279
16MB Module	POWERCUT! £479
ELONEX 560F EISA	
8MB Kit	POWERCUT! £279
16MB Kit	POWERCUT! £475

PRICE INSTABILITY! CALL FOR LATEST OFFERS ON MEMORY BEFORE ORDERING



DELIVERY CHARGES

UK MAINLAND - Next working day courier delivery to your door for all stock items
See page 11

EARLY BIRD

Order Bonus
See page 25



Ever one at Powermark passes through our training college

BANK

at
Powermark



MATCHED MEMORY UPGRADES FEATURE

MATCHED MEMORY UPGRADES FOR IBM



- Planar memory plugs directly onto system board
- Price instability - check latest offers on IBM matched memory before ordering

PS/2 35LS, 35SX, 40SX	
4MB	£159
8MB	£299
PS/2 55SX, 60, 65SX/57SX/M57	
4MB	£168
PS/2 70, Portable 70/75	
4MB	POWERCUT! £159
8MB	£289
PS/2 80	
4MB	£239
PS/2 140SX, N335SX, NSL	
4MB Card	POWERCUT! £149
8MB Card	£349
PS/2 90, 95, 95A	
4MB Module	£168
PS/2 195 & 295	
32MB Module	£Call
PS/2 95 ARRAY PENTIUM	
16MB Kit	£679
VALUEPOINT 6381, 6382, 6384	
4MB	£139
8MB	POWERCUT! £289
PENTIUM VALUEPOINT PERFORMANCE SERIES	
4MB Kit	£149
8MB Kit	POWERCUT! £285
16MB Kit	£529
THINKPAD 300, 350, 355, 360, 500, 700, 701, 710, 720, 750, 755c	
4MB	£179
8MB	£349
THINKPAD 730T	
4MB	£179
8MB	£349
PC466DX2, 100DX4	
8MB Module	£289
CL57SX	
4MB	£189
8MB	£383
TREKKA	
2MB	£89
HURDLA, SPRINTA	
4MB Kit	£149
16MB Kit	£476
PS/1	
2MB	£85
PS/1 - 386	
4MB	£149
PS/1 - PRO 486	
4MB	POWERCUT! £139
8MB	£289
CONSULTANT, ESSENTIAL, EXPERT SERIES	
4MB	£149
8MB	£279
NEW! APTIVA SERIES	
4MB Module	£149
8MB Module	£279
16MB Module	£459
PC 300 SERIES	
4MB Module	£149
PC 700 SERIES	
8MB Module	£279

MATHS CO-PROCESSORS

Installation of a Co-Processor results in a significant speed increase in maths intensive applications eg: spreadsheets, databases, CAD and graphics packages.

	INTEL	ULSI	IIT/ CYRIX
80387 SX (16 MHz → 33MHz)	£58	£49 POWERCUT!	£42
80387 SX (40 MHz)	£58	-	£48
80387 SL (25 MHz)	£58	-	-
80387 DX (16 MHz → 33MHz)	£59	£32 POWERCUT!	£49
80387 DX (40 MHz)	-	-	£51
80386 RapidCAD	£189	-	-



MATCHED ADAPTER BOARDS FOR IBM PS/2

• Completely user expandable

PS/2 50, 50Z, 60 & 65	
16MB Board with 4MB	£295
16MB Board with 8MB	£425
PS/2 70, 80, 90 & 95	
64MB Board with 4MB	£295
64MB Board with 8MB	£465

MATCHED MEMORY UPGRADES FOR VIGLEN

• Complete range for Executive, Professional and Tower

GENIE 386SX	
2MB Kit	£64
4MB Kit	£129
VIG II ELITE	
2MB Kit	£98
4MB Kit	£189
VIG III LS (Type 1)	
4MB Kit	£169
8MB Kit	£399
VIG III/25, III/33	
4MB Kit	£139
8MB Kit	£279
16MB Kit	£469
EX PENTIUM SERIES	
8MB Kit	£279
NEW! PCI PENTIUM SERIES	
8MB EDO Kit	£299
16MB EDO Kit	£549
EX 4DX33/50	
4MB	£149
8MB	£279
VIG 4SX25, 4DX33, 4DX50, 4DX2-50, 4DX2-66	
4MB Kit	£139
8MB Kit	£279
16MB Kit	POWERCUT! £469
CONTENDER RANGE	
4MB	£149
8MB	£269
GENIE 486VLB RANGE	
16MB Module	POWERCUT! £479
64MB Kit	£2396
GENIE PCI RANGE	
16MB Module	£479
8MB Module	£289

MATCHED MEMORY SIMM KITS

Include:

- full installation instructions
- anti-static wrist strap
- dedicated support hotline
- our famous double guarantee - full lifetime warranty and the Powermark Promise - our 14 day 'no-quibble' money back guarantee

MATCHED MEMORY UPGRADES FOR ICL

DRS 40, 45	
2MB Kit	£86
4MB Kit	£172
ERGOPRO C4, D4	
8MB Kit	£149
16MB Kit	£539
DRS M95	
4MB Kit	£180
32MB Kit	£1199
VALUEPLUS DL RANGE	
4MB	£168
ZENO SERIES	
4MB Kit	£149
16MB Kit	£539



BEWARE

Beware of third party, low grade memory. Powermark plc only supply factory original memory.



Certificate no. FS 26535
BS5750 registered for the supply of computer, printer and workstation memory, processor and other upgrades.

Powermark plc is regularly assessed by the British Standards Institution to ensure compliance with the quality standard.

MATCHED MEMORY UPGRADES FOR APRICOT

XEN 486SX-25, 486DX2-50, 486 DX2-66, PCM	
4MB Module	£168
8MB Module	£279
16MB Module	£599

MEMORY EXPANSION BOARDS

KINGSTON ATA BOARD	
16MB Board with 4MB	£239
16MB Board with 8MB	£349
16MB Board with 16MB	£649

QUALITY! QUALITY! QUALITY!

Being the largest direct supplier means we buy memory direct from world class manufacturers.

Powermark plc only supply factory original memory.

MATCHED MEMORY UPGRADES FOR APPLE

• Complete range stocked



Authorised Reseller

MATCHED MEMORY UPGRADES FOR DAN

DAN VANTAGE, WINDOWS NT SERIES	
4MB Kit	£139
16MB Kit	£499
PREMIUM, DANTIUM, ULTIMATE	
4MB Module	£149
8MB Module	£289

Technical Sales Order Lines

0181-951 3355
(50 lines)

MEMORY

HUGE STOCKS
Guaranteed same day despatch on virtually all stock items for orders placed even up to 4.00pm.

TECHNICAL SALES PEOPLE
Our sales people are the best. They are trained specialists in their chosen field - multimedia, memory of all types, mass storage, networking and communications.

FINANCIAL STABILITY
Powermark plc has been supplying upgrades for over 5 years and has an annual turnover exceeding £18 million with a healthy balance sheet.

LOW, LOW PRICES
We only supply products from leading manufacturers and at low, low prices too.

TECHNICAL SUPPORT
Dedicated after sales technical support teams on line to help with installation.

CORPORATE & PUBLIC SECTOR
We welcome orders from corporate, education and public sector organisations. Just fax or phone your order number.

FULL MANUFACTURERS' WARRANTIES
All products supplied by Powermark plc carry manufacturers' warranties and of course full Powermark plc guarantees.

TURN THE PAGE FOR MORE

UPGRADE DRIVE THRU
While-you-wait installation service available. See page 3 for details.

PERSONAL CALLERS
Save on delivery charges - there's plenty of parking. Telephone first to check our stock position on the items you want. We're open from 9.00am to 6.00pm Monday to Friday, Saturdays, 9.30am to 4.00pm. Technical Support and Customer Service from 10.00am to 2.00pm.

Powermark plc
Premier House, 112 Station Rd, Edgware, Middlesex HA8 7AQ
Tel: 0181-951 3355
(50 lines)
Fax: 0181 905 6233
Email: sales@powermark.com



Cards are not debited until despatch
VAT at 17.5% will be added to all prices



Public Sector customers can purchase through HMSO by calling 01603 694153.



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Powermark plc is regularly assessed by the British Standards Institution to ensure compliance with the quality standard.

Certificate no. FS 26535

Power



Mark®

**Technical Sales
Order Lines
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951 3355
(50 lines)**

**MATCHED
MEMORY
UPGRADES FOR
IBM PRINTERS**



- IBM 4019 & 4019E 3MB £149
- IBM 4029 2MB **POWERCUT!** £79
- IBM 4039 & 4079 4MB **POWERCUT!** £149
- 8MB **POWERCUT!** £339
- LEXMARK OPTRA LX/L/R/RX 16MB £149
- WINWRITER 200/400/600 2MB £79

**He's back!
DOG OF
THE
MONTH**

**MIKE DITKA
ULTIMATE
FOOTBALL CD ROM**
£2 with any purchase over £30

**TURN THE PAGE
FOR MORE**

MEMORY QUIZ

???????

"Your starter for 10MB"

1. What was the data transfer rate of a single speed CD ROM drive?
2. What does AWE stand for in the SoundBlaster AWE32?
3. What are RHOMAT and XIMAT?

Answers on fax form page

MEMORY



MATCHED MEMORY UPGRADE FEATURE

MATCHED LASERPRINTER MEMORY

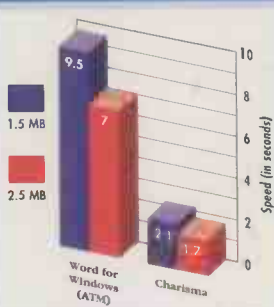
• Price instability - check latest offers on laser printer memory before ordering

- APPLE LASER WRITER SELECT 300/310 4MB £149
- APPLE LASER WRITER PRO 810 4MB £179
- APPLE LASER WRITER PRO 600/630 4MB £149
- BROTHER HL8/E/V, HL10, DPS 2MB £129
- CANON NOTEJET 486, BN22/BJC-880 4MB Module £149
- CANON LBP4, 4+, LITE, SX 2MB **POWERCUT!** £139
- CANON LBP8II 2MB £109
- CANON LBP8IV 4MB **POWERCUT!** £139
- CANON LBP 860 16MB £Call
- CANON LPB-1260 4MB £149
- COMPAQ PAGERMARQ 15/20 8MB £299
- 16MB £599
- DEC LASER 2200/2100 1MB £79
- EPSON EPL4000/4100/4300/8100 2MB £109
- EPSON EPL7000 4MB £199
- EPSON ACTION LASER 1600/1100 4MB £149
- 8MB £279
- KYOCERA F800 2MB £129
- KYOCERA FS400, 410, 1500, 1550 £Call
- NEC SILENT WRITER 95/95FX/97/97FX 2MB £85
- OKI LASER 400, 410 2MB £99
- OKI 800/820 2MB £109
- OKI LASER 830/840/850 2MB **POWERCUT!** £109
- PANASONIC 4420 2MB £109
- PANASONIC 5410, 4440 2MB £117
- PANASONIC 4450i 2MB **POWERCUT!** £99
- TEXAS MICROLASER PS, MICROWRITER 1MB £69
- TOSHIBA PAGELASER 6 1MB £119

LASER PRINTER MEMORY - AN EXPLANATION

Increasing memory in your laser printer will enable it to print large, graphics intensive documents. Additional benefits include faster print spooling, faster printing speed and multiple font downloading.

This chart shows the improvement a single megabyte of printer memory can make. "Speed" represents the amount of time required to spool the document into the printer and get the full use of your PC back.



How much memory do you need?

- Full page graphics 1MB - 2MB
- Soft fonts 1MB
- PostScript cartridge 1.5MB
- PostScript with duplexing 4MB
- 4 - 5 PostScript fonts 2MB
- 8 - 10 PostScript fonts 4MB
- Network printer sharing 4MB

MATCHED MEMORY UPGRADES FOR HP PRINTERS



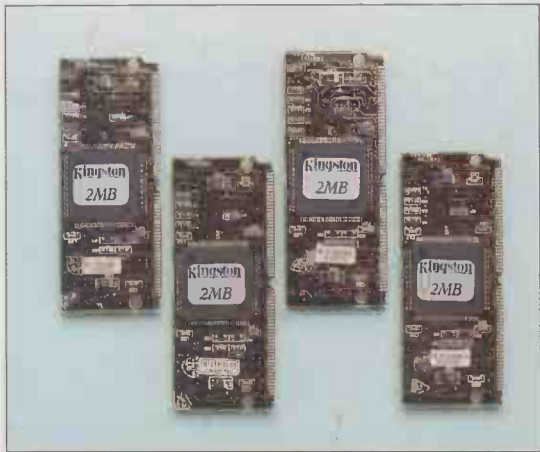
- LASERJET II, IID 2MB **POWERCUT!** £89
- 4MB £159
- LASERJET IIP, IIP, IID, IIP 2MB **POWERCUT!** £82
- 4MB £149
- LASERJET 5P, 5MP 4MB **POWERCUT!** £169
- 8MB Module £279
- LASERJET IISI, 4, 4M, 4si, 4MV, 4MP, 4P, 4V 4MB **POWERCUT!** £149
- LASERJET 4L 1MB £79
- DESKJET 500, 500c, 550 256K £39
- DESKJET 520, 540, 560C 4MB £149
- DESKJET 660C/PS 4MB £149
- 8MB £275
- DESKJET 1200 C/PS/1200, 1600C 4MB £149
- 8MB £275
- JET DIRECT EX PRINT SERVER £Call
- NETSERVER SERIES 32MB Module £1399
- DESIGNJET 600/650 4MB £142
- PAINTJET XL300 £Call
- HP COLOUR LASERJET 4MB Module £149

MATCHED MEMORY UPGRADES FOR HP APOLLO Workstations

- Call for models not listed here
- All HP Apollo memory is individually tested
- APOLLO 9000 705, 710 8MB Kit **POWERCUT!** £532
- 16MB Kit £968
- 32MB Kit £2384
- ENVIZEX RANGE 16MB Module £699

MATCHED MEMORY UPGRADES FOR DEC Workstations

- Call for models not listed here
- All DEC workstation memory is individually tested
- MICROVAX 3100 MODEL 30 & 40 8MB Kit £430
- DECSYSTEM 5100 8MB Kit £386
- 48MB Kit £1986
- ALPHASTATION 200/400 SERIES £Call



MATCHED MEMORY UPGRADES FOR IBM RISC Workstations

- Call for models not listed here
- RISC SYSTEM 6000 32MB Kit £1383
- 64MB Kit £2787
- 448MB Kit £17,384
- POWERSTATION/ POWERSERVER 200 8MB Kit £298
- X STATION 6MB Kit £228

MATCHED MEMORY UPGRADES FOR SUN Workstations

- SPARC tested and approved
- All Sun memory is individually tested
- SPARC 1, 3/60, 3/80, 4/40, 4/60, 4/65, 4/75 4MB Kit **POWERCUT!** £162
- 16MB Kit £499
- SPARC ELC 16MB Kit **POWERCUT!** £489
- SPARC LX 32MB Kit £1199
- SPARC 330, 370 & 390 16MB Kit £1294
- 32MB Kit £1802
- SPARC SERVER 630, 670, 690 64MB Kit £2812
- SPARC 630MP, 670 & 690 64MB £2812
- 128MB £5402
- SPARCSTATION 10/20 16MB £599

**QUALITY!
QUALITY!
QUALITY!**

Being the largest direct supplier means we buy memory direct from world class manufacturers. Powermark plc only supply factory original memory.

MATCHED MEMORY UPGRADES FOR SILICON GRAPHICS Workstations

- POWER SERIES IRIS 32MB Kit £2030
- PROFESSIONAL IRIS 4MB £265
- INDIGO, 4D/30, 4D/35533 64MB Kit **POWERCUT!** £1999
- CHALLENGE M/ POWER CHALLENGE SERIES £Call

All our Matched Memory Kits come with our famous double guarantee - full lifetime warranty and 14 day money back guarantee



DELIVERY CHARGES

UK MAINLAND = Next working day courier delivery to your door for all stock items
See page 11

EARLY BIRD

Order Bonus
See page 25



Everyone at Powermark passes through our training college

BANK

at Powermark



MATCHED MEMORY UPGRADE FEATURE

PCMCIA MEMORY

- All formats stocked: JEDEC, FLASH, OTPROM, DRAM, etc
 - Check compatibility before ordering
- | | |
|-----------|------|
| 256K SRAM | £48 |
| 512K SRAM | £74 |
| 1MB SRAM | £122 |
| 2MB SRAM | £99 |

DRAMs

- Call for devices not shown
 - Full range of PROMs, SRAMs & ZIPs available
 - 5 year warranty
- | | |
|-----------------|--------|
| 64K x 1 - 120ns | £1.79 |
| 256K x 1 - 80ns | £2.80 |
| 256K x 4 - 80ns | £5.77 |
| 1M x 1 - 80ns | £4.99 |
| 1M x 1 - 70ns | £5.20 |
| 1M x 4 - 80ns | £17.80 |

MATCHED MEMORY FOR NOTEBOOKS & PALMTOPS

- More memory can increase battery life by up to 18%
- COMMODORE LT286/386**
- | | |
|---------|------|
| 4MB Kit | £169 |
|---------|------|
- SANYO 17NB, 18NB**
- | | |
|-----|------|
| 2MB | £82 |
| 4MB | £165 |
- PANASONIC CF170, 270, 370**
- | | |
|-----|------|
| 2MB | £129 |
|-----|------|
- PANASONIC CF1000**
- | | |
|------------|------|
| 4MB Module | £198 |
|------------|------|
- PANASONIC CF580**
- | | |
|------------|------|
| 4MB Module | £185 |
|------------|------|
- LIBREX V386SX**
- | | |
|-----------|------|
| 1MB → 4MB | £199 |
|-----------|------|
- DEC HINOTE RANGE**
- | | |
|------------|------|
| 4MB Module | £197 |
| 8MB Module | £398 |
- HP OMNIBOOK RANGE**
Complete range stocked

MATCHED MEMORY UPGRADES FOR AST

- ACENTIA 900N, 910N**
- | | |
|------------|------|
| 4MB Module | £199 |
| 8MB Module | £349 |
- BRAVO LCII, III**
- | | |
|------------|------|
| 4MB Module | £149 |
| 8MB Module | £279 |
- PREMIUM, POWER PREMIUM**
- | | |
|------------|------|
| 4MB Module | £149 |
| 8MB Module | £320 |
- EXPLORER**
- | | |
|------------|------|
| 4MB Module | £175 |
|------------|------|

MEMORY TOOLS

- Complete range of anti-static products available
- ANTI-STATIC WRIST STRAP**
- Essential when handling electrostatic devices
- | | |
|--|----|
| | £8 |
|--|----|
- IC EXTRACTOR TOOL**
- | | |
|--|----|
| | £9 |
|--|----|
- SIMM TESTER**
- | | |
|--|------|
| | £779 |
|--|------|
- WRIST STRAP TESTER**
- | | |
|--|-----|
| | £99 |
|--|-----|

WE ALSO SUPPLY UPGRADES FOR...

Acorn, ALR, AST, Austin, Canon, Commodore, Dan, Goldstar, Hyundai, Locland, MJN, Multiplex, NEC, NeXT, Opus, Philips, QMS, Sharp, Tandy, TI, Unisys, Wyse and all Pentium and multimedia systems.



BEWARE

Beware of third party, low grade memory.

Powermark plc only supply factory original memory.

KEY TRONIC KEYBOARD FEATURE

KEY TRONIC KT2000

The Key Tronic KT2000 Windows 95 keyboard features three additional keys designed to offer users an easier interface to Microsoft Windows 95.

KT2000 £32

PROTOUCH WINDOWS 95 KEYBOARD

The ProTouch keyboard represents a breakthrough in technology. ProTouch offers increased reliability - hinge

tested to 70 million cycles - in a spill resistant product. Plus, the soft landing of the flexible lever arm switch assembly makes



ProTouch a more comfortable keyboard to use. In an independent ergonomic study results showed that ProTouch improved keying performance and was preferred over standard keyboards in all usability factors.

PROTOUCH KEYBOARD £28

KEY TRONIC COLORKEYS COOL STUFF KIT

- ColorKeys keyboard
- Clikmate mouse
- Mouse pad
- Screen bezel for 14" monitor
- Microsoft Fine Artist software
- All cables and connectors

COLORKEYS COOL STUFF KIT £49

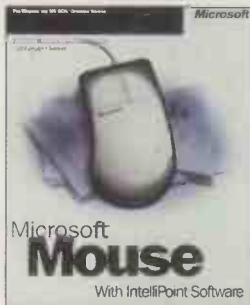


Save £7 off KT 2000 Keyboard and £7 off Protouch Keyboard when you buy Windows 95. See page 2

MICROSOFT® HARDWARE FEATURE

MICROSOFT® MICE

- MICROSOFT MOUSE 2.0**
- Plug and Play with Windows 95
 - Ergonomically designed for comfort
 - Optimum hand position
 - Teflon 'gliders' - moves smoother and swifter over any surface
- New improved IntelliPoint software gives you:*
- Shortcuts - assigns common tasks to each button
 - Single click - click just one for double click
 - Sonar - helps you find a lost cursor
 - SmartSpeed - slows the cursor for added control
- MICROSOFT MOUSE 2.0** £37



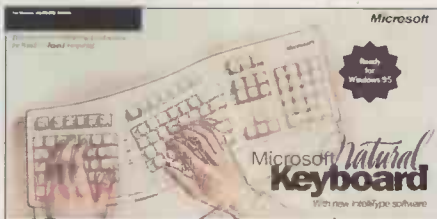
MICROSOFT® HOME MOUSE
Microsoft® Home Mouse, featuring IntelliPoint software is ready for Windows 95, and includes Microsoft® Arcade and Microsoft® The Best of the Entertainment Pack - 18 free games!

MICROSOFT® HOME MOUSE £29

Microsoft®

MICROSOFT® NATURAL KEYBOARD

- Ready for Windows 95
 - Windows logo function keys
 - Unique contoured design - encourages a balanced, more natural hand and wrist position
 - 104 key design
 - IntelliType software - customisable for improved Windows based performance
- MICROSOFT NATURAL KEYBOARD** £65



Technical Sales Order Lines

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MEMORY & KEYBOARDS

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Guaranteed same day despatch on virtually all stock items for orders placed even up to 4.00pm.
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Our sales people are the best. They are trained specialists in their chosen field - multimedia, memory of all types, mass storage, networking and communications.
- FINANCIAL STABILITY**
Powermark plc has been supplying upgrades for over 5 years and has an annual turnover exceeding £18 million with a healthy balance sheet.
- LOW, LOW PRICES**
We only supply products from leading manufacturers and at low, low prices too.
- TECHNICAL SUPPORT**
Dedicated after sales technical support teams on line to help with installation.
- CORPORATE & PUBLIC SECTOR**
We welcome orders from corporate, education and public sector organisations. Just fax or phone your order number.
- FULL MANUFACTURERS' WARRANTIES**
All products supplied by Powermark plc carry manufacturers' warranties and of course full Powermark plc guarantees.

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- UPGRADE DRIVE THRU**
While-you-wait installation service available. See page 3 for details.
- PERSONAL CALLERS**
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Tel: 0181-951 3355
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Public Sector customers can purchase through HMSO by calling 01603 694153.



BS5750 registered for the supply of computer, printer and workstation memory, processor and other upgrades. Powermark plc is regularly assessed by the British Standards Institution to ensure compliance with the quality standard.



Cards are not debited until despatch VAT at 17.5% will be added to all prices



Mark®

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DATA CARTRIDGES

	Each 10 Pack	
DC6150	£13	£119
DC6250	£18	£155
DC6525	£19	£169
DC9100Magnus	£31	£295

All QIC tapes are preformatted

QIC	Capacity	Each	10 Pack
DC2120	120-250MB	£13	£125
DC2120XL	350MB	£17	£159
QIC3010	700MB	£20	£185
QIC3020	1.7GB	£29	£270

QIC-Wide	Capacity	Each	10 Pack
5500c	420MB	£19	£169
9000c	850MB	£21	£190

DAT	Length	Each	10 Pack
1.3GB	60m	£9	£79
2GB	90m	£10	£89
4GB	120m	£11	£99
Head Cleaner		£26	

**TURN THE PAGE
FOR MORE**

ADAPTEC SCSI CONTROLLER CARDS



I/O. NOW MORE IMPORTANT THAN EVER.™

Industry standard SCSI controllers from Adaptec

	Bare Card	Kit With Software
AHA1505	-	£42
AHA1510	-	£55
AHA1515	-	£66
AHA1522 ISA	-	£119
AHA1542 ISA	£139	£183
AHA1640 MCA	£184	£229
AHA2742T EISA	£229	£275
AHA2940 PCI	£249	-
AHA2842VL/K VLB	-	£179

MEMORY

CYRIX FEATURE

THE NEW CYRIX 386 TO 486 PROCESSOR UPGRADE



See page 3 for details

Plug in the new Cyrix 386 to 486 Processor Upgrade. It's the fastest, most cost effective way to a 486 computer and it's totally compatible with the world's leading software: DOS, Windows and OS/2 operating systems.

It's easy to install. Just clip on the Cyrix processor and load the cache installation software. It's as simple as that. You're ready to run in minutes.



THE CYRIX MICROPROCESSOR UPGRADE FAMILY

The package consists of one Cx486DRx Microprocessor, a 386DX removal tool, (SX version is a clip-on chip), installation manual, upgrade cache installation software (on both 3.5" and 5.25" media) and a pin 1 locator arrow (for correctly aligning the upgrade processor in the socket). A Cyrix-green heatsink is also included with 20/40, 25/50 and 33/66 versions.

SAVE £££s! With the Memory Bank Cheque Book



Buy Windows 95 and save over £350 on leading peripherals and software!

See page 2

EVEN LOWER PRICES!

386DX	486	Price	Old Price
DX 16MHz → 486 32MHz	£135	£195	
DX 20MHz → 486 40MHz	£135	£235	
DX 25MHz → 486 50MHz	£155	£265	
DX 33MHz → 486 66MHz	£165	£185	
386SX	486	Price	Old Price
SX 16MHz → 486 32MHz	£135	£169	
SX 20MHz → 486 40MHz	£135	£169	
SX 25MHz → 486 50MHz	£155	£185	

CYRIX DRx/SRx

- Single chip upgrade solution for 386 DX and SX personal computers
- Clock doubling technology for increased performance
- 1K on-chip cache
- Very easy to install
- Compatible with DOS, Windows and OS/2
- Free technical support
- Limited lifetime warranty

INTEL OVERDRIVE® FEATURE



OVERDRIVE

Intel OverDrive® processors enable you to take advantage of advanced technology on your existing upgradable Intel 486 CPU-based system.

OverDrive® processors accelerate all applications running under MS-DOS, Windows, OS/2 and UNIX. Simply install the Intel OverDrive® processor into your existing system and watch your applications run at blazing speeds.

Intel OverDrive® processors are available for all Intel 486 CPU-based systems with or without an OverDrive® socket.

LIFETIME WARRANTY ON ALL INTEL OVERDRIVE® PROCESSORS

INTEL DX4 OVERDRIVE®

- For most 16, 20, 25, 33MHz Intel 486 SX or DX CPU-based systems
- Features Intel's "speed tripling" technology
- 16K on-chip cache memory
- On-chip maths co-processor
- The most powerful PC upgrade available

INTEL DX4	POWERCUT!	
16MHz → 48MHz		£121
INTEL DX4	POWERCUT!	
20MHz → 60MHz		£121
INTEL DX4		
25MHz → 75MHz		£121
INTEL DX4	POWERCUT!	
33MHz → 100MHz		£187



INTEL DX2 OVERDRIVE®

Give your Intel 486 SX or DX PC 66MHz performance with the Intel DX2® OverDrive® processor

- For any 16, 20, 25 or 33MHz Intel 486 SX or DX CPU-based systems

- Features Intel's "speed doubling" technology
- 8K on-chip cache memory
- On-chip Maths Co-processor
- Opens and runs all your software applications faster on your system

INTEL DX2		
25MHz → 50MHz		£79
INTEL DX2		
33MHz → 66MHz	POWERCUT!	£105

INTEL PENTIUM® OVERDRIVE®

The Pentium® OverDrive® processor is the newest and fastest member of the Intel OverDrive® processor family. It is the upgrade option for Intel SX2 and DX2® CPU-based systems and is the superior upgrade option for Intel 486SX and DX based systems. It is based on Intel's latest and most sophisticated Pentium® processor technology and features a superscalar architecture, which allows the execution of more than one instruction per clock cycle, 32K on-chip cache (one 16K code cache and one 16K data cache) and a faster floating point unit. It operates at two and a half times the speed of the system bus. For example, when a Pentium OverDrive® processor is installed in a 33MHz Intel 486 DX based system, the integer unit, floating point unit and cache operate at 83MHz while the speed of the external bus remains at 33MHz, thus delivering Pentium® processor class performance.

Can be installed in seconds by anyone

INTEL P24T 63MHz	£265
INTEL P24T 83MHz	&Call

DELIVERY CHARGES

UK MAINLAND = Next working day courier delivery to your door for all stock items
See page 11

EARLY BIRD

Order Bonus
See page 25

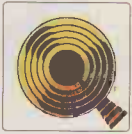


Everyone at Powermark passes through our training college

BANK

at
Powermark

SYQUEST STORAGE FEATURE



SyQuest®



SYQUEST SQ5200

SYQUEST REMOVABLE CARTRIDGE HARD DISK DRIVES

- Work like fixed drives yet provide unlimited capacity
- Superior performance to optical drives and higher reliability than floppy drives
- Perform backup faster than tape
- Provide data security

Unsurpassed warranties -
2 years on drives and
5 years on data cartridges

SYQUEST 3.5" RANGE

With your choice of 105MB or 270MB formatted capacities on each cartridge, these drives let you add as much removable storage as you'll ever need and are ideal for mobile applications.

SYQUEST CARTRIDGES

Capacity	Form	Each	5 Pack
105MB	3.5"	£41	£199
270MB	3.5"	£45	£219
44MB	5.25"	£36	£172
88MB	5.25"	£49	£239
200MB	5.25"	£60	£289

SYQUEST REMOVABLE CARTRIDGE HARD DISK DRIVES

Type	Capacity	Internal	External
SyQuest 3.5" IDE	105MB	£139	£229
SyQuest 3.5" SCSI	105MB	£169	£259
SyQuest 3.5" PARALLEL	105MB	-	£389
SyQuest 3.5" IDE	270MB	£259	£349
SyQuest 3.5" SCSI	270MB	£267	£357
SyQuest 3.5" PARALLEL	270MB	-	£439
SyQuest 5.25" SCSI	88MB	£179	£269
SyQuest 5.25" SCSI	200MB	£265	£357

IOMEGA TAPE BACKUP FEATURE

IOMEGA®

Makers of Bernoulli

1.7GB INTERNAL QIC 3020 TAPES (for 1.7GB)	£249
TAPE250 INTERNAL TAPE250 PARALLEL PORT	£29
QIC & WIDE 420MB INTERNAL TAPE700 INTERNAL TAPE700 PARALLEL PORT	£81
TAPE ACCELERATOR CARD	£149
700MB DATA CARTRIDGE	£105
	£139
	£229
	£49
	£14.95

DITTO 800

- New, advanced Travan technology
 - 800MB capacity (with compression)
 - Backward compatible with 250, 350 and 420MB tapes
 - Direct drive - no belt
 - Network compatible
- DITTO 800 INTERNAL £149
DITTO 800 PARALLEL £235

TRAVAN



DITTO 800

IOMEGA ZIP DRIVES

Awarded 5 mice by
MacUser, 9th June 1995

- Increase your hard drive capacity inexpensively on 100MB removable disks
- Provides high capacity mobile storage - use it at the office, at home, on the road, anywhere
- Zip Tools Software helps you track, organise and find everything with ease
- Excellent and easy for transferring information between two computers
- Securely organise your data by putting work, home, school, and leisure files on separate disks and let Zip Tools keep track of it all



- Makes backup fast easy and worry free
- Use as many disks as you need for one or more people or applications

IOZIP Parallel	£149
IOZIP SCSI	£149
100MB Cartridge Single	£17
5 Pack	£57
10 Pack	£98

VERBATIM FEATURE

Verbatim®

DATA AND DAT CARTRIDGES

Verbatim's tape products meet the demands of a wide range of users. Verbatim offers an unrivalled range of applications. Each tape cartridge comes with a LIFETIME GUARANTEE.

All DC and MC cartridges are PREFORMATTED, saving you hours of wasted time.

Unit	10 Pack
DC2120 QIC 80	£7 £68
DC2120XL	£12 £117
MC 3000 XL	£15 £144
4mm 60m	£6 £58
4mm 90m	£6 £58
8mm 112m	£6 £58

BLANK CDS

CD-R 74 Min	£7
-------------	----



OPTICAL DISKS

Verbatim dominate the recordable optical media market: offering the widest range of products to suite all applications. The MAC-READY format is now available on 3.5" and 5.25" disks.

3.5" 128MB	£17
3.5" 230MB	£22
5.25" 600MB	£45
5.25" 1.3GB	£57

DISKETTES

3.5" HD 10 Pack	£4
3.5" HD Preformatted 20 Pack + 2 free!	£8

FREE! with Verbatim diskettes.
WINDOWS'95 DEMO
ON EXTRA DISK

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PROCESSOR
UPGRADES &
MASS STORAGE

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Guaranteed same day despatch on virtually all stock items for orders placed even up to 4.00pm.

TECHNICAL SALES PEOPLE

Our sales people are the best. They are trained specialists in their chosen field - multimedia, memory of all types, mass storage, networking and communications.

FINANCIAL STABILITY
Powermark plc has been supplying upgrades for over 5 years and has an annual turnover exceeding £18 million with a healthy balance sheet.

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We only supply products from leading manufacturers and at low, low prices too.

TECHNICAL SUPPORT
Dedicated after sales technical support teams on line to help with installation.

CORPORATE & PUBLIC SECTOR
We welcome orders from corporate, education and public sector organisations. Just fax or phone your order number.

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Edgware, Middlesex HA8 7AQ

Tel: 0181-951 3355
(50 lines)

Fax: 0181 905 6233

Email: sales@powermark.com



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HMSO

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Powermark plc is regularly assessed by the British Standards Institution to ensure compliance with the quality standard.



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NEW!

DISK EXTENDER

Upgrades your BIOS to support new IDE hard disks larger than 520MB.

- Automatically recognises, configures and initializes most hard disk drives
 - Works with most BIOS
 - Works across most platforms
 - Adds support for up to 4 hard disk drives
 - Requires one 8-bit slot
 - Works better than any software solution
- DISK EXTENDER £49**

Save
£6 off
any

hard disk drive
over 500MB

when you buy Windows 95.
See page 2

**TURN THE PAGE
FOR MORE**

REAL HARD DRIVES

Famous hard drives...
Any journey by Wells
Fargo

A bus drive from
London to
Venice



MEMORY

SEAGATE FEATURE



SCSI DRIVES

SCSI DECATHLON FAMILY			
ST5660N	545MB	12ms	£209
SCSI HAWK-4 FAMILY			
ST15230N	4.3GB	9ms	£1388
SCSI HAWK-2LP FAMILY			
ST31230N	1.05GB	9ms	£379
ST32430N	2.1GB	9ms	£942
BARRACUDA FAMILY			
ST32550N	2.1GB	8ms	£975
Fast SCSI 2			
ST15150N	4.3GB	8ms	£1711
Fast SCSI 2			
ELITE FAMILY			
ST410800N	9.09GB	8ms	£2445

NEW!



2.5" FAST ATA NOTEBOOK DRIVES

MARATHON SL FAMILY			
ST9240AG	210MB	16ms	£175
ST9300AG	262MB	16ms	£180
MARATHON FAMILY			
ST9385AG	341MB	16ms	£219
ST9550AG	455MB	16ms	£275
ST9655AG	524MB	16ms	£329

FAST ATA POWERPACK DRIVES

MEDALIST FAMILY			
ST31220A	Powerpack 1.08GB	12ms	£214
MEDALIST XE FAMILY			
ST3491A	Powerpack 428MB	14ms	£99
ST3660A	Powerpack 545MB	14ms	£113
DECATHLON FAMILY			
ST5850A	Powerpack 854.7MB	11ms	£158



MEDALIST

- Fast ATA-2 interface for transfer rates up to 16.6MB per second



HAWK 2LP

- Fast SCSI-2 interfaces
- Fast, Fast Wide and Differential interfaces available



Seagate, the Seagate logo and Seagate Technology are registered trademarks of Seagate Technology Inc.

MEDALIST XE

- Fast ATA interface
- Up to 35.8M bits per second internal transfer rate
- 120Kb multi-segmented read/write cache
- Low power dissipation, 1.7 watt idle with advanced power management
- 300,000 hours MTBF



BARRACUDA

- 7,200RPM spindle speed reduces average latency to 4.17msec
- Available with Fast, Fast Wide, Differential
- Average seek time of 8ms
- Blistering track-to-track seek time of 0.6msec



MARATHON SL

- Fast ATA and Fast ATA-2 interfaces
- Innovative SafeRite technology yields 100 G's operating shock
- 120KB adaptive read/write cache
- ATA compatible power management
- Auto park idle feature - very low idle power



MARATHON

- Fast ATA interface
- 120KB adaptive read/write cache
- Innovative SafeRite technology yields 100 G's operating shock
- ATA compatible power management
- Auto park idle feature - very low idle power



HARD DISK FEATURE

FUJITSU

IDE			
M2682T	352MB	12ms	£115
M2684T	532MB	12ms	£122
SCSI			
M2682S	353MB	12ms	£114
M2684S	532MB	12ms	£133
M1606SA	1.0GB	10ms	£321

IBM

IDE			
Pegasus	1.05GB	9ms	£383
SCSI			
Ultrastar	2.1GB	8ms	£967
Ultrastar	4.3GB	8ms	£1698
Pegasus	1.05GB	9ms	£510

TOSHIBA

2.5" IDE NOTEBOOK DRIVES			
MK1824FC	352MB	12ms	£239
MK1924FC	543MB	12ms	£319
MK2628FC	810MB	12ms	£499

2.5" SCSI NOTEBOOK DRIVES			
MK2224FB	213MB	12ms	£279
MK2428FB	520MB	12ms	£499
MK1824FB	353MB	13ms	£279
MK2526FB	528MB	12ms	£359

QUANTUM

IDE			
LT365	365MB	12ms	£118
LPS420AT	420MB	12ms	£111
LT540	540MB	10ms	£114
LT730	730MB	10ms	£156
SCSI			
LT365S	365MB	12ms	£128
LT540S	540MB	12ms	£153
LT730S	730MB	12ms	£171
LPS1225S	1.2GB	10ms	£599
Empire 1080	1.0GB	9.5ms	£531
Empire 2100	2.1GB	9.5ms	£910

AUDIO VISUAL

Atlas XP32150	2.1GB	8ms	£895
Atlas XP34300	4.3GB	8ms	£1460
Grand Prix			
XP34301	4.3GB	8.6ms	£1484

WESTERN DIGITAL

IDE			
AC2540	540MB	13ms	£149
AC2700	730MB	10ms	£156
AC2850	853MB	10ms	£158
AC31000	1.0GB	10ms	£239
AC31200	1.28GB	10ms	£244
AC31600	1.62GB	10ms	£489



MICROPOLIS

SCSI			
3221	2.05GB	8.5ms	£848
Half Height			
4221	2.05GB	8.5ms	£865
1936	3.02GB	12ms	£1280
3243	4.3GB	8.5ms	£1320
1991	9.1GB	12ms	£2260
AUDIO VISUAL			
3221AV	2.1GB	8.5ms	£872
Half Height			
4221AV	2.05GB	8.5ms	£844
1936AV	3.02GB	12ms	£1313
3243AV	4.3GB	12ms	£1388
1991AV	9.1GB	8.5ms	£2295

HARD DISK EXPERTS AVAILABLE FOR SPECIALIST ADVICE

DELIVERY CHARGES

UK MAINLAND - Next working day courier delivery to your door for all stock items
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**EARLY BIRD
Order Bonus
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Everyone at Powermark passes through our training college

CONNER FEATURE

CONNER®

The Storage Answer

IDE DRIVES

CFS425A POWERCUT!	425MB	14ms	£111
CFS540A POWERCUT!	545MB	14ms	£113
CFS850A	850MB	14ms	£179
CFS1275A	1.275GB	12ms	£249

SCSI DRIVES

CFA540S	540MB	12ms	£149
CP1080	1.08GB	10ms	£399
CFP2107	2.1GB	9ms	£845
CFP2105	2.1GB	11ms	£797
CFP4207 Caymen	4.2GB	8ms	£1470

1GB HARD DISKS AND ABOVE

FEATURE:

- 5 year warranty on all SCSI drives
- Embedded servo systems eliminate the need for thermal recalibration and provide consistent data transfer rates
- Hot pluggable for uninterrupted data access in RAID applications
- Low power consumption means less heat and component wear



**HARD DISK EXPERTS
AVAILABLE FOR
SPECIALIST ADVICE**

NEW!

CONNER TRAVAN 800MB

The Travan 800 is the latest in value data protection. Each kit includes

- Backup Exec software
- Interface cable
- User Guide
- 800MB Travan cartridge
- 9.5MB/minute backup rate
- Backward compatible with QIC80 and QIC40

TAPE-STOR 800MB INTERNAL	£155
TAPE-STOR 800MB EXTERNAL	£259

CONNER TAPE-STOR 850MB

- External parallel port tape backup or internal IDE system
- Compact, portable external system
- 9.5MB/minute backup rate
- QIC-wide and QIC-3010 compatibility

TAPE-STOR 850MB PARALLEL	£259
TAPE-STOR 850MB INTERNAL	£175

CONNER TAPE-STOR 420MB

Kit includes: Tape, Software, Manuals and cables

- Backward compatible with QIC80 and can read QIC40
- 9.5MB/minute backup rate

TAPE-STOR 420MB INTERNAL	£107
TAPE-STOR 420MB EXTERNAL	£207

HP COLORADO FEATURE

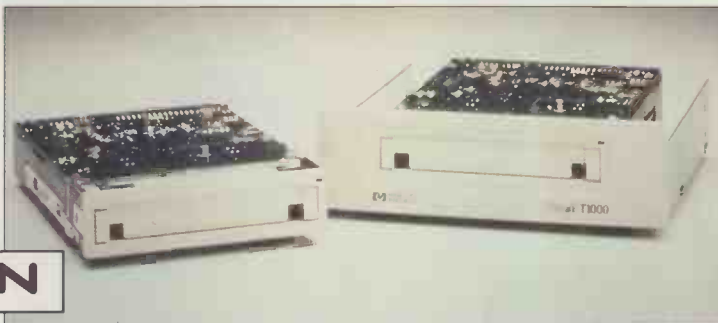
COLORADO® MEMORY SYSTEMS

A division of
hp HEWLETT®
PACKARD

HP COLORADO T1000

- Amazing value for money
- New, advanced TRAVAN technology
- 800MB capacity (with compression)
- Up to 9.5MB/min backup speed
- Fits into 3.5" or 5.25" drive bay
- Backward compatible with all QIC-80 and QIC-40 formats
- 2 year limited warranty

TRAVAN



HP COLORADO T1000

HP COLORADO BACKUP

- Easy to use software
- Scheduler
- Works with all HP Colorado devices

COLORADO BACKUP	£39
-----------------	-----

HP COLORADO JUMBO

- Connects to your floppy controller
- Internal device fits either 3.5" or 5.25" half height drive bays
- Includes software and cables

JUMBO 350	£81
JUMBO 700	£129
JUMBO 1.36GB	£227
QIC 3020	£29
FAST CONTROLLER CARD	£53
EXTERNAL MOUNTING KIT	£64

HP COLORADO TRAKKER

- Plug and play - no hardware installation
- A total backup solution - fully assembled systems available in up to 350MB and up to 680MB capacities
- Can be moved among laptops, notebooks, desktops, and towers alike

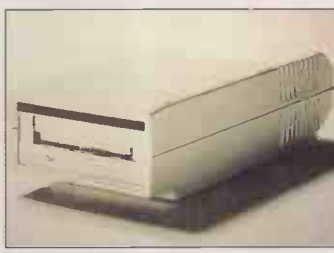
PARALLEL PORT TRAKKER 350	£154
PARALLEL PORT TRAKKER 700	£198
TRAKKER CARRY CASE	£37

HP SURESTORE TAPE SERIES

- Very fast DAT drive system
- Capacity from 2GB to typically 8GB
- PC Magazine Editors' Choice

	Int	ISA Kit*
HP SureStore Tape 2000	£651	&Call
HP SureStore Tape 5000	£739	&Call
HP SureStore Tape 6000	£844	&Call

*ISA Kit includes SCSI controller & full software



HP COLORADO TRAKKER 700

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**HARD DISKS
AND BACKUP**

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(50 lines)
Fax: 0181 905 6233
Email: sales@powermark.com

VISA MasterCard SWITCH DELTA
Cards are not debited until despatch
VAT at 17.5% will be added to all prices



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Powermark plc is regularly assessed by the British Standards Institution to ensure compliance with the quality standard.



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DELIVERY CHARGES

UK MAINLAND
Next working day courier delivery to your door

SMALL ITEMS

Examples: memory, sound/video cards, CD ROM titles, small software packages
UP TO 3 ITEMS £6.95 total
4 ITEMS OR MORE £1.95 for each additional item

LARGE ITEMS

Examples: CD ROM drives, monitors, multimedia kits, software suites
1ST ITEM £8.95
EACH ADDITIONAL ITEM £4.95

Call for rates outside UK mainland

MEMORY

U.S. ROBOTICS MODEM FEATURE



The Intelligent Choice in Data Communications

US ROBOTICS MODEMS

Model	V21	V22	V22bis	V32	V32bis	V32terbo	V34	MNP2-4	V42	V42bis	MNP5	IST Cellular	Internal	External
Sportster 14.4 + Fax	●	●	●	●	●	●	●	●	●	●	●	●	£108	£108
Sportster 28.8 V.34 + Fax	●	●	●	●	●	●	●	●	●	●	●	●	POWERCUT! £168	£166
Sportster 28.8 V.34 Mac + Fax	●	●	●	●	●	●	●	●	●	●	●	●	POWERCUT! -	£199
Courier Dual V.34 + Fax	●	●	●	●	●	●	●	●	●	●	●	●	£245	-
Courier Dual V.34 + Fax	●	●	●	●	●	●	●	●	●	●	●	●	POWERCUT! -	£242
WorldPort Dual Standard Cellular + Fax	●	●	●	●	●	●	●	●	●	●	●	●	POWERCUT! £125	-
WorldPort PCMCIA V.34	●	●	●	●	●	●	●	●	●	●	●	●	POWERCUT! £169	-

PowerPort High Speed Dual Async Serial Card. Recommended for terbo and V34 modems to prevent bottleneck of data. £49



SPORTSTER 28.8 + FAX

SPORTSTER 28.8 + FAX

The world's best selling modem just got better. With speeds of up to 28,800bps, the Sportster 28.8 + Fax offers proven high performance technology, at an unbeatable price.



COURIER V.34

COURIER

Courier Dual Standard V.34 with V.32bis
V.34 for speeds of up to 28,800bps. With the use of data compression a throughput of up to 115,200bps can be achieved, enabling you to communicate at speeds previously never possible on a dial-up line.



WORLDPORT DUAL STANDARD CELLULAR

WORLDPORT PCMCIA

WorldPort Dual Standard Cellular PCMCIA 2.0 Fax Modem

Compatible with any portable equipped with a PCMCIA type II slot and powered directly by the computer. The ideal solution for anyone who will regularly need to transfer data from their portable computer.



WORLDPORT PCMCIA

WORLDPORT DUAL STANDARD CELLULAR

Small enough to fit in your pocket, whilst providing you with all your data communications needs both in and out of the office, the WorldPort Dual Standard Cellular Fax is the perfect choice for the mobile user.

DATAFLEX MODEM FEATURE

DATAFLEX MODEMS

Model	V21	V22	V22bis	V23	V32	V32bis	V34	MNP2-4	V42	V42bis	MNP5	MNP10	V.17Fax	Internal	External
PC SuperGEM	●	●	●	●	●	●	●	●	●	●	●	●	●	£99	-
Portable SuperGEM	●	●	●	●	●	●	●	●	●	●	●	●	●	LIMITED OFFER! £69	£69
Comms Office	●	●	●	●	●	●	●	●	●	●	●	●	●	£106	£175
PC HyperGEM	●	●	●	●	●	●	●	●	●	●	●	●	●	£169	POWERCUT! £175
Portable HyperGEM	●	●	●	●	●	●	●	●	●	●	●	●	●	-	£195
Desktop HyperGEM	●	●	●	●	●	●	●	●	●	●	●	●	●	-	£242



14.4 portable only £69
Limited offer

SuperGEM Comms Office

Combines voice recording, message taking, automatic touch tone response, fax, modem and comms management in one box. Easy to use Windows software enables your PC to become an answering machine with automatic voice, fax and data detection.

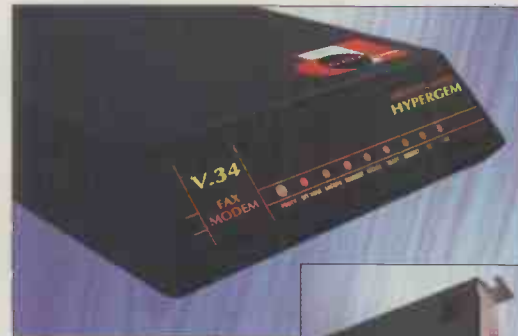
- Touch tone selection
- Voice mail
- Pager notification
- Call screening
- Sound card support
- Fax broadcasting
- Faxback/Faxforward
- Super Voice 2.0 software
- Windows fax and comms software

"Versatile modem combining answering machine with fax and data functionality - exceptional value"

What PC - June 1995



Internal comms office Only £106



HyperGEM

Available as portable, PC card or desktop
• V34 (28,800bps)
• Ideal for Internet
• Windows fax and comms software



... and here's what some of our customers have said ...
Sincere thanks for your knowledgeable and courteous assistance - a rare commodity these days!
D Cotton, Guest Brothers (Office Equipment) Limited, Lancs

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JUKEBOX HITS

Memories are made of this

Perry Como

Megabyte May

Rod Stewart

You're SIMMply the best

Tina Turner



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UK MAINLAND - Next working day courier delivery to your door for all stock items
See above

EARLY BIRD
Order Bonus
See page 25



Everyone at Powermark passes through our training college

BANK

at Powermark

MULTITECH MODEM FEATURE



MULTITECH MODEMS

Model	V21	V22	V22bis	V32	V32bis	V32terbo	V.34	MNP2-4	V42	V42bis	MNP5	Fax	Simultaneous voice & data	External
NEW! MT2834BLK	●	●	●	●	●	●	●	●	●	●	●	●	●	£392
MT1932ZDX	●	●	●	●	●	●	●	●	●	●	●	●	●	£108 POWERCUT!
MT1432LTI PCMCIA	●	●	●	●	●	●	●	●	●	●	●	●	●	£198
MT2834LTI PCMCIA	●	●	●	●	●	●	●	●	●	●	●	●	●	&Call
MT1432MK Pocket	●	●	●	●	●	●	●	●	●	●	●	●	●	£347
MT1432BLK	●	●	●	●	●	●	●	●	●	●	●	●	●	£309
NEW! MT2834ZDX	●	●	●	●	●	●	●	●	●	●	●	●	●	£165 POWERCUT!
NEW! MT2834PCSI	●	●	●	●	●	●	●	●	●	●	●	●	●	&Call



MULTIMODEM II MT2834 PCSI



MULTIMODEM II MT2834 ZDX

MULTIMODEM II ZDX SERIES

- Desktop unit
- Group 3/Class 2 (TR29) fax
- V.17 fax compatible
- PSTN only
- V42 (lap-M) error correction
- V42bis data compression
- MNP to Level 5
- Asynchronous operation
- AT command set (Hayes compatible)
- Free Multiexpress fax and comms software for windows
- 10 year warranty
- Available in 28.8bps (V34) and 14.4bps (V32bis)

MULTIMODEM II SERIES

- Desktop unit/metal enclosure
- Group 3/Class 2 (TR29) fax
- PSTN and 2W/4W leased line
- Leased line dial-backup with auto-restoral
- Security call-back (30 no.)
- V42 (lap-M) error correction
- V42bis data compression
- MNP to Level 5
- V25bis async/sync
- Free Multiexpress fax and comms software
- 5 year warranty
- Available in 28.8bps (V34) and 14.4bps (V32bis)

Save £25 off Multitech MT2834 PCSI modem when you buy Windows 95. See page 2



LASAT MODEM FEATURE

LASAT MODEMS

Model	V21	V22	V22bis	V32	V32bis	V.34	MNP2-4	MNP5	MNP10	Fax	External
Unique 144	●	●	●	●	●	●	●	●	●	●	£199 £299
Safire 144 (Mains only)	●	●	●	●	●	●	●	●	●	●	£119 £199
Credit 144 PCMCIA	●	●	●	●	●	●	●	●	●	●	£169 £229
NEW! Credit 288 PCMCIA	●	●	●	●	●	●	●	●	●	●	£249
Safire 288	●	●	●	●	●	●	●	●	●	●	£195 £295
NEW! Unique 640i single channel ISDN1/A	●	●	●	●	●	●	●	●	●	●	£399



SAFIRE 288

The Safire 288 V34 modem has V.42 error correction; V.42bis data compression, MNP 2-5,

MNP10; industry standard AT commands; async/sync/autosync communications; V.29 and V.27 fax. With indicator lights on front panel, the Safire 288 comes with cabling/PSU, fax software and is BABT approved.

It can send and receive data at 115,200 bps and send and receive faxes at 14,400 bps.

CREDIT 288

The Credit 288 V.34 PCMCIA modem which has V.42 error correction; V.42bis data compression, MNP 2-5, MNP10; industry standard AT commands; async (8/9/10-bit), autosync; auto dialling/answering; built-in 16550 FIFO UART.

It can send and receive data at 115,200 bps and send and receive faxes at 14,400 bps. Includes telephone cable/ plus, fax software and is BABT approved.



All modems supplied by Powermark plc are BABT APPROVED

"We were wrong to expect a good looking modem to perform badly. The Unique 144 displayed perfect data performance... and its throughput was excellent." Computer Shopper, April 1994

MODEMS

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HUGE STOCKS
Guaranteed same day despatch on virtually all stock items for orders placed even up to 4.00pm.

TECHNICAL SALES PEOPLE
Our sales people are the best. They are trained specialists in their chosen field - multimedia, memory of all types, mass storage, networking and communications.

FINANCIAL STABILITY
Powermark plc has been supplying upgrades for over 5 years and has an annual turnover exceeding £18 million with a healthy balance sheet.

LOW, LOW PRICES
We only supply products from leading manufacturers and at low, low prices too.

TECHNICAL SUPPORT
Dedicated after sales technical support teams on line to help with installation.

CORPORATE & PUBLIC SECTOR
We welcome orders from corporate, education and public sector organisations. Just fax or phone your order number.

FULL MANUFACTURERS' WARRANTIES
All products supplied by Powermark plc carry manufacturers' warranties and of course full Powermark plc guarantees.

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VISA MasterCard SWITCH

Cards are not debited until despatch
VAT at 17.5% will be added to all prices

HMSO
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**HAYES ESP
ACCELERATOR
CARDS**

- Helps PCs to keep up with fast modems
- Recommended for all 288 and 144 modems
- Can run at speeds up to 921,600bps

ESP Card - 1 Port £74
ESP Card - 2 Port £108

CABLES

2 metre
9F to 25M £8
2 metre
25F to 25F £8

Call for modem/serial cables and adaptors not listed here.

... and here's what some of our customers have said ...
Thank you for your help this morning. It was a pleasure to speak with someone so cheerful first thing in the day.

J Couper-Johnston
Langham Arts, London

All modems supplied by Powermark plc are BABT APPROVED

**TURN THE PAGE
FOR MORE**

**FAMOUS
COMMUNICATORS**

Mao Tse Tung
Eva Peron
Che Guevara

DELIVERY CHARGES

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See page 11

**EARLY BIRD
Order Bonus
See page 25**

MEMORY

MOTOROLA MODEM FEATURE



**3400
ONLINE & PRO
MODEMS**

- Motorola RISC Technology
- Twice the speed of V.32bis 14.4bps technology
- Automatically selects the fastest possible line speed
- Robust performance over standard telephone lines
- Data error correction and data compression
- Fax error correction
- Phone number directory

Motorola 3400 Online 28.8 Internet Solution comes complete with all hardware and software that you need to get your PC online to the Internet!

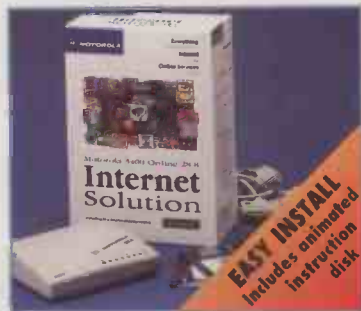
- Internet software
- Protocol software
- File transfer software
- WorldWideWeb browser software
- Electronic mail software
- Newsgroup software
- Interactive online game
- Internet phone software licence

*Voice feature allows you to make voice calls to anywhere in the world through the Internet for the price of a local call

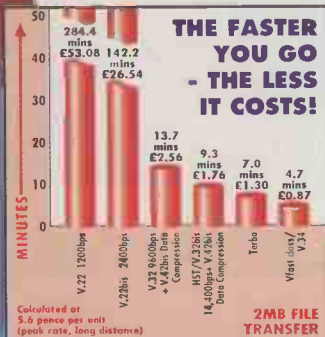
MOTOROLA MODEMS

Model	V21	V22	V22bis	V32	V32bis	V32terbo	V34	MNP2-4	V42	V42bis	MNPS	Fax	Voice*	External
3400 Online	●	●	●	●	●	●	●	●	●	●	●	●	●	POWERCUT!
3400 Pro Mac	●	●	●	●	●	●	●	●	●	●	●	●	●	POWERCUT!
3400 Pro PC	●	●	●	●	●	●	●	●	●	●	●	●	●	POWERCUT!

- Speed 28,800 bps the fastest standard available
- True V.34 worldwide compatibility
- Complete with all necessary cabling
- Includes popular fax and communications software
- Comprehensive user manual included
- Telephone support helpline



DFI MODEM FEATURE



DFI MODEMS

Model	V21	V22	V22bis	V32	V32bis	V32terbo	V.34	MNP2-4	V42	V42bis	MNPS	HST Cellular	Fax	Internal	External	
Passport F1114V	●	●	●	●	●	●	●	●	●	●	●	●	●	£84	£84	
Passport F1128V+	●	●	●	●	●	●	●	●	●	●	●	●	●	POWERCUT!	£159	£159



DFI®

DFI manufactures a comprehensive line of high quality PC components which are the strength behind it's custom-built desktop and notebook PCs.

To supplement this product line, DFI have now moved into the data communications arena, launching the passport range of BABT approved fax modems. This complete package offers you state of the art technology and incorporates everything you need to gain access to the information super highway at a highly competitive price.

F1114V

- Features**
- Data/Fax speed: 14,400 bps
 - Call back security
- Accessories included**
- Serial cable
 - Telephone lead
 - User's manual
- Software**
- Delrina's 4 in 1 Win/DOS Fax Lite and Comit Lite DOS/Win Access
 - Introductory membership to CompuServe
- Warranty**
- 5 years

F1128V+

- Features**
- Data/Fax speed: 28,800/14,400 BPS
 - Call back security
- Accessories included**
- Serial cable
 - Telephone lead
 - User's manual
- Software**
- Delrina's 4 in 1 Win/DOS Fax Lite and Comit Lite DOS/Win Access
 - Introductory membership to CompuServe
- Warranty**
- 5 years



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at Powermark

HAYES MODEM FEATURE



ACCURA 288

ACCURA+FAX

Low cost fax modems with all of the quality and ease-of-use that comes with the Hayes name.

OPTIMA+FAX

Offers outstanding performance with the ability to compress data twice as much as other fax modems.



OPTIMA 288



HAYES MODEMS

The industry standard

Model	V21	V22	V22bis	V32	V32bis	V32terbo	V34	MNP2-4	V42	V42bis	MNP5	Fax	Internal	External
ACCURA 144 + Fax	●	●	●	●	●	●	●	●	●	●	●	●	-	£135
ACCURA 288 + Fax	●	●	●	●	●	●	●	●	●	●	●	●	-	£172
OPTIMA 144 + Fax	●	●	●	●	●	●	●	●	●	●	●	●	-	£249
OPTIMA 144 PCMCIA	●	●	●	●	●	●	●	●	●	●	●	●	-	£197
OPTIMA 288	●	●	●	●	●	●	●	●	●	●	●	●	-	£342
OPTIMA 288 bundle	●	●	●	●	●	●	●	●	●	●	●	●	-	£699
2 pack with free accelerator cards and upgrade to V.34														
ULTRA 144	●	●	●	●	●	●	●	●	●	●	●	●	-	£489
ULTRA ISDN 64K System Adapter	●	●	●	●	●	●	●	●	●	●	●	●	-	£499

ESP high speed serial card, 1 port £59, 2 port £89

PSION MODEM FEATURE



PSION DACOM MODEMS

Model	V21	V22	V22bis	V32	V32bis	V.F.C.	V34	MNP2-4	MNP10	V42	V42bis	MNP5	Fax	PCMCIA
V.32bis Gold Card	●	●	●	●	●	●	●	●	●	●	●	●	●	£175
V.34 Gold Card	●	●	●	●	●	●	●	●	●	●	●	●	●	£219

GOLD DRIVE PCMCIA READER



- Internal device reads any PCMCIA card
 - Fits into any 3.5" drive bay
 - Front loading
 - Reads Type I, II and III cards
 - Easy to use
 - Easy to install
 - 5MB/sec data transfer rate
- GOLD DRIVE PCMCIA ADAPTER** £119

Comms experts available for specialist advice

All modems supplied by Powermark plc are BABT APPROVED

ZOOM MODEM FEATURE



Personal Computer World:
Editor's Choice
Award Dec '93 and
June '93

Windows User:
Best On Test,
February 94



ZOOM 14.4 MODEMS

- Remote configuration and callback security
- High speed 14,400 bps fax and data transmission with V.42bis and MNP 2-5

- Extended status reporting with 15 LED lights (14.4X only)
- 5 year warranty
- Buffered 16550 UART to prevent data overruns (14.4i only)

ZOOM MODEMS

Model	V21	V22	V22bis	V23	V32	V32bis	V34	MNP2-5	V42	V42bis	Fax	Internal	External
14.4X	●	●	●	●	●	●	●	●	●	●	●	POWERCUT!	£95
14.4i	●	●	●	●	●	●	●	●	●	●	●	POWERCUT!	£89
14.4X MacPak	●	●	●	●	●	●	●	●	●	●	●	POWERCUT!	£109
28.8X	●	●	●	●	●	●	●	●	●	●	●	POWERCUT!	£169
28.8i	●	●	●	●	●	●	●	●	●	●	●	POWERCUT!	£149
28.8X MacPak	●	●	●	●	●	●	●	●	●	●	●	POWERCUT!	£179

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MODEMS

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Our sales people are the best. They are trained specialists in their chosen field - multimedia, memory of all types, mass storage, networking and communications.

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Powermark plc has been supplying upgrades for over 5 years and has an annual turnover exceeding £18 million with a healthy balance sheet.

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TECHNICAL SUPPORT
Dedicated after sales technical support teams on line to help with installation.

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All products supplied by Powermark plc carry manufacturers' warranties and of course full Powermark plc guarantees.

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Certificate no. FS 26535

Power



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CABLES

	Unit	10 Pack
1.5m Thin Ethernet Cable	£9	£89
5m Thin Ethernet Cable	£11	£95
10m Thin Ethernet Cable	£15	£135
35m Thin Ethernet Cable	£33	£320
Unit 10 Pack		
BNC T-Piece	£3	£26
BNC Terminator	£3	£22
BNC In-Line Coupler	£3	£28

AMERICAN POWER CONVERSION UPS

LINE INTERACTIVE UPS

	Rating (VA)	Avg. backup time (mins)	Unit Price
SU250	250	8	£175
SU400	400	7	£209
SU600	600	7	£239
SU900	900	7	£409
SU1250	1250	7	£549
SU2000	2000	7	£939

OFF-LINE UPS

	Rating (VA)	Avg. backup time (mins)	Unit Price
CU250	250	7	£85
CU400	400	6	£102
CU600	600	8	£156
CU900	900	7	£279
CU1250	1250	7	£369

Powerchute Network £49
Powerchute Windows £39
Powerchute Unix £69

UPS units are measured by a VA rating, typical VA requirements are shown above

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MOVIE MEMORIES

Another chance to read...
Heroes of Powermark
RAIDERS of the Lost Ark
A Hard Disks Night



MEMORY

XIRCOM FEATURE



CREDIT CARD ETHERNET + MODEM II

- Simultaneous Ethernet/803.2 LAN plus 19,200 bps data and 14,400 bps send/receive fax modem operation in one slot
- Modem software configurable to support localised telephone requirements in US and 14 European countries
- Serial port/UART emulation provides increased compatibility with all popular terminal and fax software
- Includes terminal and fax software for Windows

- Performance modem communications via Xircom's Modem Application Programming Interface (XMAPI)
- Supports advanced PCMCIA features including HotSwap, Suspend/Resume and Integrated Power Management
- Support for remote node access applications
- Includes Windows terminal and fax software

- CEM2-10BT (TP) POWERCUT! £349**
CEM2-10B2 (BNC) POWERCUT! £359
CEM2-10BC (COMBO) POWERCUT! £369

Xircom

CREDIT CARD TOKEN RING ADAPTER IIps

- High-performance, memory-saving SmartRing software
- 16 or 4 Mbps software selectable ring speed
- Windows and DOS based installation program automatically configures PC and NOS setup
- Intuitive Windows based user utility for easy adapter management
- Allows 'hot' removal and reinsertion while preserving system status
- Supports both shielded & unshielded twisted pair Token-Ring cabling
- Compatible with the widest range of platforms

PS-CT2-16CTP (TP) £299



POCKET ETHERNET ADAPTER III



- Universal connection for all notebook, laptop and desktop PCs
 - Enhanced Parallel Port (EPP) capable
 - Requires no internal expansion slots
 - No jumpers or configuration switches to set
 - Ultra-compact, ergonomic design for maximum portability and one hand installation
 - Phantom power cable
 - Small, lightweight power supply included
- PE3-10B2 (BNC) £185**
PE3-10BT (TP) £186
PE3-10BC (COMBO) £209

3COM FEATURE



Compatible with commonly used operating systems, including Novell Network, Microsoft LAN Manager, DECnet, DOS, PC-NFS, Banyan Vines and 3+Open.

- 3C503 RANGE**
Standard 8-bit or selectable 16-bit card. Shared memory architecture and 8K buffer.
- 3C529 RANGE**
MCA Etherlink III Cards.

- 3C509 RANGE**
16-bit high performance, low component cards.
- 3C579 RANGE**
32-bit EISA interface using Parallel Tasking Architecture. The adapter uses the same drivers as the EtherLink III and is SNMP manageable when used with Linkwatch.

CALL FOR 20 PACK PRICES



3C509 RANGE

	BNC	RJ45	AUI	Unit	5 Pack
3C509	●		●	£73	£329
3C509TP		●		£73	£329
3C509C	●	●	●	£81	£359

3C529 RANGE

• MCA Etherlink III cards

	BNC	RJ45	AUI	Unit	5 Pack
3C529	●		●	£156	£699
3C529TP		●	●	£156	£699

3C579 RANGE

• 32-bit EISA interface using Parallel Tasking Architecture

	BNC	RJ45	AUI	Unit	5 Pack
3C579	●		●	£149	£679
3C579TP		●	●	£149	£679

3C589 RANGE

• PCMCIA cards

	BNC	RJ45	AUI	Unit	5 Pack
3C589T POWERCUT!		●		£107	£490
3C589C POWERCUT!	●	●		£137	£634

TOKEN RING PCMCIA

• AutoLink software
• LEDs for installation and trouble shooting

	Unit	5 Pack
3C689 TokenLink III 16/4	£299	£1399

3C590 RANGE

• PCI Bus Master adapters using parallel tasking architecture

	BNC	RJ45	AUI	Unit	5 Pack
3C590TP		●		£97	£424
3C590C	●	●		£113	£512

DELIVERY CHARGES

UK MAINLAND - Next working day courier delivery to your door for all stock items
See page 11

EARLY BIRD
Order Bonus
See page 25



Everyone at Powermark passes through our training college

ARTISOFT FEATURE



ARTISOFT®

LANTASTIC FOR OS/2 NETWORK OPERATING SYSTEM

The only network software that works in IBM OS/2 Warp V3.

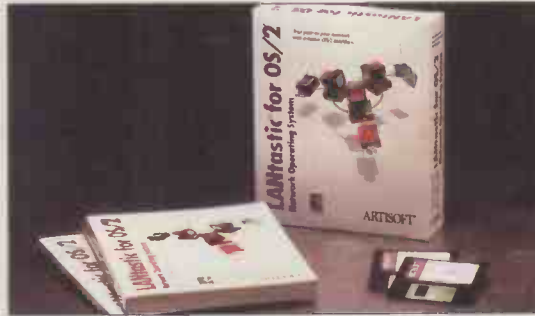
As the world leader in peer-to-peer networks for DOS and Windows, LANtastic opens the door to sharing files and printers with minimal expense and maximum flexibility.

LANtastic for OS/2 is a 32-bit, multitasking, multithreaded network operating system that supports Named Pipes and HPFS and FAT file systems.

With a familiar interface, LANtastic for OS/2 allows you to take full advantage of the power of OS/2. It features tight security and strong management features - full network control at your fingertips and quick installation.

1 USER POWERCUT! £69
5 USER POWERCUT! £299

ALSO AVAILABLE:
LANTASTIC V6 FOR DOS AND WINDOWS £59
5 USER PACK £235
LANTASTIC UTILITY PACK £249
ARTICOM £75
ARTISAVE £137



LANTASTIC NETWORK STARTER KIT

LANtastic is the most awarded network in the world (over 106 awards to date), with over 2.5 million users worldwide. Artisoft is the network for small/medium businesses. The LANtastic Starter Kit contains everything you need to

connect 2 PC's (hardware, software, cables, manuals, T-pieces) in ONE box. When you need to add a node get an add-on kit.

Installation is exceptionally easy. If you are not fully satisfied there is a 30 day money back guarantee.

Get networked with LANtastic and get the most from your PC investment.

Powerfully,
simply,
networking

LANTASTIC 2 NODE NETWORK STARTER KIT £192
LANTASTIC ADD-ON 1 NODE KIT £109

INTEL NETWORKING FEATURE



INTEL LANDESK MANAGEMENT SUITE V2.0

- Integrated desktop management applications including: software distribution and metering, inventory and remote control, printer management, traffic monitoring, powerful reporting and much more
- Powerful data capture and reporting

LANDESK MANAGER SUITE V2 £349
LANDESK MANAGER V1.51 £675



INTEL NETPORTEXPRESS XL PRINT SERVER

The high performance print server for multi-protocol networks. Supports Novell NetWare, UNIX and Macintosh network printing environments simultaneously. It connects up to three printers anywhere on your LAN, so it's easy to respond to changing users' needs.

- Print throughput of up to 180 KBps
- Simultaneously (multi-protocol) supports up to 3 protocols on up to 3 attached printers
- Software upgradable with Flash memory

NETPORT XL BNC/TP £324 £899
NETPORT XL TOKEN RING £439

...ALSO AVAILABLE
NETPORT EL BNC/TP £259 £749
NETPORT EL TOKEN RING £388

INTEL ETHEREXPRESS PRO



- Superior performance via concurrent processing, large 32k buffer and 32-bit instructions
- 90 day money back guarantee and limited lifetime warranty

ETHEREXPRESS 16					
	BNC	RJ45	AUI	Unit	5 Pack
EE16	•	•	•	£69	£325
EE16-TP	•	•	•	£71	£335
ETHEREXPRESS FLASH					
	BNC	RJ45	AUI	Unit	5 Pack
EF16	•	•	•	£74	£352
EF16-TP	•	•	•	£74	£352
EF16C	•	•	•	£86	£415
ETHEREXPRESS PRO 10 (PLUG & PLAY)					
	BNC	RJ45	AUI	Unit	5 Pack
EP16-TP	•	•	•	£59	£266
EP16C	•	•	•	£71	£329
ETHEREXPRESS FLASH PRO 10 (PLUG & PLAY)					
	BNC	RJ45	AUI	Unit	5 Pack
EFP16-TP	•	•	•	£68	£289
EFP16C	•	•	•	£77	£353

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**Save
£10
off
SMC**



**EtherEZ Ethernet
cards and £40 off
five-packs of SMC
EtherEZ Ethernet
cards**

when you buy Windows 95.

See page 2

**TURN THE PAGE
FOR MORE**

... and here's what
some of our customers
have said ...

*May I take this
opportunity to thank
both yourself and Peter
Mitchell for the helpful
manner with which you
dealt with my order.*

S Devey, Shropshire

*Please accept my
sincere thanks for your
efficient and courteous
service, not often found
these days.*

S Nightingale, Leics

*Thank you for your
customer service. I
appreciate it.*

J Kempner, Marketing
Image Ltd, Middlesex

MEMORY

SMC NETWORKING FEATURE



SMC EtherEZ Adapters

- Easiest installation into Plug and Play and non-'PnP' computers
- SimulTasking for top performance
- Extensive driver support via SMC SuperDisk
- Diagnostics LEDs
- PC Agent/SNMP for simple network management to the desktop
- 10BASE2, 10BASE-T and Combo versions
- Lifetime warranty
- Comes in a choice of single or five pack options

	Single	5 Pack
EtherEZ Adapter BNC	POWERCUT! £61	£289
TP	POWERCUT! £61	£259
Combo	POWERCUT! £69	£323



SMC ETHERCARD ELITE ULTRA

	Single	6 Pack
Elite 16 Ultra BNC	£59	£339
Elite 16 Ultra TP	£59	£339
Elite 16 Ultra Combo	£69	£386

24 AND 50 PACKS ALSO AVAILABLE

SMC ETHERPOWER PCI

	Single	5 Pack
EtherPower PCI TP	POWERCUT! £89	£415
EtherPower PCI Combo	POWERCUT! £101	£499

SMC ELITECARD PCMCIA

	Single	5 Pack
EliteCard PCMCIA TP	£85	£399
EliteCard Combo	£114	£553

SMC ETHERCARD ELITE 32C ULTRA

	Single	6 Pack
Elite 32C Ultra Combo	£141	£769

TIGER HUBS

	Number of Ports				
	TP	BNC	AUI	FL	
CX3	0	3	1	0	£209
TP6	6	0	1	0	£124
TP6B	6	1	0	0	£125
TP12	12	1	1	0	£249
CX6	1	6	1	0	£435
FL6	0	1	1	6	£Call

FISKARS POWER FEATURE

FISKARS

POWERSERVER 10

The PowerServer 10 range of line-interactive Uninterruptible Power Supplies provides a typical computer load with up to 10 minutes of battery back-up time in the event of an extended mains power failure. Cost-effective UPS for servers, workstations and other LAN applications.

- PC Magazine Editors' choice
- ABM battery management
- On-line battery testing
- Wide input range
- Compatible with LanSafe III power management software
- European approvals (VDE, SEMKO, FIMKI, etc)



Model	Power Range	Watts at Power Factor 0.7	Typical Backup Time (Mins)	
PS10/0.4	400VA	280W	10	£259
PS10/0.6	600VA	420W	10	£279
PS10/1.0	1000VA	700W	10	£479
PS10/1.4	1400VA	980W	10	£599
PS10/1.8	1800VA	1260W	10	£879
PS10/2.2	2200VA	1540W	10	£1069

FAILSAFE III

Power Management Software for Stand-Alone PC's

- For Windows, Windows NT and OS/2
- Self-guided Installation
- Automatic orderly shutdown in case of power failure
- Automatic reboot when power returns
- Power events stored in log file for analysis

FAILSAFE III WINDOWS	£49
FAILSAFE III WINDOWS NT	£49
FAILSAFE OS/2	£49

LANSAFE III

Power Management Software for Networks

LanSafe III, used in conjunction with a Fiskars UPS, provides a sequenced network shutdown in the event of an extended mains power failure. LanSafe III ensures the integrity of data by instructing the workstations to send their cached data to the hard disk, before sequentially closing down the network.

- Automatic reboot when power returns
- Power events stored in log file for analysis

POWERRITE PLUS

	Power Range	Typical Backup Time	
PRP/250	250VA	5 Mins	SPECIAL OFFER! £77
PRP/400	400VA	5 Mins	£117
PRP/600	600VA	5 Mins	£156

- Protects against power problems
- Advanced battery management (ABM) gives 30% longer battery life
- Supported by LanSafe III and FailSafe III power management software (400VA and 600VA models)

PowerRite Plus is a powerful, small-footprint Uninterruptible Power Supply suitable for use with workstations and communication devices. The PowerRite Plus range typically provide 5 minutes of back-up time for computer loads. All models feature a computer communication software option.



- Automatic orderly shutdown of entire network in case of power failure
- | | |
|---------------------------------------|------|
| LANSAFE III FOR DOS/ WINDOWS/ NETWORK | £69 |
| LANSAFE III FOR NOVELL NMS | £119 |
| LANSAFE III WINDOWS NT | £69 |
| LANSAFE OS/2 | £69 |
| LANSAFE III UNIX | £69 |

How much is your data worth?

A power failure could mean its loss!

Not only a day's work, but perhaps a quotation not sent on time or creative work that can never be recreated exactly. Look at this feature - there's a system to protect you, your data and your pocket.



NOVELL FEATURE

**Novell
Authorised
Reseller**

INTRODUCING NOVELL NETWARE 4.1

NetWare 4.1 incorporates all the advantages of previous versions of NetWare, plus gives you new capabilities designed to increase productivity, reduce costs, and simplify installing and maintaining your network. It elevates networking to the next level and lays the foundation for a distributed computing infrastructure.

- Additive licensing - 25 user licence + 10 user licence = 35 user licence



- NDS - NetWare Directory Services
- Offers a single network log in for access to all available resources
- Improved memory management and protection whilst utilising both ring 3 and 0
- Enhanced security utilising RSA public/private key cryptography
- Independent network auditing features
- Remote management features
- Automatic file grooming and archiving
- All utilities in GUI format
- Support for over 250 printers per server
- New simplified menu driven installation
- Improved ITX WAN behaviour with enhanced routing of IPX, AppleTalk and IP
- New and enhanced SFT III 4.1 providing NetWare for SAA, NetWare for MAC and NMS support
- Internationalisation via Multilingual language modules
- NetWare messaging services, NetWare for Macintosh, NetWare/IP and NetWare for OS/2 supplied in the box

NOVELL NETWARE 4.1 CD	
5 USER	£449
10 USER	£1129
25 USER	£1585
50 USER	£2129
100 USER	£3219
250 USER	£Call

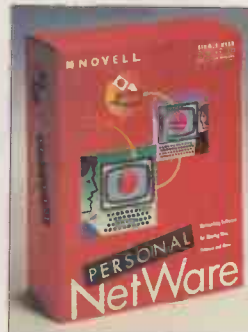
NOVELL NETWARE 3.12	
5 USER	£445
10 USER	£1059
25 USER	£1549
50 USER	£1999
250 USER	£Call

POWERCUT!

Call for CD ROM pricing

PERSONAL NETWARE

- Share all your printers, drives (CD ROMs etc), directories and files



PERSONAL NETWARE	£44
5 PACK	£189

KYOCERA PRINTER FEATURE

KYOCERA FS-400

A compact 4 pages per minute, low cost personal page printer that also offers full system printer capabilities and savings on print costs due to its cartridge-free design.

The FS-400 has a wealth of features, including 300 dpi resolution, enhanced to 300 x 1200 dpi by Kyocera resolution technology, 13 scalable in-built fonts, and for addition cost savings, Energy Star compliance and draft print mode.

Other features include industry standard LaserJet III and optional PostScript emulations, single and multi-protocol network connectivity expansion and full compatibility with Windows applications.

KYOCERA FS-400	£447
POWERCUT!	
NETWORK-SPECIFIC ETHERNET	
INTERFACE	£279
TONER KIT	£16
3 YEAR ECOSHIELD	
ON-SITE WARRANTY	£150



KYOCERA FS-400

KYOCERA FS-1550

The FS-1550 10 pages per minute printer offers substantial savings on running costs compared with competitive printers - where the ongoing cost of consumables can amount to far more than the purchase price.

It is ideal for word processing, database and spreadsheet printing, and with resolution enhancement, graphics. As your requirements grow, ECOSYS paper handling options include extra paper trays, a duplex unit and a sorter/collator.

Other features include industry-standard LaserJet III and optional PostScript emulations, sophisticated networking and IBM connectivity options, and full compatibility with Windows applications.

KYOCERA FS-1550	£925
NETWORK-SPECIFIC ETHERNET	
INTERFACE	£279
TONER KIT	£51
3 YEAR ECOSHIELD	
ON-SITE WARRANTY	£199
Also available - KYOCERA FX1600	£1099

- 600dpi printer



KYOCERA FS-1550



KYOCERA FS-1550 WITH ACCESSORIES

ECOSYS
Printing costs. Stop paying the price.

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**NETWORKING
& PRINTERS**

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Certificate no. FS 26555

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“... and here's what some of our customers have said ...
Many thanks for your advice on the phone today, it makes a change to talk to someone in your industry who doesn't treat us amateurs as idiots.
J Cross, Beds”

HP SupportPack

- Onsite warranty by HP engineers
- Recommended for all HP Laserjets & Deskjets

He's back!

YAP! PUP OF THE MONTH

DINOSAUR SAFARI CD ROM
£2 WITH ANY PURCHASE OVER £20

TURN THE PAGE FOR MORE

MEDIA MOMENTS
Famous media moments...

Virginia Wade winning Wimbledon

The highway in LA after the earthquake

First TV satellite transmission

Telstar

MEMORY

HP PRINTER FEATURE

hp HEWLETT PACKARD

Authorised Reseller
Personal Computer Products

HP DESKJET 320

- 600 x 300 dpi in black
- Up to 3 pages per minute in black
- 13 scalable Windows fonts

HP DESKJET 320 £175
HP DESKJET 320 WITH CUT SHEET FEEDER £195
COLOUR KIT UPGRADE £32
3 YEAR ON-SITE WARRANTY £39

HP DESKJET 1200C

- 600 x 300 dpi
- Up to 6 pages per minute in black

HP DESKJET 1200C £655
HP DESKJET 1200C/PS £1045

HP DESKJET 660C

- 800 x 600 dpi in black
- 14 TrueType fonts

HP DESKJET 660C £309

HP DESKJET 1600C

- 800 x 600 dpi in black
- 4MB RAM

HP DESKJET 1600C £865



HP DESKJET 660C



HP DESKJET 540

HP DESKJET 850C

- 800 x 600 dpi in black
- Up to 6 pages per minute in black
- 45 TrueType fonts

HP DESKJET 850C £405

HP DESKJET 540

- 600 x 300 dpi in black
- Up to 3 pages per minute
- 3 year warranty

HP DESKJET 540 £219
COLOUR KIT UPGRADE £32



HP DESKJET 1600C

HP LASERJET 4V

- A3 paper handling
- 8 pages per minute in A3, 16 in A4
- Delivery: £27 on this printer

HP LASERJET 4V £1425
HP LASERJET 4MV £2065
HP LASERJET 4V 500 SHEET TRAY SYSTEM £279
3 YEAR ON-SITE WARRANTY £199

Matched Memory Kits for HP Printers on page 5

HP LASERJET 5P

- 6 pages per minute
- 26 seconds first page out
- 600 dpi, RET, microfine toner
- 2MB RAM, up to 50MB

HP LASERJET 5P £597
HP LASERJET 5MP £729



HP LASERJET 5P

HP COLOR LASERJET

- Up to 10 pages per minute in black
- Up to 2 pages per minute in colour
- 300 dpi
- 1 year on-site warranty
- Delivery: £27 on this printer

HP COLOR LASERJET £4389
IEEE 1284 COMPLIANT PRINTER CABLE £19
HP COLOR LASERJET CABINET £345
250 SHEET REAR FEED UNIT £315

HP LASERJET 4Si

- 16 pages per minute
- 600 dpi
- Includes 1 year on-site warranty
- Delivery: £27 on this printer

HP LASERJET 4Si £2175
HP LASERJET 4SiMX £3099
3 YEAR ON-SITE WARRANTY £459

HP LASERJET 4L

- 4 pages per minute
- 300 dpi
- 1MB RAM

HP LASERJET 4L £369
HP LASERJET 4ML £735
3 YEAR ON-SITE WARRANTY £95



HP COLOUR LASERJET

HP LASERJET 4 PLUS

- 12 pages per minute
- Up to 600 dpi
- 2MB RAM

HP LASERJET 4 PLUS £989
HP LASERJET 4M PLUS £1349
HP DUPLEX UNIT £499
3 YEAR ON-SITE WARRANTY £159

PRINTER ACCESSORIES FEATURE

ORIGINAL TONER CARTRIDGES

CANON		
LBP 4/4+	£51	
LBP 8III	£52	
LBP 8IV	£71	
EPSON		
EPL 4100/4300	£64	
EPL5200	£84	
PANASONIC		
KX-P4410/4430	£28	
KX-P4420	£26	
KX-P4450	£18	
NEC		
NEC 610		£79
NECS60/60P/62P/90/95		£108
HEWLETT-PACKARD		
LaserJet II/IIID/III/IIID		£47
LaserJet II IIP/IIIP+/IIIP		£46
LaserJet II IIIS/4Si/4MX		£77
LaserJet II 4/4+/4M/4M+		£67
LaserJet II 4L/4ML/4P/4MP		£44
LaserJet II4V/4MV		£115
LaserJet 5 Series		&Call
Drums and developers for Panasonic range also available		

PRINTER SHARERS

TRUST AUTOSWITCH 2 £13

- Connects 2 computers to 1 printer

TRUST AUTOSWITCH 4 £27

- Connects 4 computers to 1 printer

AUTO SWITCHES

2 PCs to 1 printer £18
4 PCs to 1 printer £18

AUTO SWITCHES

- 256K buffer

4 PCs to 2 printers £127

DESKJET CARTRIDGES

HP DESKJET BLACK CARTRIDGE £18
HP DESKJET COLOUR CARTRIDGE £21

PRINTER CABLES

	1.5m	3m	10m
PARALLEL	£4	£8	£14
25M - 25M	£4	£9	£15
25M - 36M	£6	£8	£18

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EARLY BIRD

Order Bonus
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POWERMARK ACADEMY

Everyone at Powermark passes through our training college

OKI PRINTER FEATURE

OKI

OL400ex Series 4 ppm Page Printers

Are you interested in LED/laser quality printing from a fast, four page per minute printer that takes up little more space on your desk than an A4 notebook? If so, you need look no further than the OL400ex series. Both the OL400ex and OL410ex are designed to sit discretely and quietly on any desktop.



OL810ex

OKI 810ex

- 8 pages per minute
- True 600 x 600 dpi
- 2MB RAM
- HP4 compatible
- On-site warranty

OKI 810ex

£689



OL400ex

OKI 400ex

- 4 pages per minute
- HP II compatible
- 300 dpi
- PCL4
- Low cost of ownership
- On-site warranty

OKI 400ex

£289



OL300C

OKI Jet 300C

- 3 pages per minute
- Low cost colour printing
- 300 x 300 dpi
- PCL 3
- Straight paper path

OKI Jet 300C

£239

OKI 410ex

- 4 pages per minute
- HP III compatible
- 600 dpi
- PCL 5
- Low cost of ownership
- On-site warranty

OKI 410ex

£389

FUJITSU PRINTER FEATURE

FUJITSU

Fujitsu, the world's second largest supplier of data processing systems, telecommunications equipment and electronic components, provides a wide range of printer products for home and business applications. The VM range of LED Page Printers offer all the inherent quality associated with all Fujitsu manufactured products, combined with exceptional value.

- LED print technology
- Small footprint
- Easy operation
- Low power consumption
- No waste toner
- Meets the EPA requirements for 'Green' printing
- Low cost per page
- 100 page sheet feeder



FUJITSU VM8

VM4

- 4 pages per min
- 300 dpi which is optimised to 300 x 900 dpi using Fujitsu Enhanced Imaging Technology
- PCL5
- 1MB RAM expandable to 9MB
- 10MHz Intel 80960 RISC processor
- Ethernet and Appletalk network interfaces available

FUJITSU VM4

£349

VM4-WIN

- 4 pages per min
- 300 dpi which is optimised to 300 x 900 dpi using Fujitsu Enhanced Imaging Technology
- High speed Bi-directional parallel interface (IEEE P1284 Nibble mode)
- Minimal memory (3 raster memory + work memory)

FUJITSU VM4-WIN

£295

VM8

- 8 pages per min
- 300 dpi which is optimised to 300 x 900 dpi using Fujitsu Enhanced Imaging Technology
- PCL5
- 1MB RAM expandable to 9MB
- 20MHz Intel 80960 RISC processor
- Ethernet and Appletalk network interfaces available

FUJITSU VM8

£399

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Power



Mark®

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He's back!
**DOG OF
THE
MONTH**
MIKE DITKA
ULTIMATE
FOOTBALL CD ROM
£2 with any purchase over £30

ARF!



... and here's what
some of our customers
have said ...

*I am very impressed with
the response to my first
order, for a Colorado Tape
Streamer. When I gave the
order by phone I was told
you were out of stock and
expecting new supplies early
this week. It was thus a
pleasant surprise to receive
the Tape Streamer on
Tuesday. What was even
more of a surprise was to
receive yesterday your letter
dated 27th February 1995,
apologising for the expected
delay in despatching the
order. So you see, your
"delayed" delivery of the
parcel was actually quicker
than the letter by Royal Mail!*
R A Morgans
Middlesex

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FOR MORE

NEW! MEMORY
LANE AGAIN

Do you remember this
Memory Lane from
September 1993...?

Do you remember...

Life before bar codes

Light pens for the BBC
Micro

8 track stereo
systems
Pulse dialling



MEMORY

CREATIVE LABS FEATURE

SOUNDBLASTER CARDS

SOUNDBLASTER

16 VALUE IDE £64

- IDE interface
- 16-bit stereo sampling and playback
- 20 voice enhanced 4-operator stereo FM-synthesiser
- Power amplifier (4 watts per channel) and volume, bass and treble control
- Full software control of fade-in, fade-out, pan, volume, left/right steering and microphone mixing
- Bundled software

NEW! SOUNDBLASTER

16 PRO IDE £89

- With voice recognition software
- With Panasonic interface

SOUNDBLASTER

16 PRO IDE ASP £112

SOUNDBLASTER

AWE 32 IDE VALUE £129

- Includes upgrade socket

SOUNDBLASTER

AWE 32 IDE £169

- 16-bit with ASP



SOUNDBLASTER MULTIMEDIA HOME CD QUAD SPEED KIT

ALL CREATIVE LABS
PRODUCTS ARE
100% COMPATIBLE
AND COME WITH A
2 YEAR GUARANTEE

SOUNDBLASTER CARDS

MIDIBLASTER £95

- For amateur and professional music composition and presentation
- 16 channels, 128 preset sounds, 33 preset effects, 55 preset drums
- Bundled software included

MULTIMEDIA KITS

NEW! DISCOVERY EZ 16
PACK £319

- Double speed external CD ROM drive
- Soundblaster 16
- Speakers
- Microphone
- Bundled software

CD ROM UPGRADE KIT £89

DISCOVERY QUAD
SPEED KIT £275

- Quad speed internal drive
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- Ideal for home and office use

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QUAD SPEED KIT £289

- Quad speed IDE internal drive
- 16-bit ASP sound card
- Speakers
- MS Publisher
- MS Works 3
- MS Encarta '95
- MS Design Pack
- MS Bookshelf '94
- MS Cinemania '95
- MS Ancient Lands
- MS Dangerous Creatures
- MS Musical Instruments
- MS Golf and more

NEW! JUNIOR KIT £189

- Double speed internal drive
- SoundBlaster 16 Value Pack
- Screenbeat speakers
- 10 CD ROM bundle

NEW! GAMEBLASTER
AWE 32 KIT £289

- Quad speed internal drive
- SoundBlaster AWE32
- Stereo speakers
- Joystick
- Top selling bundled software titles

POWERMARK MULTIMEDIA KITS

NEW! SMART QUAD KIT £247

- Mitsumi FX4 quad speed internal drive
- SoundBlaster 16 Pack
- 10 CD ROM bundle
- Lotus SmartSuite
- 15 watt speakers

NEW! CREATIVE
DOUBLE KIT £239

- Double speed internal drive
- SoundBlaster Pro Pack
- MS Encarta, MS Dangerous Creatures, Doom I & II, MS Golf
- Screenbeat speakers

NEW! TOSHIBA 4x4 KIT £343

- Toshiba 5302 quad speed internal IDE drive
- SoundBlaster 32 AWE Value Pack
- 25 watt speakers
- 10 CD ROM bundle
- MS Encarta

NEW! JUNIOR KIT £189

- Double speed internal drive
- SoundBlaster 16 Value Pack
- Screenbeat speakers
- 10 CD ROM bundle

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AWE 32 KIT £289

- Quad speed internal drive
- SoundBlaster AWE32
- Stereo speakers
- Joystick
- Top selling bundled software titles

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MIDI keyboard for
SoundBlaster cards
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available for
specialist advice

SOUNDBLASTER CARDS

SOUNDBLASTER
AWE 32 £165

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WAVEBLASTER II £95

- Programmable Advanced WaveEffects generator



SOUNDBLASTER 16
VALUE IDE

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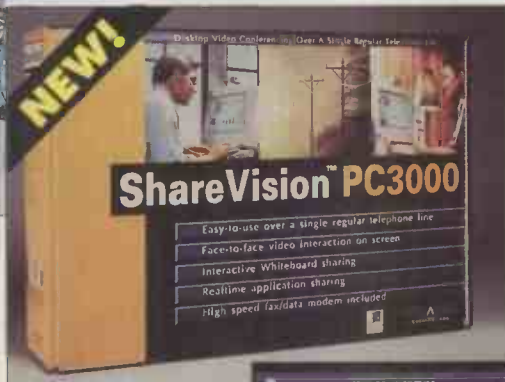
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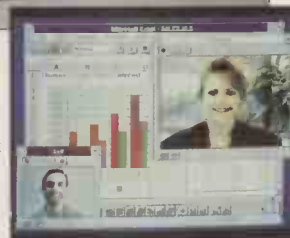


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 - Realtime application sharing
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- Intel i750PE chip inside
- VIDEOBLASTER MP400** £185
- Displays full motion MPEG video in a scalable window up to full screen
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- Requires CR-563 CD ROM drive and SoundBlaster with CD audio connector
- TV CODER INTERNAL** £99
- TV CODER EXTERNAL** £129

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CYBERMAN PCMCIA CD ROM DRIVE FEATURE



The first slimline CD ROM drive with our optional built in 16-bit sound card and it's Windows 95 compatible too!



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- Designed for the newest generation of 'sound ready' computers
 - Can play Audio CDs
 - Includes headphones
- CYBERMAN CM2 SX** £285

CYBERMAN CM2 SB

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- 16-bit wavetable synthesis sound card provides true state of the art sound quality for all multimedia applications

CYBERMAN CM2 SB £395

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Save £20 off Cyberman PCMCIA CD ROM Drive when you buy Windows 95. See page 2



CD ROM FEATURE

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- The Blues Brothers Juke Box Adventure
- Titus Fox
- Crazy Cars 3
- Fire Forget II
- Battlestorm
- Super Cauldron
- Titan
- Prehistorix
- Prehistorix II

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- Jurassic Park
- Shadowlands
- Sleepwalker

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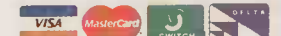
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CD ROM DRIVES, SOUND CARDS AND SPEAKERS FEATURE

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Windows95**



with...
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specialist advice

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incompatibility
between CD ROM
drives and sound cards.
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between meals
Milky Way
Kills all germs dead
Domestos



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- AZTECH EXPLORER PERSONAL SYSTEM £239
- AZTECH EXPLORER PERSONAL SYSTEM DELUXE £299

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to time.

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 - CD ROM DRIVE LASER CLEANER £24
 - CD ROM DISK CLEANER KIT £19
 - REFILLS FOR ABOVE £7
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BASEMENT!**

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- DATAFLEX GEM V22BIS INTERNAL MODEM £49
- EYE WITNESS ENCYCLO-PAEDIA CD ROM £19
- MARIO IS MISSING CD ROM £7

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- 4.5 watts per channel
- Includes power adapter

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- PIONEER DR-U104X £189
- PIONEER DR-UA124X £129
- Internal IDE quad speed drive

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- TV BUSTER PRO EXTERNAL £89
- INTERNAL £79
- TV ENCODER PROFESSIONAL PLUS £229
- Supports 640 x 480, 800 x 600
- 16.7 million colours
- REELMAGIC £289
- Watch VideoCD's on your PC
- Built-in 16-bit sound card
- Includes bundled software
- REELMAGIC LITE £215
- MOVIE MACHINE II MJPEG ADD-ON £295
- MOVIE MACHINE II MPEG ADD-ON £245
- MOVIE MACHINE PRO MJPEG BUNDLE £299
- MJPEG card
- Adobe Premiere
- Animator Pro
- Xing CD
- FPS60 VIDEO CAPTURE CARD WITH OVERLAY & ADOBE PREMIERE LE £495
- MPEG ADD-ON CARD FOR FPS60 £245

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Quality speakers supplied as matched pairs

- CREATIVE LABS SBS 300 STEREO SPEAKERS £79
- 10 watts
- Magnetically shielded
- SoundBlaster compatible
- Built-in amplifier
- CREATIVE LABS SBS 37 STEREO SPEAKERS £18
- Magnetically shielded
- SCREENBEAT £9
- Amplified with bass control
- POWERSOUND MAX SP30 £19
- With power adaptor
- 2 watts per channel
- Shielded, with volume control
- ALTEC ACS50 £69
- QUICKSHOT SOUNDMATE 3 £15
- QUICKSHOT SOUNDMATE 4 £12
- ADD UP SS50 SPEAKERS £32
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- Built-in amplifier
- LABTEC CS-1000 £59
- 'Under Monitor' unit

YAMAHA YST-M10

£49

- 10 watts per channel
- 80Hz - 20KHz frequency response
- Full magnetic shielding
- Built-in power amplifier



SOUND BOARDS

- The widest range of Sound Boards
- Multimedia experts available for specialist advice
- AZTECH SOUND GALAXY PRO £65
- SoundBlaster compatible
- AZTECH SOUND GALAXY NOVA 16 EXTRA £79
- AZTECH SOUND GALAXY WAVERIDER 32+ £96
- AUDIOTRIX PRO £179
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- On-board CD ROM instruments
- ADPCM compression software
- Daughterboard upgrade available
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- GAMEWAVE 32 **POWERCUT!** £102
- GRAVIS ULTRASOUND £99
- GRAVIS ULTRASOUND MAX £144
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- Multi CD ROM interfaces
- Dedicated digital sound processor

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- Plugs into parallel port
- 16-bit stereo playback
- Includes speaker unit
- Suitable for MCA systems
- WAVJAMMER £249
- 16-bit PCMCIA sound card
- Includes MS Sound System

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- MIDI ADAPTER CABLE £21
- MIDI ADAPTER 5 DELUXE £45
- DESK MICROPHONE £11
- HEADPHONES £9
- 'PROFESSIONAL' HEADPHONES £21
- ORCHID SCSI CHIP KIT £22

SOUND BOARD SOFTWARE

- CREATIVE VOICE EDITOR £37
- VOICE ASSIST £59
- MICROSOFT WINDOWS SOUND SYSTEM SOFTWARE £47
- MIDISOFT SOUND IMPRESSION FOR WINDOWS £45
- Play, record, edit and mix multiple sound files
- MIDISOFT MENTOR £77


CD ROM DRIVES

	Type	Transfer rate	Access	Loading	Cache	Interface	Int	Ext
Argosy 592CD	PCMCIA	307Kb/sec	320ms	Tray	64Kb	PCMCIA	-	£249
Goldstar GCD-R520B	IDE	300Kb/sec	250ms	Tray	64Kb	E-IDE	£99	-
Goldstar GCD-R540B	IDE	600Kb/sec	220ms	Tray	128Kb	E-IDE	£119	-
Mitsumi FX300	IDE	450Kb/sec	250ms	Tray	64Kb	E-IDE	£99	-
Mitsumi FX400	IDE	600Kb/sec	230ms	Tray	128Kb	E-IDE	£129	-
Nakamichi (7 CD-ROM)	SCSI	330Kb/sec	380ms	Caddy	256Kb	16-bit SCSI	-	£279
NEC 3XP	SCSI	450Kb/sec	250ms	Caddy	128Kb	16-bit SCSI	-	£249
NEC 6Xi/e	SCSI	900Kb/sec	150ms	Caddy	256Kb	16-Bit SCSI	£309	£429
Plextor 6x	SCSI	900Kb/sec	115ms	Caddy	512Kb	16-bit SCSI	£399	-
Panasonic CR503	SCSI	300Kb/sec	320ms	Tray	256Kb	8-bit SCSI	£129	-
Panasonic CR-571B	IDE	300Kb/sec	320ms	Tray	256Kb	E-IDE	£59	-
Panasonic 562B	SB	300Kb/sec	320ms	Tray	64Kb	SB16 card	£84	-
Panasonic LF1004PDO	SCSI	600Kb/sec	220ms	Caddy	512Kb	16-bit SCSI	£499	£599
Pioneer DRU124X	SCSI	660Kb/sec	150ms	Tray	256Kb	16-bit SCSI	£119	-
Sony CDU4X	IDE	600Kb/sec	190ms	Caddy	256Kb	E-IDE	£129	-
Sony CDU55E	IDE	300Kb/sec	250ms	Tray	256Kb	E-IDE	£89	-
Toshiba XM3601	SCSI	660Kb/sec	130ms	Tray	256Kb	16-bit SCSI	£219	£319
Toshiba XM5301B	SCSI	600Kb/sec	190ms	Tray	256Kb	16-bit SCSI	£149	£219
Toshiba XM5302	E-IDE	600Kb/sec	150ms	Tray	128Kb	E-IDE	£139	-


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DIAMOND

M U L T I M E D I A

Diamond have established themselves as the industry standard for high speed graphics accelerators, combining dependable quality with value and high performance.

SPEEDSTAR 64 PRO

- The best price/performance card for Windows games packages
- DRAM based
- ISA bus
- Includes Corel Draw 3 software

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- PCI or VLB bus

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STEALTH 64 VIDEO DRAM

- The world's fastest DRAM graphics accelerator
- DRAM based
- PCI or VLB bus
- Now with software MPEG support

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STEALTH 64 VIDEO DRAM VLB 2MB £139



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- Now with software MPEG support

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STEALTH 64 VV PCI 4MB £319
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GoldStar

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- 250ms access time
- 64Kb buffer
- IDE interface
- Motorised tray loading
- Volume control and headphone jack

GCDR 520B £85



GCD-R540B QUAD SPEED CD ROM DRIVE

- 600Kb/sec
- 220ms access time
- 128Kb buffer
- Enhanced IDE (AT-API) interface
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- Volume control and headphone jack

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...the best choice for Multimedia Video! Perfect colour digitising from Hauppauge.

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- Integrated TV tuner/teletext
- Perfect colour: 4:2:2 YUV colour separations and S-Video support for high quality multimedia presentations
- Square Pixel (CCIR 601) support
- Teletext feature is Reuters 1000 ready, supporting dynamic data exchange (DDE) see page 876 on CNNtext, for updated news

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WIN/TV PRISMA £159

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as it is not shipped
automatically

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Ha Ha GAGS**

Punchlines
to old, old,
old favourites

I've been ill!

So be bought him!

*Where you left it
last!*

*If you can't remember the
stories to these then contact
Quentin Quizzy and he'll be
happy to oblige.*

MEMORY

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expandable with low-cost multimedia options



MPC 3
compliant



GrafixStar 300

- Entry level graphics card
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- 85+ million Winmarks
- Up to 1280 x 1024 resolution
- Expandable with VMC multimedia options

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VLB/PCI 1MB

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GrafixStar 500

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- Expandable with VMC multimedia options
- Built-in AVI acceleration with advanced DCI drivers

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MPEG PLAYBACK
GRAFIXSTAR 500

VLB/PCI 1MB

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with sound **POWERCUT!** £159
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MPEG

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CAPTIVATOR

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HITACHI 15MVXValue

Monitor experts
available for
specialist advice



HITACHI 17MVXValue

17MVXValue

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- Superfine .26mm dot pitch
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- VESA, DPMS power save
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- MPR-II low emission
- Colour adjust facility
- 12 months on-site replacement warranty

	Size	Dot pitch	Resolution	Refresh	Tube	
15MVXValue	15"	0.28mm	1280 x 1024	60Hz	FST, Energy Star	£269
17MVXValue	17"	0.26mm	1280 x 1024	60Hz	FST, VESA-DPMS	£499
CM1711	17"	0.26mm	1280 x 1024	77Hz	FST, VESA-DPMS	£599
CM2096	20"	0.31mm	1280 x 1024	75Hz	Standard, VESA-DPMS	£1029
CM2098	20"	0.28mm	1600 x 1200	72Hz	Standard, VESA-DPMS	£1289
CM2198	21"	0.28mm	1600 x 1200	75Hz	FST, VESA-DPMS	£1579
CM2199	21"	0.26mm	1600 x 1280	80Hz	FST, VESA-DPMS	£2199

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MONITORS

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EPA Energy Star programme - the adopted 'green' standard for the PC industry

• All monitors are Macintosh compatible - cable available

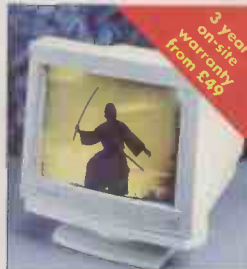
	Size	Dot pitch	Resolution at up to:	Frequency	Tube		
400LR	14"	0.28mm	800 x 600	60Hz	Energy Star	POWERCUT!	£186
410LR	14"	0.28mm	1024 x 768	60Hz	Energy Star	POWERCUT!	£197
420LR	14"	0.28mm	1280 x 1024	60Hz	Standard	POWERCUT!	£239
NEW 580+LR	15"	0.28mm	1280 x 1024	60Hz	FST	POWERCUT!	£276
880LR	17"	0.28mm	1280 x 1024	60Hz	Energy Star, FST	POWERCUT!	£510
885LR	17"	0.26mm	1600 x 1200	65Hz	Energy Star, FST	POWERCUT!	£579
895LR	17"	0.25mm	1600 x 1200	67Hz	Trinitron	POWERCUT!	£795
1080LR	20"	0.28mm	1600 x 1200	65Hz	Energy Star	POWERCUT!	£879
2100LR	21"	0.30mm	1600 x 1200	72Hz	Diamondtron		£1499
NEW KICV100	9.4"	0.30mm	640 x 480	72Hz	TFT LCD Panel Colour		£2499
NEW KIOCV200	9.4"	0.30mm	640 x 480	72Hz	STN LCD Panel Colour		£1299



TAXAN ERGOVISION 2100LR



TAXAN ERGOVISION 580+LR



TAXAN ERGOVISION 410LR

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Model	Size	Dot Pitch	Resolution up to:	Frequency	Features (see key)	
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1468	14"	0.28mm	1024 x 768	60Hz	NG, AS, DT	£192
1505	15"	0.28mm	1024 x 768	60Hz	NG, AS, DT, FS, IM	£225
1527	15"	0.28mm	1280 x 1024	60Hz	NG, AS, DT, FS, IM, OS	£272
1727	17"	0.28mm	1024 x 768	60Hz	NG, AS, DT, FS, IM, OS	£495
2010	20"	0.28mm	1600 x 1280	60Hz	DF, AR, AS, IM, OS	£959

Key

NG = Non-Glare, AS = Anti-Static, DT = Dark Tint, FS = Flatter Squarer Tube, IM = Invar Mask, OS = Digital On-Screen Controls

Save **££££s** on **Taxan Monitors** when you buy **Windows 95**. See page 2

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- True 64-bit graphics and multimedia accelerator
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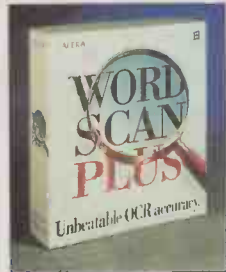
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|----------------------------------|------|
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UMAX

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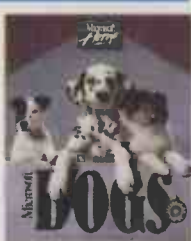
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Microsoft Windows 95 makes everything you
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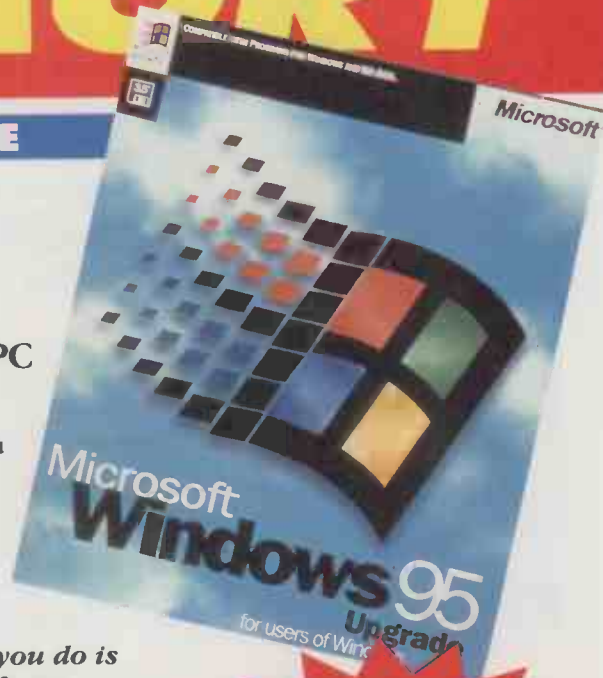
The Microsoft® Windows® 95 operating system
will transform everything you do with your PC.
Suddenly using a computer can be fast, easy
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Microsoft® Windows® 95: Your open door to doing more

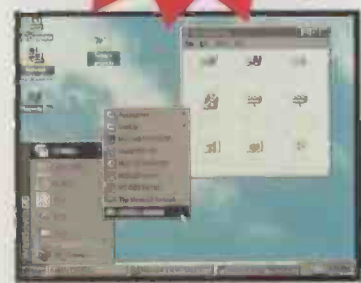
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- Plug and Play technology automatically configures compatible disk drives, sound cards and more
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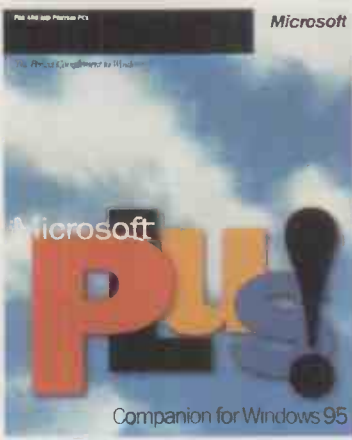
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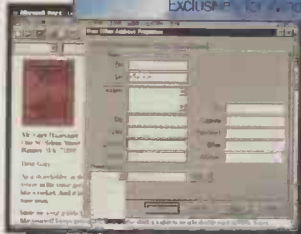
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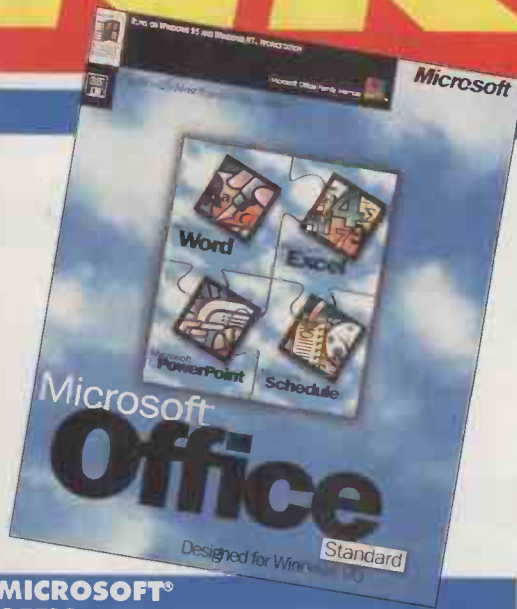
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KEY

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CUP	Competitive Upgrade	UP	Upgrade
DOS	DOS Version	Vxx	Version
LAN	Local Area Network	WIN	Windows Version

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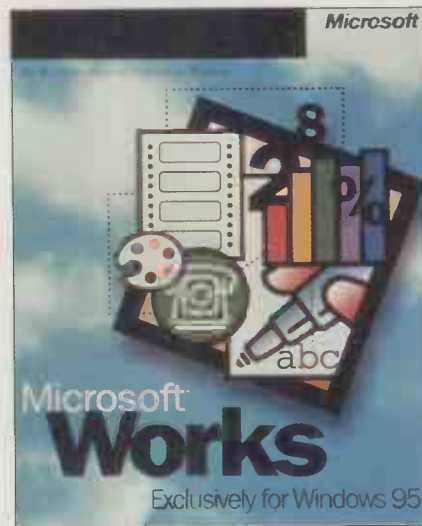
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The all-time best-selling integrated productivity programme for Windows®, Microsoft® Works is the natural

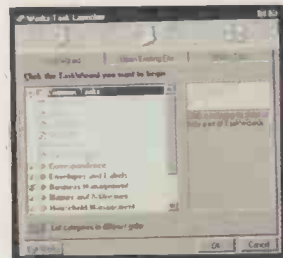
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Creative distinctive newsletters, brochures and flyers without any design experience with Microsoft® Publisher

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- Visit the Publisher Forum on the Microsoft Network directly from Publisher



- Mouseman Combo** £34
- High performance mouse of superior design
 - Ergonomic design
 - Ready for Windows 95



- Sensa** each £38
- Ergonomic design
 - Ready for Windows 95, available in: soft matt Blue Leopard or Silver Pearl, or Deep Wood and Black Chess with their brilliant lacquered surface

- Cordless** £49
- Chroma** £23

- 3 button mouse with co-ordinated mouse mat, available in: Apple green with orange mat, luminous orange with blue mat, bright blue with yellow mat and canary yellow with green mat

- Trackman Vista** £43
- Ergonomic design
 - Ready for Windows 95

- Trackman Live** £105
- A unique radio-wireless solution for presentations can be used for controlling slideshows or as a handheld mouse works from up to 10 metres
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- Trackman Voyager** £50
- Sets new standards in comfort, flexibility and performance for travellers and those looking for the latest in design

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Save £10 off Logitech Mouseman Combo when you buy Windows 95. See page 2

ACCENT FEATURE



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Includes all of the features of Accent Express plus advanced support in - English, French, German, Spanish and Italian. Each language offers a spell checker, thesaurus, hyphenation, word-forward translation with the Berlitz Interpreter and keyboard maps. More than 75 TrueType fonts included. Accent Special Edition contains advanced word processing features such as object oriented style sheets, encryption, compression, hidden text and custom zoom. Text can be easily imported from or exported to most popular word processing programs.

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"Accent is the best multilingual word processor we've seen." PC Magazine, January 1995

"If you're looking for a world-class correspondence program, I've got it. ... for those who must do electronic correspondence in many languages, I'd think this would be a godsend." Byte, January 1995

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Accent Express has all of the features of a traditional word processing program plus the capability to create documents in over 30 languages. Accent Express can import and export text and graphics. Accent Express includes 50 keyboard maps for ease of use and authentic character reproduction in any language.

ACCENT EXPRESS £39

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UK MAINLAND - Next working day courier delivery to your door for all stock items
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SOFTWARE WARRANTY
Do check compatibility before ordering. Faulty software replaced through Powermark Customer Service. Opened software cannot be returned.



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IBM OS/2 WARP FEATURE

OS/2 WARP

Amazing application support

This operating system will run your current DOS and Windows applications reliably and often faster. Carry on working at full speed while printing a document, formatting a diskette or recalculating a spreadsheet.

Word processing

Word processing and faxing come free as part of the BonusPak in addition to a spreadsheet, report writer, database, charting and graphics tool, calculator, address book, to-do list and many other productive applications.

Great games

The best memory management to give a full 640Kb memory to run all your DOS and Windows games smoothly. It also picks up your games DOS settings automatically so no more editing or reboots.

Drag and drop

OS/2 Warp is intuitive, it just works the way you do.

Crash protection

Protects your applications and data should another DOS or Windows application crash.



45 Ways to Get Warping with IBM CD Showcase

- Includes full version of Ami Pro for OS/2
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Free as part of the OS/2 Warp BonusPak. With graphical interface and 3 hours free Net access also included.

IBM OS/2 WARP V3

3.5" FLOPPY	£51
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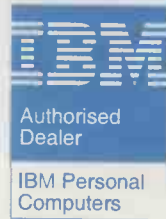
IBM CD SHOWCASE £9.99

(when purchased with OS/2 Warp)

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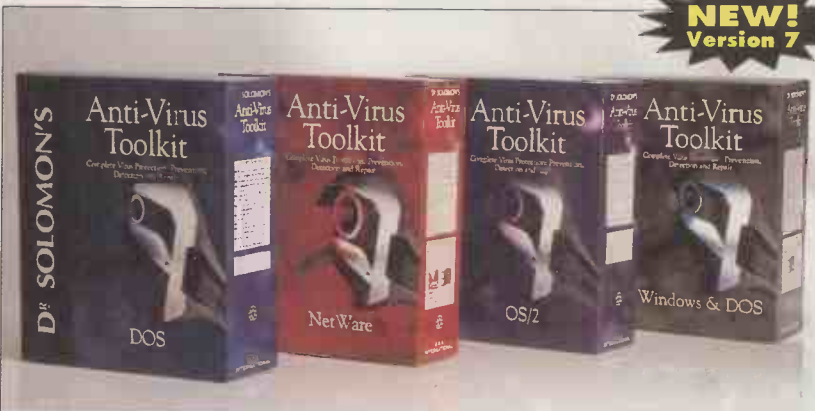
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Version 7



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Combat viruses in DOS, OS/2, Windows and Netware
The best answer to the serious problem posed by viruses. Each toolkit is made up of four programs geared to locate, identify and destroy existing viruses and then protect your system.

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VIRUSGUARD - This is the memory resident utility that is installed every time you restart your computer. It checks every

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PC Protection for IT Professionals

An easy to use package which gives you back control over who uses your computer

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- Program authorisation
- Hard disk boot protection

PC ARMOUR £49



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when you buy Windows 95.
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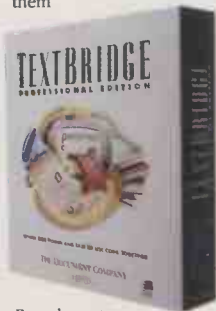
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- Easy to use automatic functions

TEXTBRIDGE 3.0	£69
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COMPETITIVE UPGRADE	£189

TURN THE PAGE FOR MORE

MEMORY

EUROPRESS FEATURE

3D INTERIOR DESIGN

Helps you design the home of your dreams

- Eliminates all the problem areas of designing interiors
- Guides you on the most effective room schemes



Granada TV's House Style 3D Interior Designer gives you practical help in planning your ideal home. It takes the worry out of home improvements and helps you save money by avoiding costly mistakes.

Ensure your ideas really work before you buy furnishings, fabrics, wallpaper and paint. And it's so easy to use!

- Draw scale floorplans of all your rooms then build them into a blueprint of your whole house with
- Choose your furnishings and fittings from 3D Interior Designer's bank of nearly 400 items
- Position them for the most striking effect, and then add colour schemes of your choice from the program's extensive palette
- Finally, view your plans from four different 3D perspectives - so you can see exactly what your design would look like in real life!



3D GARDEN DESIGNER 2

Helps you design the garden of your dreams

- Takes the guesswork out of caring for your garden
- Guides you through the most effective planting schemes
- Auto design feature



Gardeners' World

Imagine your dream garden. Make it a reality with 3D Garden Designer 2, which takes full advantage of the vast scope offered by CD ROM.

- **Extensive reference section**
With 600 trees, shrubs and plants, including 200 full colour photographs. Gardeners can also add their own favourite plants.
- **More realistic**
Adds realistic textures to trees and plants and shows how your garden will mature through the seasons from year to year.
- **Help for the inexperienced**
Auto-designer feature automatically fills any size and shape of plot with a suggested layout. A useful 'topical tips' section has helpful expert information for specific times of year and climatic conditions.
- **Enjoy the view**
Gardens plans can be viewed in 3D from many different angles.

Alice's Adventures in Wonderland

The world's best-loved children's story brought to life on your PC.

The most famous of all children's stories takes on an entirely new dimension in multimedia.

As you listen to this interactive storybook, Sir John Tenniel's black and white Victorian illustrations burst into vivid colour and magically come to life.

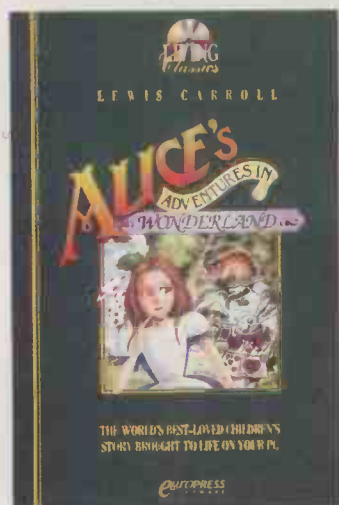
Use your PC's mouse to tell the story. Start by making the White Rabbit take a watch out of its waistcoat pocket and say to itself: "Oh dear! Oh dear! I shall be too late" - and then follow Alice on her unforgettable adventures.

AND THERE'S MUCH, MUCH MORE!

Among the pages are games you can play with the inhabitants of Wonderland. Help Alice escape from the Great Hall, play a guessing game with the Caterpillar, fight lethal crockery in the Duchess's kitchen and interrupt the Queen of Hearts in a tense game of croquet.

PLUS! The CD ROM of Alice in Wonderland can also be used on any audio CD player to tell Alice's wonderful story in words and music.

Alice's Adventures in Wonderland £15



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SOFTWARE



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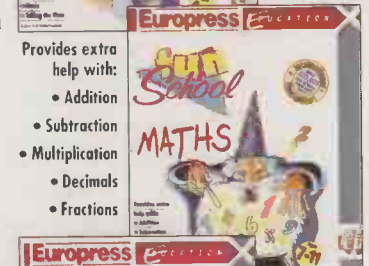
Learning is an exciting adventure - and that's what the award winning Fun School educational programs are all about.

Fun School - The UK's best selling range of educational software



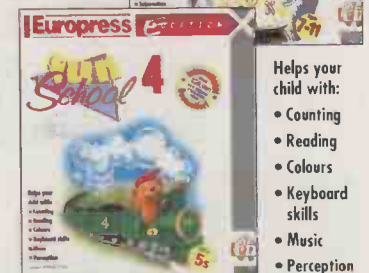
Helps children take their first steps in:

- English
- Maths
- Art & Design
- Music
- Telling the time



Provides extra help with:

- Addition
- Subtraction
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- Decimals
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- Helps your child with:
- Counting
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Fun School titles conform to
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STARFISH SOFTWARE FEATURE

Sidekick 95 for Windows 95

The Simplest Way to Stay Organised

Simple to use, easy to learn and incredibly powerful - Sidekick is already the best-selling personal organiser ever. The new 32bit Sidekick 95 uses the power and flexibility of Windows 95 to get you organised quicker. It takes up a fraction of the memory other PIMs use, so you can keep it running all the time without affecting your system's performance.

Sidekick 95 helps you simplify your life - not complicate it. With the improved drag-and-drop interface, there's no need to enter information twice or complete complicated import / export procedures. Sharing information between the Calendar, Cardfile, Wordprocessor, Expenses Tracker and Contact Manager is as easy as moving your mouse across the desktop. Sidekick 95 will even dial your phone! Using Windows 95's new "Plug-and-Play" technology, Sidekick automatically looks for and configures any installed modem.

New for Sidekick 95 is an integrated word processor with all the features you need for day-to-day letter writing and document production. What's more it's linked directly to the Cardfile database, so writing properly addressed letters or even mail merging is just a mouse click away. To make life easy, Sidekick will automatically print letters, schedules, notes, names and addresses in over 70 different formats including labels, envelopes and popular paper organiser formats like filofax™.

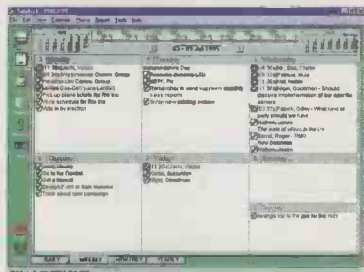
Over 10 million copies sold!

- Windows 95 Plug and Play compatibility
- Integrated, full function word processor
- Worldwide clock
- TAPI standard phone support for incoming calls
- Track your expenses and create complete summaries in seconds
- Now you can move your appointments, notes, and to-do items from one time to another with drag-and-drop simplicity
- Great new label, address book and envelope printing features gets you started with more than 70 templates
- Alarms with snooze feature

Sidekick 95 for Windows 95 £29



Starfish Software



Save £10 off Sidekick 95 and Dashboard 95 combo when you buy Windows 95. See page 2



Who uses Sidekick 95? The business & home office professional

Friendly and flexible, Sidekick 95 offers all the calendar, address book and word processing features every overloaded professional needs. And thanks to integrated contact management, all dealings with prospects and customers can be easily tracked and managed.

The mobile professional

Sidekick 95 is the perfect portable companion - It instantly updates your files from your desktop PC to your portable and then back again.

The home PC and family PC

Sidekick 95 can keep track of everyone in the family - all in one place. From the kid's activities to personal errands, you'll always be in the right place at the right time. Even more, Sidekick 95 can organise your household inventory, car maintenance records - even your CD collection!

You!

If you've ever used a paper-based organiser or address book, then you already know how to use Sidekick 95. Imagine your current personal organiser, but with the timesaving power of your PC. Let Sidekick 95 forward unfinished tasks to the next day, sound alarms to remind you of appointments and help you manage important contacts.

Dashboard 95 for Windows 95

The Simplest Way to Organise Windows 95

Like the dashboard in your car, the new native 32bit Dashboard 95 for Windows 95 helps you to get to where you want to go by keeping everything close at hand. Launch applications, check your system's memory usage, disk space and resources and at last - Windows printing made easy! Dashboard 95 makes choosing and using a new printer simple, just click an icon of the new printer and Dashboard does the rest.

New for 95 are Dashboard's Virtual Screens. This innovative and useful feature allows you to open applications on up to 9 virtual screens and then switch between them with a simple mouse click. No more cluttered screens!

Dashboard 95 for Windows 95 £29



NEW for Windows 95

Launch Applications
No need to search for programs - just use Dashboard 95's Launcher!

Virtual Screens
Switch between up to 9 virtual screens on your PCI

Easy Printing
Just choose the printer you need by clicking an icon - easy!

Customise
Customise Dashboard 95 to do exactly what YOU want it to!

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better financial future.



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LANDMARK SOFTWARE

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• DIY - Windows trouble
shooter

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• Data security made easy

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• Increases performance of
PC by eliminating
unwanted files

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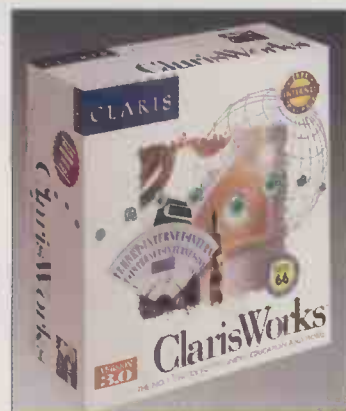
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SOFTWARE FEATURE

WORDPERFECT

PERFECTOFFICE

Welcome to the PerfectOffice
If you could work anywhere you wanted, where would it be? Somewhere comfortable. Somewhere efficient. Organised. A place where you can relax and actually get some work done.

Well, you have just described PerfectOffice. It's the new integrated office suite of leading Windows applications. And quite simply, it's the perfect place to work.

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- The most powerful custom development tools
- The first and only "create your own" suite

PerfectOffice

Standard includes

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- Quattro Pro 6.0
- Presentations 3.0
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- InfoCentral 1.1
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PERFECTOFFICE

STANDARD UPGRADE

£129

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Half price voucher
for Windows 95 when you buy PerfectOffice
(Offer ends 30th September)

WORDPERFECT 6.1

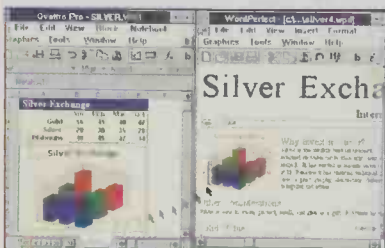
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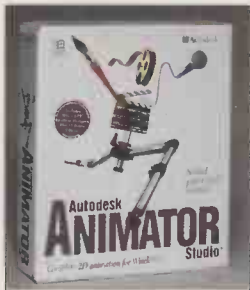
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- CD CD ROM
- CUP Competitive Upgrade
- DOS DOS Version
- LAN Local Area Network
- MS Microsoft Product
- SL Site License
- UP Upgrade
- Vxx Version
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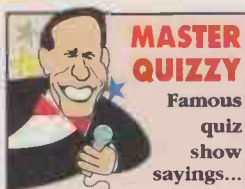
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- ALPHA 5 HOME & BUSINESS EDITION** £45
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Ten point penalty/your starter for ten

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Come on, come on University Challenge

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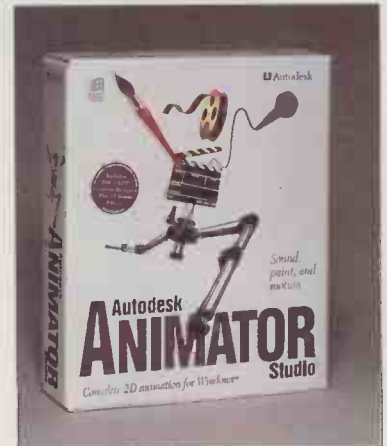
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See IBM Warp feature on page 32

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STAMPS

1. Please complete in block capitals

Mr Mrs Ms

First Name: _____

Surname: _____

Post Code: _____

Address: _____

I am seriously interested in meeting someone through Dateline.



2. Personal Information

Age: _____

Marital Status: Single Divorced

Widowed Separated

Religion: _____

Place of Birth: _____

Do you have children of your own?

Yes No

If yes, how many live with you? _____

3. Your work

Occupation: _____

Self-employed employed

civil servant manual worker

part-time not working

unemployed retired

4. Schooling

O levels / GCSE's A levels

Further Education Polytechnic

University Business School

Other: _____

5. Your Personality

Warmhearted Fashionable

Serious Practical

Considerate Conventional

Shy Reliable

Romantic Adventurous

6. How would people who know you best describe you?

always ready for a joke

somewhat dreamy

never has problems

takes life a bit too seriously

not easily upset

always active

chatty

7. Your interests

Wining/Dining Jazz/Folk music

Pubs Classical music

Sports/Keep fit Theatre/Arts

Politics/History Watching TV

Reading Smoking

Travelling Astrology

Science/Tech Children

Cinema Homemaking

Pets/Animals Gardening

Pop music Countryside

8. Your personal details

Height: _____

Build: slight medium large

Hair colour: _____

Dress/Looks: casual sporty

fashionable elegant

9. Details of the partner you would like:

Min. age: _____ max. _____

Height: min. _____ max. _____

Don't mind

Children? Yes, at home

Yes, living elsewhere None

Marital status: Single Divorced

Widowed Separated

Don't mind



9. Which of the three pictures do you prefer? (tick the box)

Please answer the questions above, cut out this page and send it to us at:
Dateline 23 Abingdon Road, London W8 6AL or call us now on 0171 938 1011

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News & Views

IBM VisualAge C++

If you think that Visual Basic & Delphi represent the state of the art in visual development tools, then you haven't seen IBM's VisualAge. You design the GUI portions visually, as is usual these days, but you can also build the non-visual portions visually as well. They call it "visual construction from parts" and so far it has only been available in the expensive Smalltalk variant.

IBM have now combined this technology with the robust tools from C Set++ to produce the first of a new generation of C++ compilers, at a sensible price! The first version is for OS/2 (of course!), but a Win32 version is due in 6-9 months. Future platforms include Power Mac, Solaris, AIX and OS/2 Warp for Power PC.

The core of this cross-platform portability is Open Class, an enhanced version of the class library in C Set++. This provides over 400 classes covering user interface, database access, collections, data types and exceptions. Taligent will influence future enhancements.

A few other highlights include: Data Access Builder maps DB/2 tables to C++ classes, generating C++ & SQL code; Direct-to-SOM for generating CORBA-compliant objects; Project Smarts; new Browser (no need to compile); and advanced Debugger & Performance Analyser.

How much do you think IBM are asking for this technological powerhouse? After all, it is probably the most sophisticated C++ development system ever produced and won 2 out of 4 awards at Object World Boston '95? £1000 perhaps. At least £500? No. It can be yours for only £266 + VAT (CD-ROM + printed docs). Call us now before they change their mind!

SpeedPascal/2

A 32-bit Borland Pascal for OS/2? Not quite, but this is as close as you'll get. The Pascal Magazine said: "If Borland were to produce a Borland Pascal for OS/2, I do not think that it could be very different from (or even much better than) Speed."

Full GUI IDE with context-sensitive help, integrated debugger, resource editor, assembler, etc. And there is the only Application Framework for Pascal on PM called OPML, which is similar to Borland's OWL.

With Borland leaving OWL behind in the Win16 world in favour of VCL & Delphi, SpeedPascal/2 is the only way of porting your OWL apps to a 32-bit operating system. And SpeedSoft are working on a Windows version of the compiler as well. Call us now to order your copy (CD-ROM, online docs). Only £79 + VAT until the end of July, then £100 + VAT.

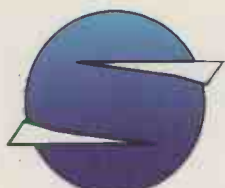
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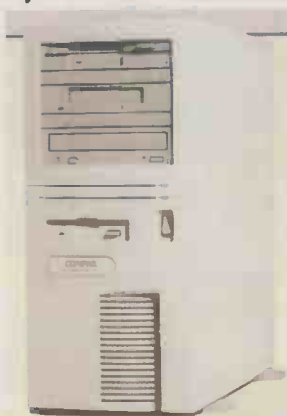


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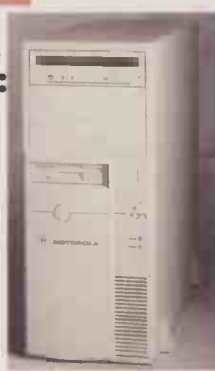
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This barebone system from Motorola puts the superior performance of the new 100MHz 604 CPU in use where speed is critical. Basic features include: 2 fast 16550 serial, 1 parallel and 1 mouse ports, Cirrus 5434 PCI VGA, enhanced IDE, SCSI2 controller, 32-bit Ethernet and a Sound port. We add to this excellent system Windows NT Server 3.5 software, 16MB RAM, a quad speed CD ROM, 1GB mode 4 IDE disc drive and a 15" ADI



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We provide an efficient backup service to all our customers in the form of CD ROM. We can put as much as 600 megabytes of your DOS or WINDOWS hard disc onto a single CD in less than an hour!
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Using a MPEG video capture and compression system, we can transfer up to 1 hour of your video tape directly onto a CD which you can use on PCs equipped with VGA card with MPEG play function.

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P75 Multimedia



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SOLIDISK Proves you can get a quality Pentium multimedia PC for £1,200.*

COMPUTER BUYER MAGAZINE JULY 1995

Specifications:

- Triton - Pentium AIO Mainboard
- INTEL 75MHz Pentium Processor
- Medium Tower Case with 200W PSU
- Teac 1.44 Floppy Disk Drive
- Seagate 545MB Mode 3 IDE Hard Disk Drive
- Creative Labs Sound Blaster 16 Value
- NEC CDR272 Quad Speed CD ROM Speakers
- Trident 9660 PCI Graphics Card
- ADI 4V 15" Non Interlaced Monitor
- 8MB RAM (2x 1MB-36 SIMM)
- WINDOWS 95
- Mitsumi 2 button MS compatible mouse

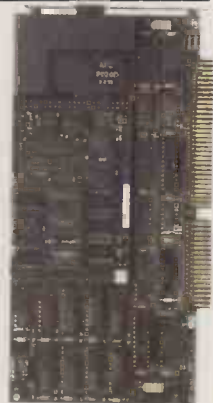
Buy this winner for only £1,200 + VAT

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Includes an analog adapter for phone or fax machines. Can also be used as a 56KB MODEM.

£740 DIGIBOARD PC IMAC CARD:
Transparently connect two NOVELL networks - make/break calls on traffic; supports NT server RAS - full 128 KB/S.

£790 SONIX ARPEGGIO PC CARD:
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ST41080U (9Gb)	£2188.00
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ST3660R (545Mb)	£122.50
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WD1000 (1Gb)	£211.00
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Idexk 17" Vision Master	£536.00
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ADI MicroScan 15"	£270.00

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Adaptec AHA 150S	£38.00
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Stealth 1Mb DRAM PCI	£110.00
Stealth 2Mb VRAM PCI	£210.00
Stealth 4Mb VRAM PCI	£340.00
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9660 Chipset 1MB DRAM PCI	£70.00
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Mirage PCI 2Mb with Microstation 4/u	£132.50
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Orchid Kelvin 64 PCI 1Mb	£116.00
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Cirus Logic 5422/4 1SA 1Mb	£50.00
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Toshiba 5301B SCSI x4 Speed	£162.00
Mitsumi FX400 IDE x4 Speed	£125.00
NEC CDR273 IDE x4 Speed	£118.00
Nakamichi MBR7 CD changer	£508.00
Yamaha CD Recorder x4 Speed	£1,699.00
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MAINBOARDS

486 (PIII) 256Kb Cache SPIDE, without CPU (53-99MHz)	£110.00
Pentium PIII 256Kb Cache SPIDE, No CPU (75/90/100MHz)	£147.00
INTEL	
Intel Zappa with TRITON chip Pentium 75-120MHz, EIDE & VIO, no CPU	£160.00
Intel Endeavour Pentium 75-120MHz, EIDE & VIO, Sound Blaster, no CPU	£220.00
MOTOROLA	
Motorola Atlas PowerPC 604 100MHz, EIDE & VIO, SCSI 2, Crystal Sound	£800.00
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Conner or Colorado 250MB Internal	from £99.00
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Man Symbol



SEXWOMAN.BMP
Woman symbol

● When Bill Gates speaks, everyone who's anyone listens. After all, you don't get to become head of the largest computer software company in the world without knowing a thing or two about what people want. At the moment, he's currently banging on about Windows 95 and its amazing pre-emptive multitasking capabilities.

Funny. As we distinctly remember him saying: "No user of microcomputers wants multitasking, nor would they be able to use it. All they would ever do with it would be background printing, and you can do that under DOS."

● With the increasing research into speech recognition software, it won't be long before you simply tell your PC what to do. That said, we can't wait for the nightmare scenario, as spotted by *PCW* reader Jonathan Sandys.

Yelled across an office full of PCs at their C prompts: "Hey, how do I format my hard disk?"

"Format c: ENTER."

"You sure?"

"Yes!"

Whir of a roomful of disks reformatting...

● Rumour has it Amstrad entrepreneur and Spurs manager Alan Sugar is moving into that other funny old game, cosmetics. His first product will apparently be "electronic facial toner". We had wondered what he was going to do with all those printer spares...

● "My toaster can toast two slices of bread in 42 seconds. My neighbour has one that can toast four slices of bread at



Top Just to prove that database packages are getting more and more user-friendly these days, DataEase International has included these two handy pictures in its bitmap catalogue. It's hard to imagine how database developers have survived all these years without such essential facilities

Above Just when you thought your staff had had enough of Doom and that productivity was returning to normal, Psygnosis launches the all-new 3D Lemmings. Rumour has it the new graphics were modelled on Take That fans...



once but it takes 67 seconds. How can I improve things?"

- Response time or throughput — Buy a second two-slice toaster.
- Time versus money — Squish your four slices so they take the space of two, then toast them in your fast two-slice toaster. Compression's been around a long time.
- Size vs speed — Toast the first two slices, and while eating them, toast the second two. Pipelining is the happening thing.

● Traditionally, when you think Texan, you think big. Big money, big buildings, big country, big people, big hats. Micrografx chief J Paul Grayson, based in Richardson, Texas, certainly lived up to the image during a flying visit to London last month. He may have lacked a JR-style Stetson but he displayed a distinctly Texan sense of scale. Estimating the growth potential for sales of his new Win95-friendly graphics products, he eschewed the usual dreary market

statistics. "What's the world population now — more than five billion? In a few years it will be more than seven billion," he said, those two billion extra sales flashing in front of his eyes like the lights of downtown Dallas.

• And finally, this month we wave goodbye to Cutting Edge Editor David Brake (pictured above left) who leaves us after four years for the greener pastures and faster leased line at *New Scientist*, where he will take on the roll of Internet Editor. We wish him all the best, although we're glad to have our bandwidth back.

Sorry, our mistake

In the Lexmark review in the colour printers group test (page 466, *PCW* August), there was a misleading omission. It should have read: "Windows 95 drivers were provided with the 150c, so there are no compatibility problems."

ChipChat



**MICROSOFT®
WINDOWS '95
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The DOSSIER® Range

ADVANCED SOUND THE NOTEBOOK PC THAT OFFERS POWER, FLEXIBILITY AND MULTIMEDIA SOUND

CASE STYLE
NOTEBOOK
Dimensions:
(W x H x D) mm
279 x 43 x 216 closed.
Weight with battery: 2.7Kg (6lb) for mono, 2.95Kg (6.5lb) for colour Dossier 486 and 3.09Kg (6.8lb) for colour Dossier P5.



LCD Status icon display panel including battery charge gauge.



Easy to upgrade CPU. Up to DX4 100MHz for Dossier 486 and up to Pentium® 90MHz for Dossier P5. Also easy to upgrade RAM and hard disk.



Two separate PCMCIA type 2 slots or one type 3 allowing a host of PCMCIA cards (for modems, networks, storage and more) to be used.



Docking station accessory option. Just slip the Dossier ADVANCED Sound into the docking station to transform it into an instant desktop system.

The Viglen Dossier® ADVANCED Sound is a range of portable notebook sized PCs that offer flexibility and power for people on the move. This range provides many advanced features that rival even the most powerful desktops. It is available in two main processor ranges, the Dossier® 486 processors ranging from 486SX 25MHz to 486DX4 at 100MHz, and the Dossier® P5

for Pentium® processors from 75MHz to most powerful 90MHz. There is a choice of exceptional colour screen types for each range, Dual Scan or a high contrast fast TFT and also a Mono screen for 486 models. In addition to the features shown on the left, the Dossier® ADVANCED Sound includes sound hardware compatible with SoundBlaster and

Microsoft Sound system allowing you to manipulate sound and music to enhance your productivity. Plus there is a whole range of accessories and upgrades including a docking station, PCMCIA cards, external speakers, car battery adaptor and many more, making the Dossier® ADVANCED Sound a notebook that needs to be seen and heard to be believed!



LOOK AT THIS SPECIFICATION

- Dossier® 486:**
- Intel SL enhanced 486SX 25MHz, 486DX2 66MHz, 486DX4 75MHz, and 486DX4 100MHz.
 - 4MB RAM, upgradeable to 20MB.
 - 170MB HD upgradeable to 720MB.
 - Choice of Mono (9.5" STN), Colour DSTN (10.3" Dual Scan STN), or Colour TFT (9.5" TFT) screen.
 - Battery Life: 5.5 hours on 486SX mono with full power management, 4 hours without, 4 hours on 486SX colour with full power management, 2 hours without. (High processor speeds will reduce battery life).
- Dossier® P5:**
- Intel Pentium® processor 75MHz and 90MHz.
 - 8MB RAM, upgradeable to 40MB.
 - 540MB PCI IDE HD, upgradeable to 720MB.
 - Choice of Colour DSTN (10.3" Dual Scan STN), or Colour TFT (10.4" TFT).
- Battery Life: 2 hours on Pentium 75MHz colour with full power management, 1.5 hours without. (High processor speeds will reduce battery life).
 - Infra red wireless link control Windows.
 - 3.3 volt technology.
 - Comprehensive power management with doze, sleep, suspend and resume.
 - 8K internal cache, (486) and 16K (Pentium processor).
 - 3.5", internal 1.44MB floppy drive.
 - Local bus accelerated Super VGA Graphics with 1MB Video DRAM (PCI local bus graphics for Dossier® P5).
 - 1 Serial, 1 Parallel, 1 PS/2 port, 2 PCMCIA type 2 or 1 type 3, 1 expansion socket for docking station.
 - 85/86 key keyboard.
 - Ergonomic large tracker ball with arm rest to reduce wrist fatigue.
 - NiMH battery.
 - Audio with built in speaker and microphone and socket for external speakers and line in (16-bit stereo for Dossier® P5).
 - Ability to record, compress, store and playback voice, sound and music.
 - LCD Status Icon display.
 - MS-DOS® 6.22, Windows 3.11, Works for Windows™ ready to run and Lotus Organizer.
 - User-friendly manuals.
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Easy to Own payment scheme from £46.08 per mth over 36 mths 19.9% APR 10% deposit. See "Order page" for typical example.

Organizer
Working Together
Supplied as standard

WORKS
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SEE 'VIGLEN OPTIONS' PAGE FOR DETAILS.

THE PRICE YOU PAY

DOSSIER 486				INTEL SL ENHANCED 486SX 25MHz				DOSSIER P5				INTEL PENTIUM® PROCESSOR 75MHz			
MODEL NAME	DISPLAY	HARD DISK	RAM	PRICE	MODEL NAME	DISPLAY	HARD DISK	RAM	PRICE	MODEL NAME	DISPLAY	HARD DISK	RAM	PRICE	
DOSSIER 486 SM	MONO 9.5" LCD	170MB	4MB	£999	DOSSIER P5 SD	COLOUR 10.3" DUAL SCAN	540MB	8MB	£2099	DOSSIER P5 ST	COLOUR 10.4" TFT	540MB	8MB	£2999	
DOSSIER 486 SD	COLOUR 10.3" DUAL SCAN	170MB	4MB	£1399	DOSSIER 486 UPGRADES										
DOSSIER 486 ST	COLOUR 9.5" TFT	170MB	4MB	£1939	CPU UPGRADE TO: 486DX2 66MHz £49, 486DX4 75MHz £59, 486DX4 100MHz £79										
				HARD DISK UPGRADE TO: 260MB £39, 340MB £79, 540MB £169, 720MB £279											
				MEMORY UPGRADE TO: 8MB £149, 12MB £299, 20MB £639											
										DOSSIER P5 UPGRADES					
										CPU UPGRADE TO: Pentium® Processor 90MHz £99					
										HARD DISK UPGRADE TO: 720MB £129					
										MEMORY UPGRADE TO: 16MB £309, 24MB £679, 40MB £1359					

ALL PRICES EXCLUDE VAT AT 17.5% The above upgrades are available specifically for the Dossier

PRAISE INDEED!

PC MAGAZINE
August 1994
Dossier 486
WORTH a Look
What to buy for Business
February 1995
Dossier P5

PC MAGAZINE
March 1995
Dossier 486 Highly Recommended
GOOD Value
What to buy for Business
February 1995
Dossier 486

PERSONAL COMPUTER REVIEWER'S CHOICE
May 1995
Dossier P5/90

WINNER
JUNE 1995
Dossier 486

Personal Computer World
...this hot-rod, it's very, very quick.
March 1995
Viglen Dossier P90
...the Viglen is a 'no nonsense' machine at a competitive price.
March 1995
Viglen Dossier 486 Advanced Sound

CHOOSE YOUR OPTIONS
The following are only some of the options available specifically to the Dossier range. For a full list of other items look at the 'Viglen Options page' or for a free copy of the Direct Guide please call our sales department.
N4ADXDK0 Docking station for Dossier 486 £309
N4XDELUX Deluxe padded carrying case £49
N4XPSXDC Universal car battery adaptor £69
CMDP0T3F 14400/14400 PCMCIA Fax/Modem £185
PAMMPS03 External amplified speakers £23





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CONTENDER PCI PROFESSIONAL

Dimensions (W x H x D) mm: 380 x 150 x 415

Two free 5.25" drive bays.

CONTENDER PCI MEDIUM TOWER

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Three free 5.25" drive bays and two free (one internal) 3.5" drive bays.

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Supplied as standard with the Contender® PCI Range.

Get your hands on the New Microsoft Mouse with IntelliPoint software. Built for Comfort! Built for Speed!

Now all Contenders comply with EPA energy saving specification.



NOTE FOR 486 SYSTEMS

Due to the rapid changeover of Intel CPU production from 486 to Pentium® processor, please check availability of 486 systems before ordering.

The Contender® PCI is a new value range of personal computers providing the performance edge and future proofing of PCI local bus technology as well as the ease of use of Plug and Play software. It is one of the lowest cost PC investments you can make without compromising

quality, reliability or support. And you won't be disappointed when it comes to performance either.

The Contender® PCI is available in a choice of two case styles (see inset box) and in a 486 and Pentium® processor range. It offers amazing value for money

and is ideal for most office applications such as word processing, accounts and spreadsheets.

With a host of options including multimedia, the Contender® PCI makes the perfect PC for everyday use.

LOOK AT THIS SPECIFICATION

- Choice of processor, memory and enhanced IDE drives.
- 8K (16K for Pentium Processor) Cache RAM built into CPU plus 128K (256K for Pentium Processor) second level external cache.
- 3 ISA, 2 PCI and 1 PCI/ISA shared bus slots.
- One 3.5" floppy drive.
- 2 Serial, 1 Parallel printer port (EPP), 1 PS/2 mouse port.
- Choice of case styles either Professional for desktop use or Medium Tower for desktop or floor standing use.
- 486 models CPU upgradeable to 486DX4 100MHz and Intel Overdrive processors based on Pentium® technology.
- High Performance PCI bus Windows accelerated Super VGA card with 1MB (upgradeable to 2MB) video DRAM option for even faster performance.
- Viglen ENVY 14R, 14" Super VGA Colour Monitor.
- 102 Key compact ergonomic keyboard.
- Genuine Microsoft Mouse.
- MS-DOS® 6.22 and Windows™ 3.11 and Works for Windows™ pre-installed and ready-to-run.
- User friendly manuals.
- 12 months parts and labour collect and return warranty. Low cost on-site option up to 5 years available.
- Free lifetime hotline technical support.
- Options for competitive application software bundles.

THE PRICE YOU PAY

THE CONTENDER PCI 486 RANGE				THE CONTENDER PCI PENTIUM® PROCESSOR RANGE			
COLOUR SUPER VGA	PCI 4DX266	PCI 4DX475	PCI486DX4100	PCI P560*	PCI P575	PCI P590	
HARD DISK	RAM	486DX2 66MHz	486DX4 75MHz	486DX4 100MHz	Pentium® 60MHz	Pentium® 75MHz	Pentium® 90MHz
270MB	4MB	£849	£859	£889	-	-	-
420MB	8MB	£979	£989	£1009	£999	£1109	£1199
530MB	16MB	£1219	£1229	£1249	£1239	£1349	£1429
1GB	16MB	£1299	£1309	£1329	£1319	£1429	£1499

The prices above are for complete Contender® PCI Medium Tower and Professional systems ready to run with MS-DOS 6.22 and Windows 3.11 and are based on either an Intel 486 or Pentium® processor. To order please quote the relevant model along with the hard disk and RAM capacity required and PLEASE DO NOT FORGET to specify the case style required. ALL PRICES EXCLUDE VAT AT 17.5%

*The Contender P560 is a limited offer (while stocks last) please check availability before ordering.

CHOOSE YOUR OPTIONS

- For a list of some of the options available with all Viglen PCs, refer to the 'Viglen Options' Page or for a free copy of the Direct Guide please call our Sales Department. The following are some of the options you can choose specific to the Contender PCI:
- PDDXPST2** High Performance Diamond Stealth 64 DRAM SVGA card (1MB upgradeable to 2MB as used in the Genie range) instead of the standard Contender SVGA card **£29**
 - PDDXPAT4** High Performance ATI Mach 64 SVGA card with 2MB of VRAM instead of the standard Contender SVGA card **£149**
 - PDDXPST5** Highest Performance Diamond Stealth 64 Video SVGA card with 2MB of VRAM instead of the standard Contender SVGA card. This card allows the fitting of an optional high performance MPEG module for full motion video applications **£179**
- For the optional MPEG module providing CD-i and Video CD compatibility (when a CD ROM is fitted) please add a further **£229**

MULTIMEDIA OPTION

Why not add Multimedia to the system of your choice? See 'Viglen Options' page for details.

TAKE ADVANTAGE OF THE SOFTWARE BONUS WITH EACH VIGLEN PC
SEE 'VIGLEN OPTIONS' PAGE FOR DETAILS.



Includes software for easy configuration of add-in cards



Easy to Own payment scheme from **£37.08** per mth over 36 mths **19.9% APR** 10% deposit. See "Order page" for typical example.



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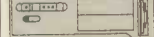


The **genie**® **PCI** Range **LEADING THE RACE FOR PERFORMANCE AND NEXT GENERATION TECHNOLOGY**

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GENIE PCI PROFESSIONAL

Dimensions (W x H x D) mm: 380 x 150 x 415



Two free 5.25" drive bays.

GENIE PCI MEDIUM TOWER

Dimensions (W x H x D) mm: 170 x 380 x 420



Three free 5.25" drive bays and two free (one internal) 3.5" drive bays.

MICROSOFT® ERGONOMIC MOUSE

Supplied as standard.

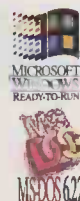
Get your hands on The New Microsoft Mouse with IntelliPoint software. Built for Comfort! Built for Speed!

The Genie® PCI is the flagship of the Viglen range of personal computers, providing the highest performance systems which are in the forefront of leading edge technology. The Genie® PCI was one of the very first systems to incorporate the new PCI local bus architecture with all its performance

advantages as well as the easy to configure plug and play software - thus eliminating the guesswork of yesterday's technology. PCI local bus has now become the industry standard for PCs. The Genie® PCI has carried on incorporating the advances of new technology such as the Triton chipset.

EDO RAM and currently provides one of the fastest PCs yet. Available with incredibly fast PCI graphics cards, enhanced IDE hard disks and the highest specification 15" Monitor. If performance is your requirement, then the Genie® PCI is the choice for you.

15" MONITOR SUPPLIED AS STANDARD



LOOK AT THIS SPECIFICATION

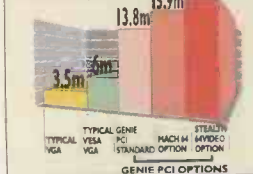
- Choice of processor, memory and hard disk capacity.
- 3 ISA, 2 PCI, 1 PCI/ISA shared slots.
- Enhanced IDE support
- 256K secondary WRITEBACK cache.
- One 1.44MB floppy drive.
- 2 serial, 1 parallel printer port (EPP).
- Choice of case styles, either Professional or Medium Tower.
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- On board sound system
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- High Performance PCI bus Windows accelerated Super VGA card with 1MB (upgradeable to 2MB) video DRAM option for even faster performance.
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- 102 key compact ergonomical keyboard.
- Microsoft mouse with Microsoft Mouse Manager software utilities.
- MS DOS® 6.22, Windows™ 3.11 and Works for Windows™ ready-to-run.
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- 12 months parts and labour warranty with option for low cost parts and labour maintenance for up to 5 years.
- FREE lifetime hotline technical support.
- Option for competitive application bundles.



GENIE PCI PERFORMANCE

VGA Performance in New Winmarks 95

Figures based on 100MHz Pentium® based Genie PCI systems



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THE GENIE PCI PENTIUM® PROCESSOR BASED RANGE

COLOUR SUPER VGA	RAM	PCI P5175 Pentium® 75MHz	PCI P5190 Pentium® 90MHz	PCI P51100 Pentium® 100MHz	PCI P51120 Pentium® 120MHz	PCI P51133 Pentium® 133MHz
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1GB IDE	16MB	£1599	£1679	£1769	£1919	£1999
1.6GB IDE	32MB	£2199	£2289	£2379	£2529	£2619
2GB SCSI-2	32MB	£2499	£2589	£2679	£2829	£2919

The prices above are for complete Genie PCI Professional and Medium Tower systems ready to run with MS-DOS 6.22 and Windows 3.11 and are based on either an Intel 486 or Pentium® processor. To order please quote the relevant model along with the Hard Disk and RAM capacity required and PLEASE DO NOT FORGET to specify the case style required. ALL PRICES EXCLUDE VAT AT 17.5%

NEW FASTEST EVER GENIES

The Genie range now includes the new Intel Triton based Motherboard providing dramatic increases in performance. In fact the performance of this range was so impressive that the 120MHz system (fitted with pipeline burst cache - this is an optional extra) earned us the supreme accolade of being voted PC Magazines Editor's Choice for the Ultimate PC in the June 95 issue. Here are some of the many features of the new Genie PCI Pentium® processor based systems:

- Fast new EDO DRAM as standard
 - Capable of accepting the new faster pipeline burst (PB) cache (optional)
 - Capable of accepting faster mode 4 IDE Drives (standard on HD of 1GB and greater)
 - Socket 5 as standard, thus upgradeable to future Pentium® Processors up to 133MHz
- If you require 256K of pipeline burst cache instead of the standard asynchronous version please add £30. Please note that there is a severe world shortage of this memory, so please check on delivery dates.

PRAISE INDEED!

January 1995 Genie PCI P5160

Feb 1995 PC Today

WHAT PC? WINNER

June 1995 Genie PCI P5190

April 1995 Genie PCI P5190

PERSONAL COMPUTER NEWS

January 1994 PC magazine

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Windows Users

CHOOSE YOUR OPTIONS

For a list of some of the options available with all Viglen PCs, refer to the 'Viglen Options' page or for a free copy of the Direct Guide please call our Sales Department. For the Genie range may we suggest a larger 17" monitor, a multimedia upgrade and perhaps a Microsoft Office application suite as an ideal option. The following are some of the options you can choose specific to the Genie PCI Pentium® processor based range:

- PDDXPAT4 High Performance ATI Mach 64 SVGA card with 2MB of VRAM instead of the standard Genie SVGA card £139
- PDDXPST5 Highest Performance Diamond Stealth 64 Video SVGA card with 2MB of VRAM instead of the standard Genie SVGA card. This card allows the fitting of an optional high performance MPEG module for full motion video applications £169
- For the optional MPEG module providing CD and Video CD compatibility (when a CD ROM is fitted) please add a further £229
- PAMNP504 15 watt speakers (Model QS-816) to connect to Genie PCI £36

TAKE ADVANTAGE OF THE SOFTWARE BONUS WITH EACH VIGLEN PC

SEE 'VIGLEN OPTIONS' PAGE FOR DETAILS

MULTIMEDIA OPTION

Why not add Multimedia to the system of your choice? See 'Viglen Options' page for details.

EASY2OWN™

Easy to Own payment scheme from £3.20 per mth over 36 mths 19.9% APR 10% deposit. See "Order page" for typical example.

intel inside

pentium® PROCESSOR

PLAY

Includes software for easy configuration of add-in cards

yes NetWare Tested and Approved

RING 0181 758 7000 **Viglen** YOU'LL NEVER LOOK BACK FAX 0181 758 7080

Viglen options

Take advantage of the Software Bonus



Get the WORKS with Viglen!

In addition to MS-DOS® 6.22 and Windows 3.11, all Viglen systems are now supplied with Microsoft® Works for Windows™ an easy to use integrated package comprising a word processor, spreadsheet, database and electronic communication software; the ideal tool to run a small business. **Works for Windows™** manuals and disks are not included but these can be provided at small additional cost.

Please quote the following:

Order code **WAPCMD10** Works 3.0 for Windows Manual and disks **£9.99**

...and Software Bonus Upgrades...

The additional software bonus obtained from Viglen gives you a choice of upgrading to further powerful applications from Microsoft at very competitive bonus upgrade prices. These bonus upgrade prices are only available when ordered with a Viglen PC at the time of purchase. The following applications are available. Please add the relevant order code when ordering:



Microsoft® Office 4.2

This is the latest version of the most popular and powerful integrated software package from Microsoft featuring the technology of Intellisense. The package includes Word for Windows™ 6, Excel 5 and Powerpoint 4 as well as a licence to use MS Mail. Supplied pre-installed with full manuals and disks. Order code:

WAPMMX30 Bonus Upgrade Price (Floppy Disk version) £169 or
WAPMMR30 Bonus Upgrade Price (for CD version) £159



Microsoft® Office Professional 4.3

This is the same as Microsoft® Office 4.2 with the addition of the latest version of Access 2.0 - the powerful yet simple to use Windows based database. Supplied pre-installed with full manuals and disks. Order code:

WAPMMX50 Bonus Upgrade Price (Floppy Disk version) Price £249 or
WAPMMR50 Bonus Upgrade Price (CD version) £229



Viglen Consumer Bundle

Microsoft® Publisher 2.0, the easy to use desktop publishing package, plus Microsoft® Money 3.0 for money management made simple. Both these packages are fully pre-installed and supplied with full manuals and disks. Order code **WAPMMX60 £49**

Software may be supplied in Viglen OEM packaging

ALL PRICES EXCLUDE VAT AT 17.5%



COMMUNICATE WITH THE WORLD



Why not add a fax/modem to your system and join the information super highway. The Viglen FM1414 Fax modem provides you with 14,400 baud fax and data facility with **Internet** and **Compuserve** access software as well as a free starter pack. All this and the ability to receive and send faxes within Windows for only **£89 + VAT** Order code **CMDN0VGF** when ordering.

Upgrade your Monitor

The Viglen desktop and tower systems are supplied with either a 14" or 15" Colour Monitor as standard. To enhance your viewing further, you can upgrade to one of our superb 17" Colour Monitors the ENVY 17P or the even more enhanced ENVY 17PE.



Upgrade from:	Upgrade to:	Price to add:
Contender Range	ENVY 17P	£330 + VAT
Contender Range	ENVY 17PE	£410 + VAT
Genie Range	ENVY 17P	£240 + VAT
Genie Range	ENVY 17PE	£320 + VAT

Experience the excitement of CD ROM and Multimedia

Why not add a CD ROM drive or indeed a full multimedia option including CD ROM drive and a 16 bit sound card to the system of your choice? You can choose from one of the following new exciting and cost effective options. Remember, all options are factory fitted, installed, fully tested and ready to run.



CD ROM Drive Option

ONLY £79 + VAT

Take advantage of the ability to use all the new software that is being supplied on CD ROM format and add an IDE CD ROM double speed photo CD compatible drive to your system for **only £79 + VAT**. Please quote order code **DCDDNP01** when ordering.

Multimedia Options

For a complete multimedia solution why not add one of our multimedia options to your system.

For a Contender PCI system choose Option 1.

Option 1 includes a genuine 16 bit SoundBlaster card, along with a 2X CD ROM drive as well as a pair of amplified speakers, microphone, SoundBlaster Ensemble software, 3 Microsoft CD titles (Encarta '95, Musical Instruments, and Golf) and Microsoft Works and Money. To order this option fully fitted to your Contender PCI system quote order code **UCDM01N1** and add **£169 + VAT** to your order.

For a Genie PCI Pentium® system choose Option 1B.

Option 1B is only for the Genie PCI Pentium® system as it does not include a sound card (Genie PCI Pentium® systems now have sound as standard on the motherboard). This option is supplied with a 4X CD ROM drive as well as a pair of amplified speakers, microphone, Voyetra Audiostation software, 3 Microsoft CD titles (Encarta '95, Musical Instruments, and Golf) and Microsoft Works and Money. To order this option fully fitted to your Genie PCI Pentium® system quote order code **UCDMB1N1** and add **£169 + VAT** to your order.



Multimedia option 1B fitted to a Genie Professional system.

Support for you

Unlike many PC manufacturers, Viglen puts equal emphasis on its after-sales service - that means not only a comprehensive standard warranty on every product but a choice of service packages that offer total cover for up to five years.



All Viglen PCs are supplied with a 12 months collect and return warranty (UK only). This covers your Viglen PC and any other options that are factory fitted, covering parts and labour. In addition to these standard warranty terms, which provide a better and quicker response than some of our competitors, Viglen offer a choice of additional low-cost on-site options to meet specific user requirements - See to the right.

Do not forget, when you compare our services with our competitors, please read their small print. With Viglen, you have a choice and your choice is clear.

ADDITIONAL ON-SITE OPTIONS

For complete peace of mind choose one of the additional low-cost on-site warranty options.



This option converts the standard Viglen warranty into a next business day on-site response for 12 months covering parts and labour. Order code **ZSMI2NBD £39** - for all desktop and Tower models. Order code **ZSMI2DSS £149** - for Dossier portable range.



This option converts the standard Viglen warranty into a 4 hour on-site response for 12 months covering parts and labour. Please call for details of this individually tailored package.

FOR A FULL RANGE OF THE UPGRADES AND OPTIONS AVAILABLE WITH YOUR VIGLEN PC, CALL NOW FOR YOUR FREE COPY OF THE VIGLEN DIRECT GUIDE.

RING 0181 758 7000



Viglen
YOU'LL NEVER LOOK BACK

FAX 0181 758 7080

699
PERSONAL COMPUTER WORLD
SEPTEMBER 1995

Viglen Limited, Viglen House, Alperton Lane, Alperton, Middlesex HA0 1DX.

Special Configurations direct to you

Viglen produce a wide range of PCs and options to give you the ultimate choice. We have also designed a number of special configuration packages offering an abundance of software applications to suit specific needs and budgets.

For education, entertainment, personal accounting, business management or high performance computing, we have the package to fit your needs. We also have the latest multimedia systems combining sound, text, animation and video into one easy to use system. There is a Viglen Special Configuration that's just right for you.



We will do our utmost to despatch the special configuration models shown here within 3 working days from clearance of payment. Any upgrades or additional options will require extra time up to 10 working days.

**MICROSOFT®
WINDOWS '95
LAUNCH
READY**

1 HOME BUSINESS MULTIMEDIA PC

The Home Business Multimedia PC provides everything you need for a good performance Multimedia system including an abundance of software to get you started.



only
£43.50
per month
APR 19.9%
EASY-DOWN
monthly payment
scheme

£999
+ Delivery and VAT =
£1191.45

**4MB RAM
270MB HD
14" SVGA Colour Monitor
Double speed CD ROM Drive**

486 DX2 66MHz
Viglen Contender® Professional PCI with Intel 486DX2 66MHz Processor
Fast PCI Local Bus Accelerated Graphics 1MB Video DRAM
2 serial, 1 parallel, 1 PS/2 port,
1 games port
3.5" Floppy Drive
Ergonomic Compact Keyboard
Genuine Microsoft® Ergonomic Mouse
MS-DOS® 6.22 and Windows 3.11 Ready To Run
Plus
Genuine 16 Bit SoundBlaster Sound Card
Stereo Amplified Speakers
Microphone
Microsoft® Works for Windows™
Microsoft® Publisher
Microsoft® Money
Multimedia CD Titles from Microsoft®: Encarta® 95, Musical Instruments and Golf



ORDER CODE: SHPG4027X1

2 PERFORMANCE MULTIMEDIA PC

The Performance Multimedia PC brings together the fast 75MHz Pentium® processor, along with a fast VGA card and 15" monitor to provide one of the best price/performance systems available and is ideally suited for business and home.



only
£60.66
per month
APR 19.9%
EASY-DOWN
monthly payment
scheme

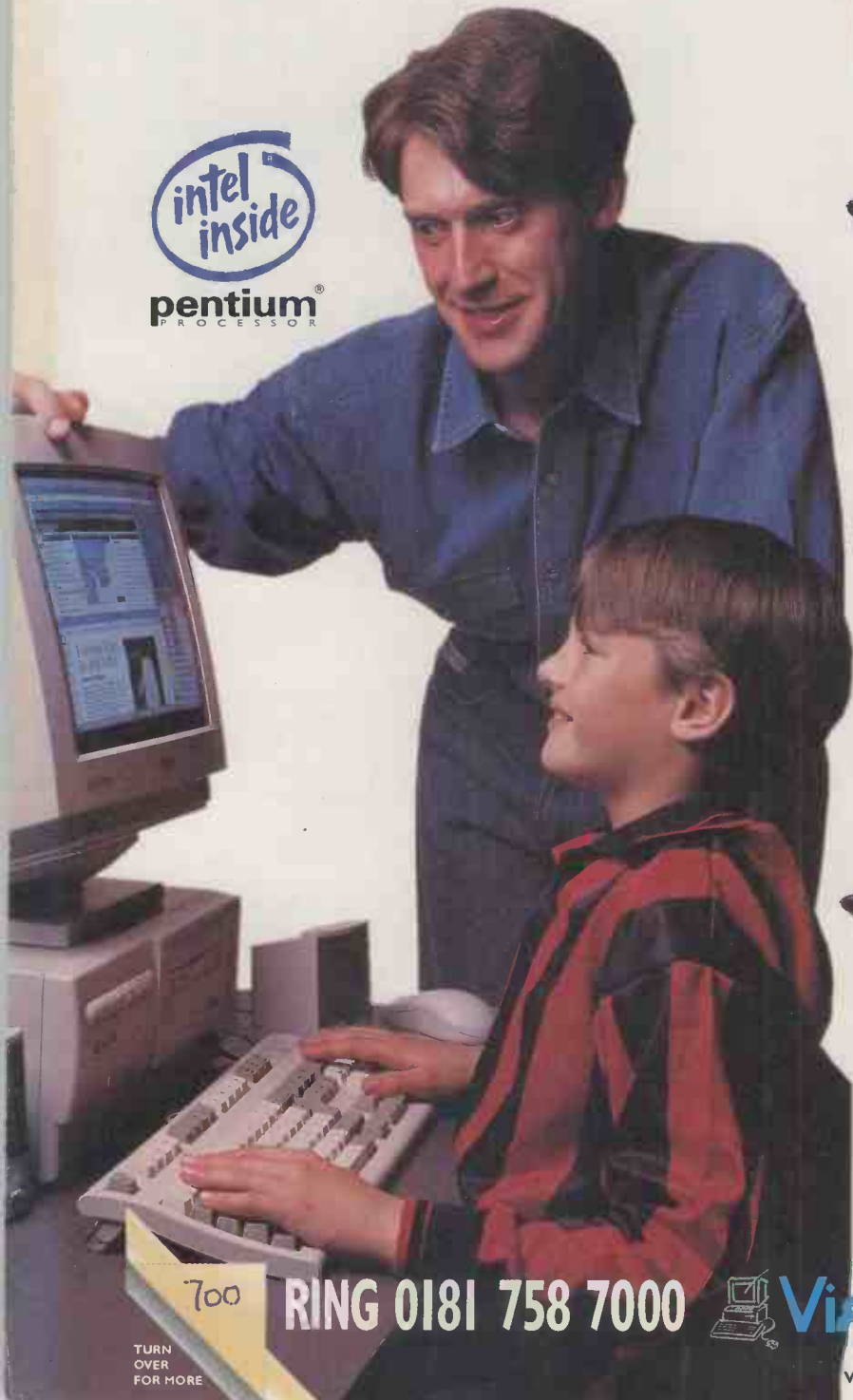
£1399
+ Delivery and VAT =
£1661.45

**8MB RAM
530MB HD
15" SVGA Colour Monitor
Fast 64 bit PCI Graphics card
Quad speed CD ROM Drive**

**PENTIUM®
PROCESSOR
75MHZ**
Viglen Genie® PCI Professional with Intel Pentium® 75MHz Processor
2 serial, 1 parallel, 1 games port
3.5" Floppy Drive
Ergonomic Compact Keyboard
Plug and Play Software for easy upgrading
Genuine Microsoft® Ergonomic Mouse
MS-DOS® 6.22 and Windows 3.11 Ready To Run
Plus
Genuine 16 Bit SoundBlaster Chip
Stereo Amplified Speakers
Microphone
Microsoft® Works for Windows
Microsoft® Publisher
Microsoft® Money
Multimedia CD Titles from Microsoft®: Encarta® 95, Musical Instruments and Golf



ORDER CODE: SPPQ8053X1



700 RING 0181 758 7000

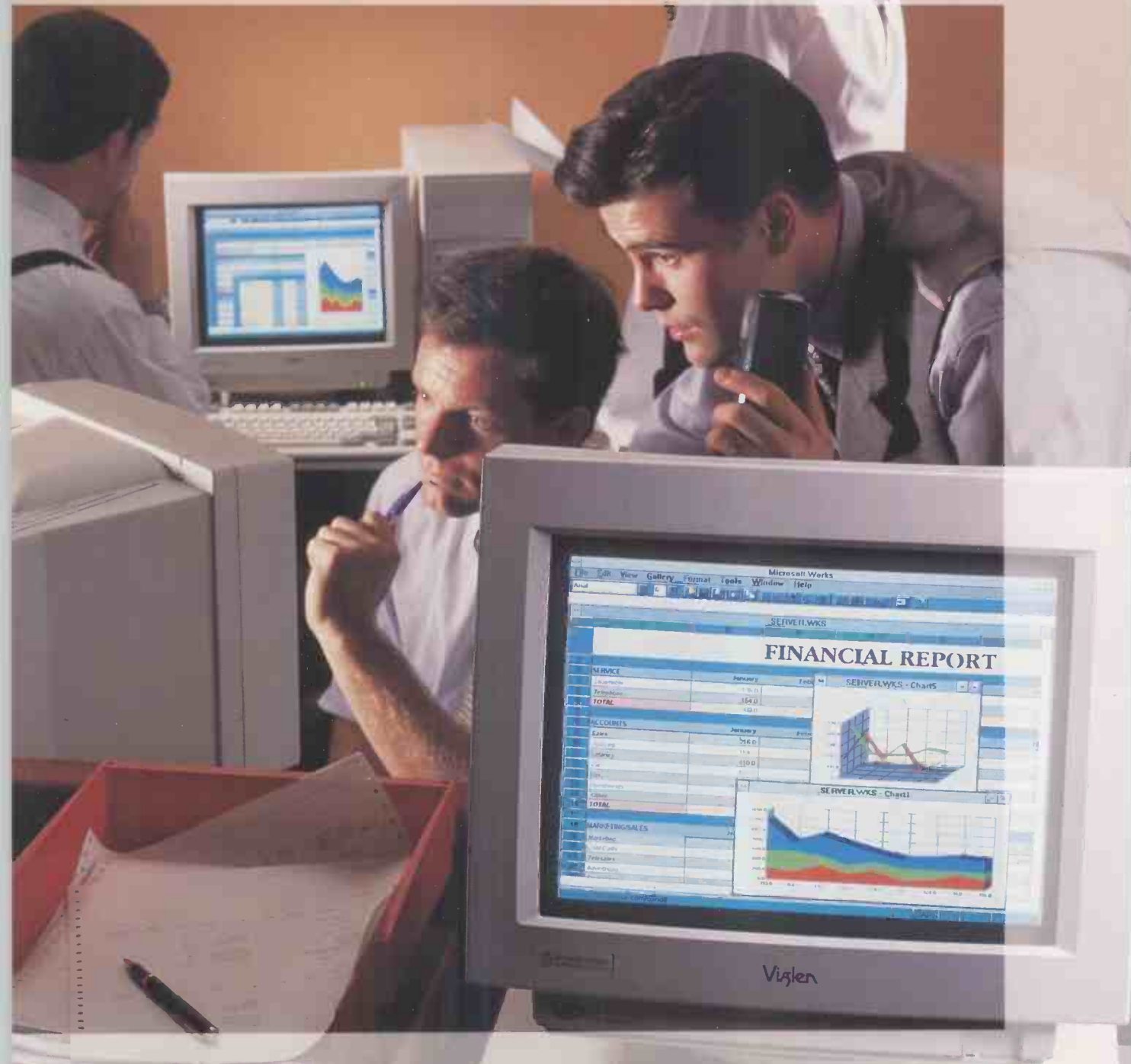
Viglen FAX 0181 758 7080
YOU'LL NEVER LOOK BACK

TURN OVER FOR MORE

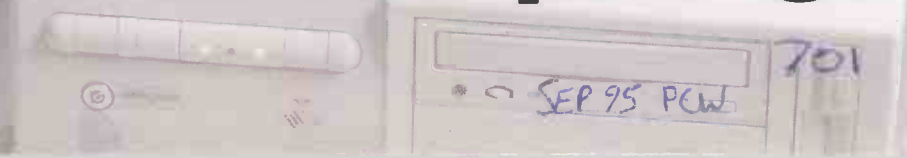
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Visgen

Personal Computers



Setting the standards
in Personal Computing.



Software packages

The Viglen Special Configurations are each supplied with a different variety of software packages which are pre-loaded, include full user manuals and disks and are ready to use. Here, we have briefly outlined each package to help you decide which Special Configuration is right for you.


Microsoft® Works
Five essential tools for easier everyday computing. Word processing, spreadsheet, database, graphics and communications tools.



Microsoft® money
A complete set of financial management and planning tools to manage your investments and expenditure.




Microsoft® publisher
This desktop publishing software is the key to producing professional quality output, layouts and clip art.




MULTIMEDIA TITLES


Musical Instruments
Features 200 instruments - many rare and exotic - from around the world. Hear and play 1,500 authentic sound samples of instruments and jazz, classical and rock ensembles.



ENCARTA® '95
The complete interactive Multimedia Encyclopedia. This best selling and award winning title condenses 28 volumes into one CD. Maps, charts, sound and pictures bring information to life!




GOLF
Rise to the true-to-life challenge of Microsoft® Golf. Realistic graphics and sounds combine with true golf ball flight paths, accurate swing control and a choice of courses.




SOFTWARE BONUS UPGRADES

All the special configurations shown can be further upgraded to include one of the following professional integrated software applications from Microsoft at a very special bonus upgrade price. If you require pre-installation please specify and allow extra delivery time for these options.

Microsoft® Office 4.2
A popular and powerful integrated software package from Microsoft featuring the technology of Intellisense and including Word for Windows™6, Excel 5 and Powerpoint 4 as well as a licence to use MS Mail. Supplied pre-installed with full manuals and disks. Order code **WAPMMR30 Bonus Upgrade Price £159 (CD version with full manuals)**



Microsoft® Office Professional 4.3
This is the same as Microsoft® Office 4.2 with the addition of the latest version of Access 2.0 the powerful yet simple to use Windows based database. Supplied pre-installed with full manuals and




disks. Order code **WAPMMX50 Bonus Upgrade Price £229 (for CD version with full manuals).**

Please note some software may be supplied in Viglen OEM packaging

17" MONITOR UPGRADES

Upgrade your special configuration Business System with one of our superb 17" Colour Monitors, the ENVY 17P or the even more enhanced ENVY 17PE.



Upgrade from: Performance/Power/Ultimate 120
to: ENVY 17P
Price to add: £240 + VAT

Upgrade from: Performance/Power/Ultimate 120
to: ENVY 17PE
Price to add: £320 + VAT

Upgrade from: Ultimate 133
to: ENVY 17PE
Price to add: £80 + VAT

3 POWER MULTIMEDIA PC

The Power Multimedia PC takes the Performance Business Multimedia PC a stage further, with a faster processor and higher Hard Disk capacity, providing increased performance capabilities.

only **£63.73** per month
APR 14.9%
FAS 2 OWN
monthly payment scheme

£1559
+ Delivery and VAT = £1849.45



8MB RAM
1GB HD
15" SVGA Colour Monitor
Fast 64 bit PCI Graphics card
Quad speed CD ROM Drive

PENTIUM® PROCESSOR 90MHZ

Viglen Genie® PCI Medium Tower with Intel Pentium® 90MHz Processor
2 serial, 1 parallel, 1 games port
3.5" Floppy Drive
Ergonomic Compact Keyboard
Plug and Play Software for easy upgrading
Genuine Microsoft® Ergonomic Mouse
MS-DOS® 6.22 and Windows™ 3.11 Ready To Run

Plus
Genuine 16 Bit SoundBlaster Chip
Stereo Amplified Speakers
Microphone
Microsoft® Works for Windows
Microsoft® Publisher
Microsoft® Money
Microsoft® Multimedia CD Titles from Microsoft®: Encarta® '95, Musical Instruments and Golf

ORDER CODE: SPDN8100X1

4 ULTIMATE 120 MULTIMEDIA PC

This configuration is 'the hottest PC money can buy' according to PC magazine which after reviewing 24 other top of the range systems awarded the Genie its Editors' Choice for the Ultimate PC. We have configured this system to be similar to the reviewed PC except that we have added a fast modem, and reduced the price. You will also need to add a 17" monitor option (see '17" monitor upgrades' above) to obtain the reviewed specification.

only **£96.53** per month
APR 14.9%
FAS 2 OWN
monthly payment scheme

£2369
+ Delivery and VAT = £2801.20



16MB EDO RAM
1GB HD
15" SVGA Colour Monitor
Stealth 64 Video VRAM with 2MB
Quad speed CD ROM Drive
14400/14400 Fax Modem,
Internet Access Software
256K Pipeline Burst Cache

PENTIUM® PROCESSOR 120MHZ

Viglen Genie® PCI Medium Tower with Intel Pentium® 120MHz Processor
2 serial, 1 parallel, 1 games port
3.5" Floppy Drive
Ergonomic Compact Keyboard
Plug and Play Software for easy upgrading
Genuine Microsoft® Ergonomic Mouse
MS-DOS® 6.22 and Windows™ 3.11 Ready To Run

Plus
Genuine 16 Bit SoundBlaster Chip
Stereo Amplified Speakers
Microphone
Microsoft® Works for Windows
Microsoft® Publisher
Microsoft® Money
Multimedia CD Titles from Microsoft®: Encarta® '95, Musical Instruments and Golf

ORDER CODE: SPDUA100X1

5 ULTIMATE 133 MULTIMEDIA PC

If the Ultimate 120 system was not powerful enough, Viglen offer you even more power and specification with this ultimate 133 configuration. This system provides more memory, higher capacity hard drive, a 17" monitor and the most powerful Pentium® processor yet.

NEW

only **£117.99** per month
APR 14.9%
FAS 2 OWN
monthly payment scheme

£2899
+ Delivery and VAT = £3423.95



32MB EDO RAM
1.6GB HD
17" ENVY 17 Colour Monitor
Stealth 64 Video VRAM with 2MB
Quad speed CD ROM Drive
14400/14400 Fax Modem,
Internet Access Software
256K Pipeline Burst Cache

PENTIUM® PROCESSOR 133MHZ

Viglen Genie® PCI Medium Tower with Intel Pentium® 133MHz Processor
2 serial, 1 parallel, 1 games port
3.5" Floppy Drive
Ergonomic Compact Keyboard
Plug and Play Software for easy upgrading
Genuine Microsoft® Ergonomic Mouse
MS-DOS® 6.22 and Windows™ 3.11 Ready To Run

Plus
Genuine 16 Bit SoundBlaster Chip
Stereo Amplified Speakers
Microphone
Microsoft® Works for Windows
Microsoft® Publisher
Microsoft® Money
Multimedia CD Titles from Microsoft®: Encarta® '95, Musical Instruments and Golf

ORDER CODE: SPDVB160X1

6 PROFESSIONAL BUSINESS PORTABLE PC

This configuration combines the fast 486DX2 66MHz with a large memory and Hard Disk capacity along with a fast modem and large colour screen to make it one of the most powerful and flexible notebook PCs for the Professionals on the move.

only **£69.40** per month
APR 14.9%
FAS 2 OWN
monthly payment scheme

£1699
+ Delivery and VAT = £2013.95



8MB RAM
340MB HD
10.3" Dual Scan Colour LCD Screen
14400/14400 Fax/Modem

486DX2 66MHZ

Viglen Dossier® ADVANCED Sound notebook sized (6.5lb) portable PC with 486DX2 66MHz Processor
1 serial, 1 parallel, 1 PS/2 port
2 PCMCIA ports, socket for docking station option
CPU Upgradeable
3.5" Floppy Drive
Built in speaker and microphone for multimedia sound
Built in large tracker ball
MS-DOS® 6.22, Windows™ 3.11 Ready To Run and Lotus Organizer

Plus
Microsoft® Works for Windows™
Microsoft® Money

ORDER CODE: SSSG8034X1

PC MAGAZINE UK'S CHOICE
June 1995
Viglen Genie Pentium PCI 120MHz

APPROVED BY
Computer Associates
for the use of the **READY TO RUN** logo

INFORMATION READY TO RUN





ORDER CODE: SPDUA100X1

702

SOFTWARE BONUS UPGRADES

At Viglen we believe in putting you first.



At Viglen, PC also means Pleased Customers.

Our customer first philosophy ensures every aspect of our business is geared to customer satisfaction. In recognition of this the 1993/4 Computer Weekly Datapro Survey consistently rated Viglen first for reliability, sales support and overall satisfaction. Viglen were also highly commended in The Daily Telegraph and First Direct Customer First Awards 1994.



The entire Viglen product range provides the best value for money available. Viglen topped the price performance ratings in the 1993/4 Computer Weekly Datapro Survey.



Widely regarded as the best support in the industry, each Viglen product purchased gives **FREE lifetime access to our technical support** telephone service and bulletin board.



Our sales staff will gladly guide you through the jungle of computer jargon with help on the ideal system for you.



Technical specialists are always available for more specialised advice.

Each Viglen system has a **12 months parts and labour warranty**, including collection from and return to you at our expense (mainland UK only). For complete peace of mind there is also a further choice of low-cost on-site service packages for up to 5 years. With mission critical systems, such as file servers, our 4 hour response premium on-site service is available.



Our pedigree is impeccable, with over 19 years experience in providing quality manufacture and support services.



Don't worry about compatibility - Viglen's PCs are guaranteed to run all software that operates on equivalent IBM PC/AT. Viglen is licensed under the relevant IBM patents.



Viglen's desktop systems are made in the UK to exacting quality control procedures to give you added confidence in our products.



Extremely competitive repair and upgrade services are always available from our service department.

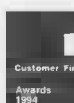


As a Novell authorised OEM Viglen take the work out of networking by providing the very best in network solutions and support for 2 to 250+ users. In-house Novell certification labs and the availability of more than two Certified Novell Engineers at all times mean that Viglen are a networks supplier to rely on.



Our quality and reliability standards are second to none, thanks to the latest design and manufacturing processes approved to BS5750 quality standard. The Datapro survey rated Viglen first for reliability.

Remember to carefully read the small print of our competitors when comparing services. At Viglen we believe in giving you a choice and making that choice crystal clear.



The Daily Telegraph and first direct



Viglen - Once again, Viglen PCs take the hardware honors in the U.K. User Survey, with the highest ratings for Overall Satisfaction, Price/Performance, Expansion Capability, and Ergonomics.



Ordering direct, couldn't be easier phone, post, or by fax.

If you require any help or advice on choosing a system to suit your requirements please call our Sales Department. To help us identify your requirements please state the product code (where applicable), description and price of items required.

When you have decided on your system please fax or phone your orders. You will need to add £15.00 per system for courier delivery, add 17.5% VAT on top. Collections may be made by prior arrangement. Please allow 7-10 working days for delivery, except for Viglen special configuration models which we will do our utmost to despatch within 3 working days from clearance of payment.

BY PHONE

Credit card, Switch, Connect or American Express card holders can order by telephone. Just call us and ask for our Sales Department.



Official orders from educational establishments, government departments and PLCs accepted.

Very competitive Lease Rental arrangements are available for bona fide businesses, educational and government establishments.

BY POST OR FAX

You can place your order with our Sales Department by post or fax to the address or number shown below. We will require a cheque for the full amount by return post. Credit card, Switch, Connect or American Express card holders may authorise payment by quoting the credit card number and expiry date.



EASY OWN monthly payment scheme is available to private purchasers subject to status. Typical example of payment calculation of PC costing £799 ex VAT: £799+£15 (delivery) + 17.5% VAT = £956.45 total cash price. 10% deposit of £95.65 required followed by 36 monthly payments of £31.27 (APR=19.9%). For finance over £1499 exc VAT, APR drops to 14.9%. Additional payment protection insurance is available. Viglen Ltd is a licensed credit broker.

EDI. Purchase orders via electronic data interchange accepted using INS Tradanet service.

Public sector customers may also purchase at special prices through the HMSO.

Please ring 01603 694153



See, Touch and Feel our products... Come and visit us in the showroom area.

Viglen Limited, Viglen House, Alperton Lane, Alperton, Middlesex HA0 1DX.



Showroom open

Monday-Friday 9.00 - 5.30

Saturdays 9.00 - 1.00

Showroom closed

Public and Bank Holidays



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HP LASERJET 4 PLUS



£2,737

MORE ON THE BUDGET.

ECOSYS FS-1600



£2,737

MORE IN THE BANK.

When do two very similar printers become very different?

When you look at their consumables costs.

New research* shows that, *over 300,000 pages, you could be* **Ecosys** *paying almost £2,800 more than you need.*

And that's on top of the purchase price.

Multiply the consumables costs by the number of printers in your organisation, and it could mean adding hundreds of thousands of pounds to your overhead.

The ECOSYS FS-1600 from Kyocera, on the other hand, can cut your consumables costs by around 80%.

Which keeps nearly £2,800 in the bank for every one you use.

The ECOSYS range offers a choice of 10 and 18 ppm speeds, 300 or 600 dpi resolution, and LaserJet and Postscript emulations. There are duplex and networking facilities, and a wide range of high capacity paper-handling options.

ECOSYS. No printers cost as little to run.

And you can bank on it.

Use the coupon - or telephone for more details. Today.



To: Kyocera Electronics (UK) Ltd, 8 Beacontree Plaza, Gillette Way, Reading, RG2 0BP. Fax: (01734) 311108.

Please send me full details on printers and printing costs.

Name _____

Position _____

Company _____

Address _____

Postcode _____ Tel no _____ PCW 9B

01734 230700

PRINTING COSTS. STOP PAYING THE PRICE.

*Source: Independent research carried out by Pira International, using European Printer Manufacturers and Importers (EPMI) guidelines and prices at RRP ex-VAT. All prices correct at time of going to press.