Personal Computer World

October 1995 **£2.95**

FX Fighter -
Virtua Fighter on the PC?
p248

Britain's favourite personal computer magazine
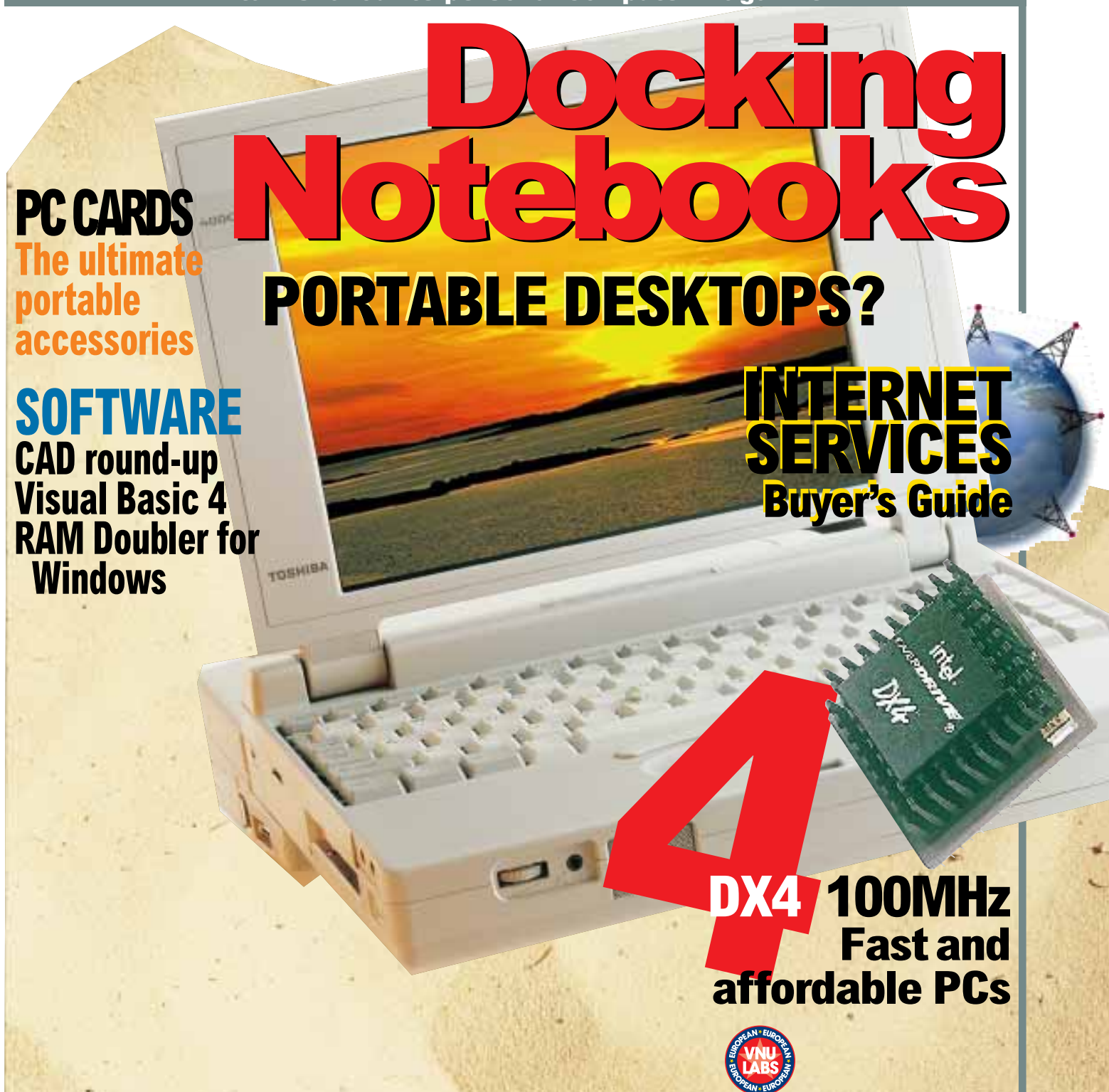
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Fast and affordable PCs

TOSHIBA

DOUBLE DISK SUPER PACK Now with *INTERACTIVE* CD-ROM **and** 3.5in disk

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DOUBLE DISK
SUPER PACK
On your CD-ROM and
3.5" Disk this month:
Personal Computer World

ON THE DISK
1 CHARM II - strategy game
2 PC TAX - UK tax package
3 RECORDER - teach yourself to play
Run A:\PCW.EXE from Windows

Turn to page 8 for more details

ON THE CD
Masses of shareware including:
Mahjong, Poke_It Poker, Postcode, Photovision
20 sound effects, 25 Midi tunes, 25 Wav tunes

Rosenthal utility collection:
Cleaner, Master, Uninstall, Virsim

MSCDEX
Updater of 2.22 to 2.23

DEMOS
Space Quest/ Reunion/ Flagtower/ Kingdom
GALLERY
60 high resolution photographs

PCW Cover Disk

Another packed cover disk which, this month, features version two of the smash Shareware hit Charm, PC Tax, an excellent tax advisor program that may save you money, and Recorder, a fun and educational music program for Windows.

Installing and running the PCW Cover Disk

To install the programs, insert the disk in drive A: or B:, and from Windows run the file PCW.EXE in the root directory of that drive. All the files will then be installed (by default unless you specify otherwise) in subdirectories of a new directory called PCWOCT95. Program Manager icons will also be created for you to run the programs.

Charm II
[Minimum Requirements: 25MHz 386, 2Mb RAM, 256 colour VGA/SVGA display, SoundBlaster compatible card (optional)]
The aim of the game in Charm II is to escape from each of the levels. To do

this, you must collect all of the talismans (golden crosses) to open the Level Exit Door. But it's not as easy as that, as there are various obstacles to make your task more dangerous and complex.

These include: Doors that require the corresponding key to be opened; Stones that must be pushed around; Traps — if you walk over them you're a goner; Gobbs, little nasties that follow you around and attempt to kill you; Stoppers, which are like stones but with a mind of their own; Crushers — heavy blocks that fall from the skies (you must dodge them to escape); Fire, which will spread over twigs lying on the ground, and can bar your path (if you are standing over twigs, then fire can burn you to death); Dark Evil — be very, *very* careful!

You move your character (called Ino) around the playing area using the cursor keys or the keys on the numeric keypad. On your travels, be sure to collect as many CHARMS as you can. There are 5

different types of charm ranging from 100 to 1000 points in value.

To help you, you can collect and use sticks of dynamite to destroy boulders and certain other obstacles, but take care — they also destroy orbs, charms, keys and even *you*! You can also set up chain reactions to blow up a large number of obstacles. To detonate dynamite, press D. To set a stick of dynamite that you are carrying on the ground, press S.

Good luck, you'll need it!

PC Tax Advisor
[Minimum Requirements: 512Kb RAM, Text mode]
An excellent DOS-based tax advisor which has been produced by HCS Ltd, a software house specialising in PC-based financial software, and Richens & Co, a firm of tax consultants.

It has been designed to not need printed documentation and has sample data preloaded, along with extensive Help screens. The program will prove especially useful for readers who will have to fill in self-assessment forms under the government's latest tax regulations, and could save you money.

Recorder
[Minimum Requirements: Windows 3.1]
A great program that teaches you how to play the recorder as well as the fundamentals of music theory. It is very easy to use, requiring no documentation. Just click and follow the prompts.

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 30 days. If you wish to continue using the software 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.

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: TIB PLC (PCW), TIB House, 11 Edward Street, Bradford BD4 7BH, 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, 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 is usually quicker for you to call them first. Alternatively, ring our hotline on week days between 10:30a.m. and 4.30p.m. on 0891 715929. Calls are charged at 39p per minute cheap rate and 49p at all other times.

PCW Interactive CD-ROM

Robin Nixon introduces this month's software packed CD-ROM which include the very latest demos, applications, utilities, Shareware, demos, videos and even several dozen megabytes of Mac software.

[Minimum requirements: 8Mb RAM (4Mb of this can be in a permanent swapfile), 386 SX/33 processor, Windows 3.1. Users with less than this should still be able to run all the DOS programs on the CD-ROM using the program DOSMENU.BAT, though you may have to "clean" boot with no unnecessary TSRs or device drivers loaded. For best performance we recommend: 8Mb installed RAM, 486 DX/50 processor, Windows 3.11]

To run PCW Interactive, use either Program Manager or File Manager to select your CD-ROM drive and run the

Personal Computer World

PCW Interactive
October 1995 (100 pages)
Including Octobers's cover disk

1 CHARM II
Straegy game

2 PC TAX
UK tax package

3 RECORDER
Teach yourself to play the recorder

Windows and DOS
with 90Mb Mac Software

4 SHAREWARE
Mahjong, Poke_It Poker, Postcode, Photovision
20 Sound effects
25 Midi tunes
25 Wav files

5 MSCDEX
Updater of 2.22 to 2.23

6 DEMOS
Space Quest
Reunion
Flagtower
Kingdom

7 GALLERY
60 High
Resolution
photographs

For technical support call *Robin Nixon* on: 01233 665800 or email
RNIXON@CIX.COMPULINK.CO.UK

CD-ROM
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Postcode locator — Look up postcodes
Recorder — Learn how to play the recorder

SUPERSCAPE
Two more stunning virtual worlds
SYSTEM SVGA256
Microsoft's SuperVGA graphics drivers

VIDEO FOR WINDOWS
Version 1.1e — the latest

CUT OUT THIS LABEL AND KEEP WITH YOUR CD-ROM

file PCWI.EXE in the root directory of the CD-ROM.

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.BAT 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.

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.

PC Tax Advisor

Please note that after duplication we discovered that the PC Tax Advisor attempts to write a temporary file to the drive from which it is run. Therefore, it will not run directly from the CD-ROM as it will generate an error when the write attempt fails. The easiest way for you to run this program is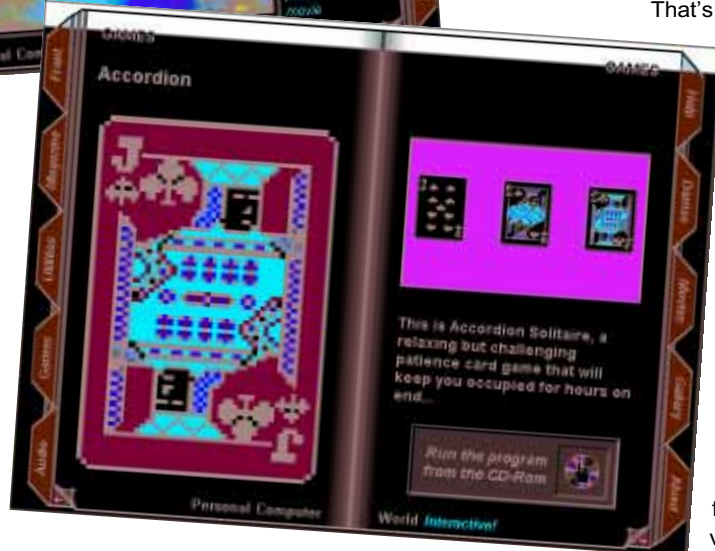 to run the file \COVERDSK\PCW.EXE from Windows which will install all the floppy disk programs on your PC. You can then run PC Tax from a new icon which is added to Program Manager.

Top *From the Country & Western movie*
Above *Relax with Accordion Solitaire*

Mac Software

This month we have started including Mac software on the CD-ROM. To kick off there are three superb demos comprising over 50Mb of software. They are two great children's interactive stories from Oxford Multimedia, "A Christmas Story" and "The Fish Who Could Wish", which we know your kids will love, and a stunning trailer for "Deadalus". To use them, insert the CD-ROM in your Mac's drive and, using Finder, run the programs that interest you (remembering to read all accompanying documentation first). Unless you have a PC emulator, you should ignore all the other folders that you see.

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.

There are also 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 choose to have digital movies played back on your PC at full screen resolution! That's right, without having to recourse to hardware add-ons such as MPEG cards, you can have full screen digital videos when you run the PCW Interactive CD-ROM. But 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 and select the "Windowed" option and quit again.

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 can't read.

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.

To upgrade to the new driver using this CD-ROM, 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.

Left *Trace your family tree with Reunion*
Below *Oh mother... a battle game for you to get embroiled in*

This will then 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.

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 takes 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.

IMPORTANT — READ THIS!

* General Protection Faults

If you receive General Protection Faults when running PCWI or playing any digital videos, it is probably because your graphics display driver may not be entirely 100% Microsoft compatible. The answer is therefore to install one of Microsoft's own drivers, as follows:
1). Run "Windows Setup" from File Manager, then select "Options" followed by "Change System Settings".
2). Scroll through the list of displayed graphic drivers until you get to the final entry "Other Display (Requires Disk from OEM)", and select it.
3). Insert this month's CD-ROM into the drive and replace the "A:\" prompt with "D:\SYSTEM\SVGA256" (changing the D: to the correct letter if your CD-ROM is not in drive D:), then press Return.
4). Scroll through the new drivers until you find the ones beginning "Super VGA...." and select the one for the resolution you prefer to use. The driver will then be installed and Windows restarted. PCWI and Video for Windows should then have no further problems.

If this works (which it should in 95% of cases) you may wish to contact the supplier of your graphics card to see if they have an updated graphics driver. If Microsoft's drivers don't work you will need to contact your graphics card supplier anyway.

* Video for Windows installs fails

If the Video for Windows installation fails and you receive an error such as "XXXXXXXX.YYY cannot be updated as it is a shared file", the answer is to delete the file "XXXXXXXX.YYY" (or whatever it is called) and try reinstalling Video for Windows.

* PCWI is slow to load or runs slowly

You need at least 4Mb of RAM and a 4Mb permanent swap file to use PCWI. You are also advised to enable read cacheing of your CD-ROM by adding its name to the SMARTDRV line in your AUTOEXEC.BAT file. You should also allow MSCDEX to set up its own buffers by adding a line such as /M:10 to the MSCDEX line, also in your AUTOEXEC.BAT file. Please refer to your manuals for full details.

* Windows NT, OS/2 and Windows 95

Unfortunately Macromedia Director, the program used to create PCWI, is incompatible with Windows NT. However, you can run PCWI from OS/2 by simply calling up PCWI.EXE from the command line. Please note that we cannot guarantee that PCWI will work with any of the beta versions of Windows 95, and we can only offer support to users of the final release version.

Advice & Contacts

The PCW CD-ROM and cover disk are virus checked at every stage of production. However, neither VNU nor Ultimedia will accept liability for any problems arising from its use. You are advised not to install software on a networked PC before checking the disk. While PCW maintains a high standard of quality control, floppy 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.

For technical support on the CD and the programs on it, call the Support Line on 01233 665800. Initially this is a voice service manned by technical support staff. All calls are charged at the standard rate. You can also email rnixon@cix.compulink.co.uk, or CompuServe: 70007,5547.

Superscape

[Minimum requirements: 8Mb RAM, 486or Pentium processor with SVGA-capable graphics card, monitor and mouse]

On this and next month's CD-ROMs there will be four more 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 of the 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=C:\SUPERSCP\PROGRAMS`

is added, which sets the environment variable VIS to point to the SUPERSCP directory. 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= command 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 the same, and replace the \DOS with the correct directory if you do not have DOS installed in \DOS.

The Watchman Virtual World

The Watchman demonstration illustrates how a product might be visualised or designed using Superscape VR. Not only

can the proportions and visual design be represented and edited, but any features, mechanical or electrical, can be simulated.

Once you load the Watchman file, you will be presented with two default tapes and a prompt to select one. Both tapes contain an animation; one is a lower resolution than the other to allow users with low memory systems to use this demo.

About the Rubik Cube

This demonstration illustrates the ability to interact with an object.

Foreground buttons

The six larger buttons in the foreground correspond to the centre face of the same colours on the Rubik Cube (except the light green button which corresponds to the cyan face colour). Click on one half of the button to rotate the face of the cube one way, click on the other half to rotate it the other way.

Clicking on the top right button (olive colour) toggles cube rotation — on off.

Clicking on middle right button (black) generates a random move. Click and hold mixes up the cube.

Click on the bottom right button (white) to solve the cube automatically.

Rubik cube

Clicking on a layer of the cube rotates it in one direction only.

About Superscape

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.

SUPERSCAPE COMPETITION ENTRY FORM: OCTOBER PCW INTERACTIVE

Answer 1 _____   Answer 2 _____

Name... **Title**..

Company...

Address...

....

Postcode.. **Telephone**...

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

Your chance to win a copy of Superscape VRT

This month our special prize is Superscape VRT, a complete suite of authoring tools for creating virtual worlds. It comes with twenty virtual worlds and two hundred virtual clip-art images. To win a copy of Superscape VRT, all you need to do is tick the boxes to the correct answers to the questions below and send the coupon to the address shown.

The Questions

1) In the Watchman, what video scene can you see on the Watchman when you press the play button?

(a) A battle (b) A windsurfer (c) A driver

2) In the Rubik Cube, how many faces can you see on the Rubik Cube in the panel?

(a) 3 (b) 4 (c) 5

Personal Computer World

A B C
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BACK ISSUES

We keep a stock of past issues and can provide individual copies at a charge of £5. Call **Tom Costin (0171 316 9714)**.

• "It's only been in recent months that I've come to expect the Internet to become mainstream," said Bill Gates in a recent column. If that's what he's said publicly, you can imagine the flame mail he might have sent to some of his senior VPs. Something along the lines of: "We have missed a multi-billion dollar opportunity by failing to launch an Internet browser. How has this happened?"

And the cause of the imaginary mail is Netscape. Even by Californian start-up standards, Netscape's rise has been extraordinary. Within hours of going public the share price rose from $11 to $28 a share, giving the company a market value of over $1 billion, and the price is predicted to carry on climbing. By using the Internet as the distribution method, giving away free evaluation software, and keeping the price to register the software low, Netscape shot from 0 to 6 million copies in just four months.

• While Netscape looks set to prosper, at least in the short term, it's unclear which of the many companies involved in the other net-related activities of service provision, network operation and supplying third-party content will still be around in a couple of years' time. As our round-up of Service Providers (page 152) demonstrates, loads of companies have been hopping into the service provision market, but most are probably feeling a little apprehensive at present as BT begins to lumber into position to provide a service of its own. BT has the potential to turn every exchange in the country into a POP (point of presence) and decimate the opposition in the process. And for companies like Compuserve who are also in the business of supplying third-party content, things will be just as tough. Microsoft Network is of course a major threat, but the openness of the ever-expanding Internet is a worse one. It means that Compuserve's traditional gravy train — reselling information — may not be around for a whole lot longer.

**Ben Tisdall
Editor**

Next Month

Laser Printers

An in-depth look at the latest lasers. And because we've divided them into three categories — budget, personal and network, there's one for everybody.

Windows Databases

Latest versions of the Windows databases reviewed, including Win95 versions of Microsoft Access and Lotus Approach.

Delving into Delphi

Tim Anderson with part one of a series on getting the most from Borland's Delphi.

November issue
— On sale Thursday 5th October

December issue
— On sale Thursday 2nd November
• Back up devices
• Accounts software

PCW
Newsprint

And for our next trick...

The next version of Windows,
codenamed Memphis, is sched-
uled for 1997 under the name of
Win97. It will marry Windows NT
and Windows 95, and will have a
full 64-bit architecture. An interim
Win96 will include network hooks
and mail features left out of Win95
in order to get it to market in 1995,
say Microsoft insiders. It is
targeted to debut at Spring
Comdex in Chicago.

Tim Bajarin

Battle of the networks as Win95 gamble pays off

Microsoft's gamble in launching Windows 95 the face of a threatened anti-monopoly su appeared to have paid off last month. It risked ing to withdraw all copies to remove links to th new Microsoft Network (MSN). Instead, the U Department of Justice, investigating claims of unfair competition, pledged to take no action the August 24 launch. The DoJ was under p from an industry poised to reap billions of dollars' worth of business in new or upgraded 32-bit applications.

Still more was at stake: a slice of the burg-eoning online cash economy. UK banks are not alone in fearing they may be sidelined, with the MSN just a click away from millions of Win95 screens across the world.

But the MSN faces stiff competition and the charges it announced last month – £60 a year (£55 to early signers, or £6 a month) plus £3.25 an hour beyond two hours a month – are attractive only for light users. Moreover, Web access will not be available to British MSN users until next year. Microsoft argues that its software is easy to use; but so is the latest software provided on signup by Net providers charging a flat monthly £10 to £20.

MSN product manager, Jeremy Gittings, points out the MSN will be available at launch in 52 coun-tries – a big plus for travellers. He said several UK companies plan to offer services on the MSN, and income from these, and from advertising, may

A sample from GSP's Designworks, one of several graphics packages shaping up for the new 32-bit Win95 world — see page 23.
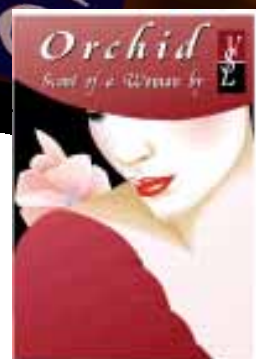
push down connect charges. (This begs the ques-tion of why businesses should pay MSN a premi-um when they can set up shop for free on the Web.)

Compuserve responded by undercutting MSN, slashing its basic hourly rate by nearly 40 percent from £3 to £1.85 – with the first five hours free and no email premium. The monthly flat charge remains at £6.20. Heavy users can pay £15.60, plus £1.22 an hour after 20 hours.

Compuserve offers free membership with software and 10 hours online on 0800 289378; Microsoft 0345 002000

Clive Akass

Serial killer could have a whirl in every port

The PC's familiar serial port could become a thing of the past with the development of a new fast connection, the final specification for which was due to be published late last month. The Universal Serial Bus stems from Intel but has been endorsed by major industry players..

It could also replace the par-allel port, says Intel, which stands to make money from new USB driver chips; but the stan-dard is open and royalty-free for third-party developers.

The old serial port is too slow for fast modems and ISDN, and is usually limited to one device

per port. The new bus is more than 100 times faster (12 Mb/sec) and can be linked to up to 63 devices via a chain of expansion hubs.

The USB is Plug and Play compliant, allowing devices to be "hot swapped" at will. It is designed for simultaneous

support of several relatively slow devices (up to ISDN's 128Kbps) rather than high-speed peripherals such as video displays.

But there are competing technologies, including Apple's Firewire port — see News Analysis on page 38.

Check this out: £850 for the taking... if you can be bothered!

If you were given a £850 cheque, redeemable only over a 30-day period five years from now, would you remember to cash it? More than three out of four people would not, according to a PC vendor making just that offer.

Singapore-based IPC (unrelated to the publishing company) is offering people who buy selected systems from one of its 75 sales centres 50 percent of their money back in the year 2000.

Similar schemes are common in the US and the Continent, according to sales director Stefan Trbovic (sic). The deal is that IPC pays a premium on each sale to a company called Homefield Insurance, which in turn is underwritten by three US offshore finance companies.

The cash is invested but earns nothing like enough to cover the payback; the companies bet that most people won"t claim. "The people who do not claim are underwriting those who do," said Trbovic.

He reckoned that at most 25 percent, and more likely around five percent, will claim "even if they stick a piece of paper on the wall and frame it to remind them."

That might be true for small sums. But what about sums of up to a memorable £850 from IPC systems costing up to £1,699? Alan Scott, director of a marketing company called Warranty Management which represents Homefield in Britain, said confidently: "The redemption rates are no different if the sums involved are £500 or £2,500."

He said Homefield and its reinsurers had combined assets of around $430 million and that the claim address for claims would be valid in five years.
IPC 01282 618866
Clive Akass

Child and (very) adult CD-ROM titles from Dorling-Kindersley

Dorling Kindersley has demonstrated its Autumn CD-ROM titles. Due out in October are Eyewitness Virtual Reality: Cat and Bird, Anne Hooper's Ultimate Sex Guide and the Dorling Kindersley Children's Dictionary.

Virtual Cat and Bird are based on the Eyewitness series of books. The CD-ROMs are innovative because they use a virtual world idiom and allow you to wander around a virtual museum with a floor devoted to each animal. You can stop in front of exhibits then click on them to drill down for more information. Cat, for example, includes over 800 screens and pop-ups and nearly 50 videos and animations. DK plans to release Virtual Shark and Dinosaur in '96, each of which will have its own floor.

Anne Hooper's Sex Guide, again based on a successful book, is an adult CD aimed at improving people's sex lives. It uses video and animation, some quite explicit, to explain the subject. The CD starts by giving you a sex questionnaire and mimics a real-life personal consultation with the author, herself a sex therapist and marriage counsellor. The CD will also include a Sexopedia reference section and password protection to prevent children getting their hands on it.

The Children's Dictionary follows on from My First Incredible, Amazing Dictionary and is aimed at 7-12 year olds. It has over 45,000 definitions plus animations, illustrations and sounds. All four titles are expected to have a street price of between £29 and £39.
Dorling Kindersley 0171 836 5411
Ben Tisdall

What Gaul!
● Asterix the Gaul has fought his way on to a £39.9 CD-ROM called Caesar's Challenge. It is a cartoon game for up to four players.
Funsoft 0181 748 7565

Re-markable!
● A new brand of rewritable disk labels, on sale at major stationers, will change your life, according to the publicity blurb. A packet of 10 Re-Mark-It labels will change your bank balance to the extent of £2.49.

Live coverage
● The Live 95 electronics show will take place at Earl's Court for six days from 19 September. Attractions include computer games and BT's Internet café.

Fax switch turns on your PC

● One snag of fax-modem cards is that your PC needs to be on all the time to monitor the phone line. Alltek has come up with what looks like a relatively cheap, though not ideal, solution.

The Autopower AP1000N device will switch on your PC (or any other device, such as an answering machine) when you receive a phone call and switch it off again after a time of your choice. The logic can cope with Windows or DOS software.

One problem is that the first fax call is lost. But Altek's Victor Roche said: "Most fax machines are programmed to retry a number at least three times."

The device will cost about £128, but the price is expected to fall to less than £70 if sales take off.

Alltek 0181 662 0736

Lindy tunes in

● The £44.99 Lindy sniffer is designed to fine-tune performance on SCSI chains.

Lindy 01642 765275

Tornado card

● The £299 Tornado video card supports up to 1600 x 1280 in 256 colours, and 800 x 600 in true colour.

Datapath 01332 294441
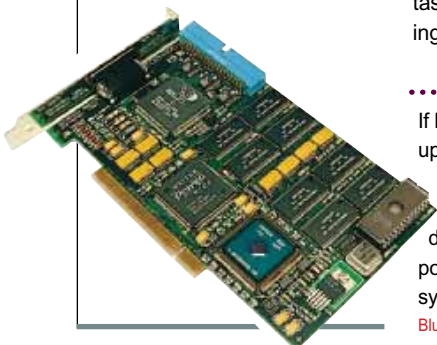
Prisoner's laptop ban a load of tosh, says peer

A computer-buff peer has taken up the case of a prisoner who has been banned from his laptop for three years.

The prisoner paid more than £3,000 for a Toshiba 3200SXC in October 1992, using money from an inheritance, after being told that he could keep it in his cell at Long Lartin.

But before the laptop arived he was moved to Full Sutton, where he was told that as a top-security prisoner serving life, he could not use it.

Now Lord Avebury, chair of the Parliamentary Human Rights Group, has written to the director-general of the prison service, Derek Lewis, asking him to explain the decision. His letter, a copy of which he passed to *PCW*, concluded: "Many computer users would be

While we are (almost) on the subject of law and order, clock this hot item from a display of stolen antiques set up by Twickenham police at www.open.gov. uk/metpol/tw/tw-home.htm

glad to help solve any difficulties that might be foreseen."

The prison service refused to comment on details of the case, but a spokesman said it was up to the local governor to decide whether a prisoner was allowed to use a computer.

It seems, however, that the governor feared the Toshiba's Undelete facility might be used to reveal hidden messages – a line that would presumably ban all mail for fear of invisible ink.

"It is ridiculous. Prisoners in other countries are allowed PCs," said Lord Avebury, who is patron of the Buddhist Prison Chaplaincy. As a knowledgable PC owner, he is sympathetic to the fact that the unused 20MHz 386SX-driven Tosh is a poor beast by today's standards. "Think what you could get for £3,000 now," he said.

The power of the P6 reflected in 3D

Real-time continuous speech recognition and increased use of 3D will be among technologies that mature with the power of the next-generation P6 chip, according to Intel.

"It's a capability that will hit the mainstream in a couple of years," said microprocessor marketing manager, Lewis Paceley.

The first P6 is due to ship before October. It will have a 150MHz version as well as the 133MHz chip originally announced, Paceley revealed. Intel claims the 150MHz version will have a SpecInt92/fp92 rating of 220/215, compared with the latest 133MHz PowerPC 604's score of 200/200. On 32-bit applications it is more than twice as fast as a 100MHz Pentium.

But, curiously, Intel cheerfully admits it is actually slower than the Pentium on many 16-bit tasks, because it gains some speed by anticipating instructions on the basis of 32-bit file access.

Paceley said: "If you are planning to run 16-

bit applications, you should buy a Pentium. If you are going to run 32-bit, you should buy a P6."

But the company expects that the P6 will sell at first mostly to companies, designers and academics for servers and processor-intensive applications. By contrast, Pentium sales have been predominantly to the home and small-business market.

"I think this was mainly due to the fact that the Pentium came at the same time as technologies like the CD-ROM hit the mainstream, turning the PC for the first time into a games machine," said Paceley.
• Intel will announce the name of the P6 at the Fall Comdex where it will be showing 133MHz and 150MHz systems, *writes Tim Bajarin*.

Officials discounted speculation that the next-generation P7 will use RISC instructions, as in the Power-PC, or the VLIW technology Intel is developing with HP. The P7 is in the works for 1997 and will use traditional CISC instructions. It seems that the VLIW-based chip is unlikely to appear before 1999.

If heads comes up five times in a row, what are the chances that it will come up on the next coin toss? The answer is fifty-fifty, of course, but there are many who would argue otherwise: gambling is the last bastion of superstition. Your opinion on the matter will dictate whether you trust the predictive power of Lotto Win version 2.0, which urges you to "unleash the power of your PC on the lottery." But the package also helps you run lottery syndicates, so at £12.99 it is a good bet anyway.

Blue Quetzal 0181 810 6500
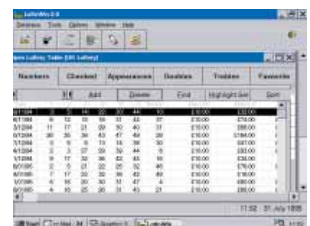
Win95 apps start to roll

Developers of graphics applications, which will benefit particularly from 32-bit operation, were among the first to announce Windows 95 upgrades. Micrografx came out fighting with an aggressively-priced suite bundling an entire range of studio apps optimised for the new Microsoft Office.

The ABC suite includes new versions of Designer, Picture Publisher, Flowcharter, and Media Manager. A CD preview is available for £9.90.

Corel announced that CorelDraw 6.0 would ship shortly after Win95 and would cost £495. It includes a new 3D modelling and rendering module.

More downmarket but looking good value at £39.95, was GSP's Designworks 3.0. This UK package will not have a 32-bit version until next year but it is Win95 tested. Included in the bundle is a utility for making bordered certificates, which GSP believes will be a big selling point with the small clubs and groups among its target market.

Adobe announced version 6 of its PageMaker desktop publisher, which includes facilities for creating Acrobat and HTML Web documents.
● **More applications, page 141.**
Corel 0800 581028; Micrografx 0800 626009; GSP 01480 496666

Short Stories

On the border
● This design was produced by a new package called GraphicType Designer which builds up borders and corner pieces from design elements held as fonts. The character-based approach means the required width, height and thickness of a border can be controlled easily. The £39.50 is available for an introductory price of £24.95.
GraphicType 01275 333730

Peril of the booby-trapped letters

The belief that email presents no virus risk could lull people into a false sense of security, warns mail specialist Centreline 2000.

A virus, like any program, cannot be emailed without being translated (uuencoded) into a 7-bit format which has to be decoded by the recipient to present any threat.

But the increasing practice of sending fully-formatted word-processor files, using a MIME or uuencoding utility, presents a new danger: the booby-trapped letter.

Centreline's sales director, Stuart Hillston, points out that a standard Word document can be set to launch a macro, or compiled Basic program, when opened – and that can be made, say, to reformat all the disks on a network.

"If you have a MIME converter, the files comes through as a standard Word document which many people might open without thinking. A virus program would not be able to detect anything suspicious."

He admitted that he had not heard of it happening. "But it can be only a matter of time before someone does it."

Centreline's answer is to include with its mail systems a browser that enables a user to view the file without launching the application.

The sender could hide the source by using an anonymity server or by getting the macro to strip the information from the document, Hillston said.
Centreline 2000, 01905 724080

Clive Akass

Each-way bet
● Portable Add-ons has introduced a range of what it calls Trumcards — PCMCIA cards that double as modems and Ethernet connectors. Prices range from £439.
Portable Add-ons 01483 440777

Soft bonanza
● More than 500Mb of shareware is on the latest Night Owl 17 CD-ROM. It includes utilities, games, drivers and databases for Windows, DOS and OS/2, and costs £19.
CD-ROM Distribution 0161 477 8848

Fujitsu joins the super-floppy league as it launches the 'world's smallest' drive

Fujitsu is the latest company to entered the "battle of the super-floppies", in which several technologies are competing for an emerging market in low-cost high-capacity removable disks.

It has launched what it claims is the world's smallest magneto-optical drive, the £299 M2541, which is just 17mm high and weighs 250 grams. It takes 3.5in 230Mb disks costing about £20 each.

It is available now to PC and notebook makers as an internal enhanced IDE drive;

but SCSI, parallel-port and PC card versions are imminent. The drive is available as an option in Apple's latest portables.

Maximum data transfer rate is a said to be 1.6Mb/sec – twice as fast as a quad-speed CD drive – and the average seek time is 65 milliseconds.

Iomega revealed a huge market in this area when demand for its £150 Zip drive, which takes £15 100Mb disks, rapidly exceeded the supply. Drives should be more

freely available this autumn. Iomega has a 1Gb drive in the pipeline.

Syquest responded by announcing its 3.5in EZ 135 drive, which is faster than the Zip and takes 135Mb disks costing from £12.50. The internal version costs the same as the Zip, but the standlone costs £179. It should have been available last month but Syquest said it would be delayed by about three weeks.

Compaq has said it will be launch a true "superfloppy" drive early next year which will read existing floppies, as well as a new 100Mb format. But it is expected to be relatively slow.

Back to school

● Education specialist 10/10 is offering two of its leading products at an 80 percent discount to tempt parents in the approach to the new school year.

The company offers a series of £26 modules based on the national curriculum; each is said to offer computer-assisted learning for all levels between the ages of six to 16.

Peter Davidson, chairman of 10/10, said: "Packages like that can cost £1,500 for one subject. We don't have the same kind of marking and assessment facilities but we are much cheaper."

He said the cut-price offer had been made because experience had shown that parents who bought one module returned for more.

10/10 Software 01132 394627

Olivetti in ATM breakthrough

● A breakthough in mobile multimedia communications is being claimed by researchers at Olivetti's Cambridge laboratory.

They have built what they claim is the world's first radio system using Asynchronous Transfer Mode (ATM) communication which is particularly useful for multimedia.

The test system uses the 2.45GHz band with a raw data transfer rate of 10Mb/sec.

ZSafe hides data on the fly

● ZSafe for Windows and DOS is targeted particularly at portable users who fear sensitive information may get into the wrong hands if machines are lost and stolen.

Developer Zincom says the software encrypts and decrypts hard-disk data transparently on the fly. It can also be used in desktop PCs.

Zincom 01565 650383

Acorn upsets its dealers and loses MD despite arrival of new machines

Acorn Computers has had a controversial month, making up-beat product announcements but losing a managing director and enraging many of its dealers.

First the good news: a new entry-level (from £749+VAT) A7000 featuring the latest ultra-integrated (audio, video, I/O, memory management plus CPU) ARM3500 RISC chip.

Acorn also upgraded its flagship Risc PC 600 range with a slightly faster ARM610 processor, added an on-board 16-bit audio and ATAPI CD -ROM controller, and improved the Risc OS operating, including a secret new JPEG image decompressor which is incredibly fast.

There is also a 40 percent faster Risc PC 700 featuring ARM's newest ARM710 RISC CPU, also available as a £100 upgrade to 600 owners.

The bad news: Acorn has appointed one third of its education dealers as agents for a new direct sales strategy aimed at tackling Apple, RM and PC schools competition. Sadly, the deal undercuts all other Acorn dealers. Education is 80 percent of Acorn's market. Acorn's Usenet conference (comp.sys.acorn) has been in uproar as dealers accused the company of stealing their livelihood.

Then Sam Wauchope, Acorn's popular MD, unexpectedly resigned. "I can't comment about his resignation," said his successor David Lee, "...but it wasn't due to the channel changes." Acorn's line, according to Lee, is that dealers with a good reputation can add value to their hardware sales in various ways. Acorn has also introduced an interest-free credit scheme to boost consumer sales.

Ian Burley

Macabre but fascinating images from the Visible Human project (see *Newsprint*, February) are now available on CD-ROM. The images are of the body of Joseph Jernigan, who earlier this year was executed by injection at the age of 39 in Texas for killing an elderly man during a burglary.

His body, which he left to science, was first scanned for general orientation and then frozen and sliced into 1,870 1mm sections which were photographed in 24-bit colour at a resolution of 2048 x 1216 pixels. The result is a 42Gb set of 10,000 images which allow the body to be viewed from any angle.

The entire set has been compressed onto a single CD-ROM, with navigation software, and costs £495.

Floating Point Systems 01734 776333

RM goes back to school with Windows NT

Acorn's major rival in schools unveiled its next-generation schoolkid-proof networking product. Research Machines won a majority market share by going the mainstream PC route while Acorn ploughed its own RISCy furrow.

Its RM Connect involves a move to Windows NT as the server operating system to facilitate support of mixed Windows 3.x and Windows 95 environments.

The environment has been customised to help teachers set up the network for new classes – a considerable task, with each child having specific resources and rights and each PC having several users a day. The task is reduced to simple drag and drop operations; groups can be set up by copying lists to the clipboard.

RM consultant Steve Thomas said schools have more users and more sophisticated systems than many businesses.

Research Machines 01235 826000

Logitech beats dirty balls horror

Logitech claims to have solved the vexing problem of dirty balls. Its new range of pointing devices include trackballs and mice with no moving parts apart from the ball itself.

At the heart of the device are a charge-coupled light sensor (CCD) and two light-emitting diodes (LEDs) mounted on a piece of plastic (see picture). The LEDs illuminate a ball splattered randomly with dots.

The image of the ball is focused onto the CCD and is interpreted with the aid of a neural network to provide positional information. This derives from displacements rather than absolute positions, so the precise pattern of the dots is not a factor and marks do not upset the calculations.
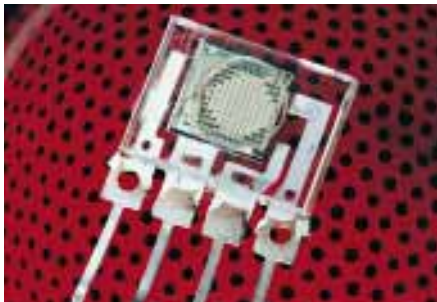
Moreover, the Swiss-developed system, called Marble Sensing Technology, does away with the usual wheels and rollers which translate ball movements via optical or resistive sensors and are very vulnerable to gunge. The first products using the new systems are likely to appear in September.

Hot stuff on the Win95 keyboard

Windows 95 has revealed the dark secrets of Microsoft's ergonomic keyboard — the one that looks as if it might swing back and clunk you on the head if you throw it out of the window (as well you might, if you're not a touch-typist). The board sports two extra Windows keys and an applications key, which we were promised would get up to all sorts of tricks under Win95.

Users can now get a free driver upgrade that pops up a shortcut menu at the touch of the apps key. Hot combinations using the Windows key will perform a variety of tasks from logging off to mimimising all apps. The keys are implemented on some third-party boards *(see story, right).*

Details on 0345 002000

Two-speed mouse for the Mac

A two-speed Mac mouse which allows you to shift gear for long jumps or fast scrolling may be adapted for PC use if it proves popular, says US mouse-maker Microspeed.

The latest Windows drivers provide a certain amount of ballistic control, moving the pointer further if the mouse is moved quickly, but the effect is subtle, according to Microspeed's Daniel Mertens. The MacTrac 3.0 mouse can be configured to switch gear instantly by clicking a middle button.

Mertens said the sister PC product could be made to do the same thing, but not with the normal Windows driver. A PC driver upgrade will be provided if the feature proves popular with Mac users.

The company has just set up a London office, and plans to launch a Win95 version of its award-winning WinTrac trackball in September for about £75. It will also offer a sturdy £34 keyboard with the new Win95 function keys *(see story, left).*

● A new pointing device called the Felix AB is designed to improve the accuracy and comfort of Win95 users, and reduce repetitive strain injuries, *writes Tim Bajarin.*

A handle operates a chip-controlled tracking system, providing very precise control of the cursor. I was sceptical at first, but quickly found that it was easy to use, fast and precise. Developer Altra bills it as a mouse replacement, but designers and other users may find it a low-cost alternative to a graphics-tablet combination.

It should be in the UK by late autumn and has a street price of around $60.

Altra 307 328 1342 (US)

Microspeed 0171 720 0592

Tim Bajarin in the US

Portable paging goes both ways

● The first two-way wireless messaging for portables is hitting the market. Last week, Motorola introduced its $600 Personal Messenger PC card-modem, which works with its ARDIS FM service. I have been using one with an HP 200 LX palmtop, and find it very useful. It has a connection to RadioMail, a great mail service optimised for wireless, and lets me send e-mail and faxes from almost anywhere.

Also useful is Motorola's Envoy, a pen-based palmtop with a wireless modem built in. It uses General Magic's Magic Link operating system. Skytel will launch a two-way paging system this autumn.

Companies like Ex Machina have enabled PC users to contact this type of pager with ease. However, two-way pagers add a new dimension. Instead of a keyboard, they have four buttons that can be used to respond to messages with multiple-choice questions. They are expected to appear in Europe early next year.

Advisor checks for Win95

● A program called Win 95 Advisor, from Touchstone Software, rates your PC for Windows 95 suitability. An installation planner lets you pre-select options available during Win95 installation and prepare for required entries. It detects if your BIOS will enable all Win95's Plug and Play features.

Advisor even checks for free space and Windows 95 compatibility with current compression and partition type, and benchmarks your system for multimedia performance. A tutorial explains key Windows 95 options and requirements to help you avoid problems. It will sell for about $35.

New Nighthawk printer sharer

● Up to forty PC users can share printers and swap files via the parallel port using new DFS devices from Nighthawk. Data can be transmitted up to 500ft using ordinary phone cable that plugs in the back of the devices, which cost £60 per PC and £50 per printer.
Nighthawk 01799 540881

Time TV

● Time has launched a new range of PCs equipped with cards that enable you to watch TV. Prices start at £1,699 for a DX2/66 with a 540Mb disk and CD drive.
Time 01282 777111

New printer

● Mannesmann-Tally has launched the T711c colour bubblejet, with a 300dpi resolution, for £269.
Mannesmann-Tally 01734 788711

Big picture

● NEC has produced what it claims is the first plug-and-play 29in monitor. The Multi-Sync 4Pgplus supports up to four sources simultaneously and costs £3,197.
NEC 0181 993 8111

Music online

● You can search for and buy sheet music and MIDI files from http://www.music-sales.co.uk, a new Web site set up by the Music Sales Group. Also at the site are sample files which change periodically.

Motorola's modem trouble

High-speed modems seem jinxed. After US Robotics' trouble with the 28.8k Sportster, Motorola is now having problems with the V3400 Pro modems which come bundled with the Internet Solution startup kit.

Some early models can generate a very short spike of DC (around 30-35 volts) when switched on. If the PC is already powered up, the spike may travel down the serial lead and into the PC's serial port where it pops a chip.

This only happens if the serial cable is screened, because the screening creates a more efficient transfer path. Most users will however not know whether their cables are screened or not. The cure, now incorporated in Motorola's modems, is a pair of blocking capacitors. If Motorola's engineers are satisfied that a faulty V3400 is the cause of damage, the company will repair a customer's PC.

Motorola seems to be doing its best for customers, without creating a panic reaction or triggering opportunist claims. It says it has warned the distribution chain, withdrawn faulty product and "informed all relevant press". Motorola's Simon Boyle believes that anyone who takes a Motorola V3400 modem back to a shop and complains that it does not work, will be fully advised of the problem rather than just given a
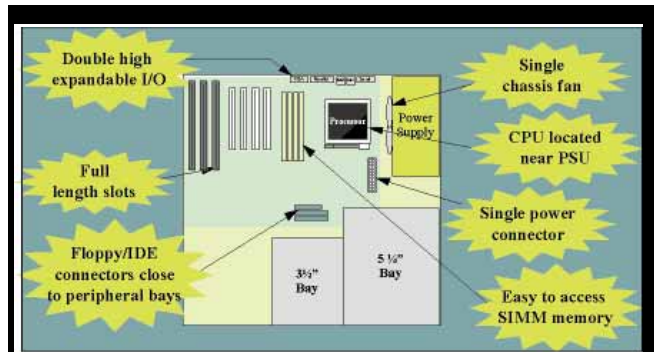
Leave the power supply and disk drives where they are in the above diagram and switch the rest clockwise through 90 degrees, and you will get something roughly like Intel's old Baby AT motherboard, which forms the basis of millions of current PCs. It will look a lot more awkward: longer leads, expansion cards blocking memory slots, and the processor and power supplier generating heat at opposite ends of the board — often necessitating two fans. The layout pictured is of Intel's new ATX board, which PC makers from Compaq, Dell, Gateway, and IBM downwards will be using for the forthcoming P6 machines. The wonder is that the board was made like that in the first place.
Clive Akass

replacement. By then the serial port may not work with any modem.

Most of the faulty batch ended up on the US market, so Motorola expects few claims in the UK. Because of a complex factory numbering system Motorola cannot easily identify risky units by serial number. Anyone with doubts can call Motorola on 01293 422600 for advice. I called and got a very quick response.
Barry Fox

US Robotics modems speed up

● US Robotics has become the latest modem maker to offer speeds beyond 28.8Kbps – billed with the V.34 standard only last year as the fastest modems would ever go. It is offering free upgrades which push its Courier and Total Control models to 33.6kbps. Point your browser at www.usr.com.
USR 0753 811180

Postcode utility with a nice price

A utility that provides addresses for given postcodes is being offered for £42.50, a fraction of the cost of some rival products.

Postcode, from AFD Software, is also available as a shareware version that gives only the town and county to which a code refers. It is available at http://www.nildram. co.uk/nildram/postcode.html.

Distributor Nildram claims it can speed up the typing of addresses as it will complete them down to street level once it is given the postcode.
• The new version of Quick-Address with Find from QAS will generate estimated household income from the postcode. It costs £3,000 for one user, with

substantial reductions for multiple licences. QuickAddress basically provides a front-end for income data compiled by The Marketing Information Consultancy with information on more than 13 million housewholds.
Nildram 01442 891331
QAS 0171 498 7777
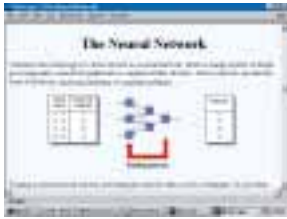
● A government Web site devoted to neural networks has been created with the aid of the technology it was set up to promote. The site (at http://www.globalweb.co.uk/nctt/) includes an online tutorial for beginners and companies who may be considering neural-net applications.

The creation of hypertext links between its 1000 pages was part-automated with the aid of a neural utility. The Web page is part of the Department of Trade and Industry's three-year Neural Network Technology Transfer programme, which has prompted more than 10,000 enquiries.

The programme has also produced, with the University of York's Electronics Centre, a four-module distance-learning course on neural technology. It is available from the centre (01904 432323) or from the Institution of Electrical Engineers on 01438 313311.

Net censor to protect kids

● A robot censor has been produced by US company Surfwatch to prevent young netsurfers from being exposed to bad language or sexually explicit material.

The software, which is available for both servers and surfers, keeps an updatable database of dodgy sites to which it block access. It also monitors material for bad words.

SurfWatch 415 948 9500 (US)

● Portable Add-ons is offering this PC Card CD drive for £299. Tel: 01483 440777

Plan to put British Library online given OK by Labour party

A plan to use millenium funds to put British Library archives online, mooted in Newsprint previously, has received partial backing from Labour. The party proposes to set up a Millenium Archive on the Internet of major works from the Library, as well as from other museums and art galleries.

Shadow Heritage Minister Chris Smith said: "It would take most of the next century to put everything in the British Library online... But we could take all the important manuscripts and some of the rare printed books and put them into digital form."

The facilities would be free to schools and public-access facilities like libraries but there might be a charging mechanism for "the use of creative material."

Mr Smith was speaking at the launch of Communicating Britain's Future, Labour's infonet policy document, which also proposed giving a free rein as soon as possible for British Telecom to compete with cable companies.

This could lead to homes across the country receiving the broadband connections necessary to realise the potential of the infonet. BT has promised to invest £13 billion in upgrading its network provided it is allowed to recoup the money with entertainment services.

It is banned from doing this under a deal designed to allow cable companies to make a return on their investment. The government says it will "review" this policy by 2001.

Mr Smith said Labour would limit this restriction to the first seven years of a cable company's franchise.

Clive Akass

IBM is involved in digitising exhibits at several major museums, including the Vatican and (from last month) the Lutherhalle Wittenberg. This wonderful sixteenth-century Aztec painting, from one of the few written works surviving from the pre-Colombian civilisation, can be downloaded from IBM's Digital Library page at http://www.ibm.com/Features/Library/.

Upgrade kit takes 386 into 486

Technomatic is selling a kit claiming to upgrade 386 and 386SX machines to 486 performance for just £99. The kits, from Workstation Source, comprise a Texas Instruments SXL2-50MHz chip sitting on a tiny daughterboard. This replaces a 386DX chip or "piggy-backs" a 386SX up to 25MHz.

Workstation's James Gower said: "Our specialist dealers will be able to warn customers if their machines are unsuitable, and we give a money-back guarantee."

Technomatic 0181 205 0190; Workstation Source 01734 759292; Sunbelt (corporate enquiries) 0181 715 9913

Infra-red networking for PowerBooks

Power SCSI
● Adaptec has produced a fast SCSI2 adaptor, called the AHA-2490W, for the PowerMac 9500's PCI bus. The company also says that following its acquisition of storage specialist Trillium Research, it will be developing RAID mass-storage systems for the PowerMac.
Adaptec 01252 811200

Net benefit
● WordPerfect 3.5 for the Mac is now available for £125, or £60 to upgraders. New features include an HTML editor for creating Web pages, and the Netscape Navigator is bundled with the package.
　　Novell claims the new version is the fastest and most "Mac compatible" version available.
Novell 01344 7244600

Doomed Macs
● Virgin Interactive is selling Doom II for the Mac in both CD-ROM and floppy versions.
Virgin Interactive 0181 964 8242

Bit animation
● Bit UK is selling ElectricImage Animation System 2.5, which it claims is the fastest and most powerful Mac animation production tool available. New features include inverse kinematics, light rays and network rendering. It costs £5995.
Bit 01420 83811

Express storage
● Micro Design International has launched version 2.0 of SCSI Express, which assists the installation of storage devices in the Mac environment. It supports both the HFS and NDR file formats, respectively for Mac-only and mixed-platform environments.
MDI 01454 614182

● Psion has reduced the cost of its Gold Card V.34 fax-modem PCMCIA card by 40 percent to £299.
Psion 01908 261686

Apple has scooped the PC world by incorporating infra-red networking as standard into its latest top-of-the-range Power-Book portables.

Users of the new PowerBook 5300 will be able to connect to a network simply by walking within two metres of a machine equipped with an IR port AirDock 230kbps costing about £59 street price from Farallon.

The IR link, which uses the Appletalk protocol, can sense any other 5300 or similarly-equipped machine within range and link up with them (there can be more than one) as if they are physically linked on a network.

A software upgrade will also make the port IRDA compatible for talking directly to IBM machines, though this is not yet available. Portable products manager James Dingwall says Appletalk allows the machine to connect with "foreign" networks including Netware. There are three new PowerBook ranges:
● The 68LC040-powered 190 replaces the old 100 series. A version with a 10.4in dual-scan colour screen costs £1,490. Options include an I-R port, a

Apple unveils three new PowerMacs

Three new PowerMacs were unveiled at MacWorld in Boston last month. The 7200, the 7500 and the 8500 complement the top-ranking 9500. All feature fast PCI buses, enabling them to use cards benefiting from the high-volume prices of the Intel-based market.

　　Prices start at £1,055, which is also competitive with the PC market. Pictured here is the 90MHz 7200.

lithium-ion battery and one of Fujitsu's new magneto-optical drives. It is designed to compete with low-end Wintel notebooks — a mono version will cost around £1100.
● The PowerDuo 2000 is basically a 100MHz PowerPC upgrade to the 200 sub-notebooks. The Duo 2300 with a 9.5in active-matrix colour screen will cost about £2530.
● The 5000 series replaces the old 500s and use a lithium-ion

battery with a claimed life of up to five hours. A 10.4in active-matrix SVGA version is available.
Farallon faxback 01494 434 224;
Apple 0800 127753

Top 10 Windows and DOS		Last month
Product	Manufacturer	
1　First Aid for Windows	RMG	1
2　MS Office 4.2 U/G	Microsoft	4
3　Sidekick for Windows	RMG	-
4　The Business Plan Builder	RMG	4
5　Uninstaller v3	Microhelp	-
6　Alpha 5 Home & Business	Guildsoft	-
7　Cleansweep	Quarterdeck	3
8　Smartsuite	Lotus	-
9　PCDOS Version 7	IBM	10
10　Quickbooks v3	Intuit	-

Top 10 DOS		
1　PC DOS Version 7	IBM	3
2　Flight Simulator V5.1	Microsoft	1
3　QEMM v7.5	QuarterDeck	2
4　Solo Payroll	Pegasus	10
5　DOS 6.22	Microsoft	5
6　Gardeners World	Europress	6
7　The Last Dynasty	Sierra	-
8　Turbo C++ V3	Borland	4
9　Sterling Payroll	Sage	-
10　Star Trek	Microprose	-

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7　Cleansweep	Quarterdeck	3
8　Smartsuite	Lotus	18
9　Quickbooks v3	Intuit	15
10　MS Office 4.3 Pro U/G	Microsoft	9
11　Quicken v4.0	Intuit	6
12　Truespace v1	RMG	-
13　Solomon's Anti Virus	S&S	5
14　Encarta 1995	Microsoft	-
15　12,000 Clipart	Softkey	20
16　Form Art Tool	IMSI	-
17　Magnaram	Quarterdeck	-
18　WordStar V2	Softkey	12
19　CAD Graphics Converter Gold	IMSI	-
20　Gallery 2	Corel	16

Our apologies for printing old figures last month. These figures from Software Warehouse are for July sales.

Net sex? No thanks

Britain does not need any more legislation to control porn on the Net, writes William Poel. We already have the tightest laws in Christendom.

The recent crackdown on alleged purveyors of online paedophilia has again highlighted the issue of pornography on the Net. But Britain doesn't need more laws to cope — it has enough already.

The British are a very strange lot where sex is concerned. We display a curious mixture of prurience and outrage that perhaps manages to keep the whole subject more interesting than the very matter-of-fact approach adopted throughout most of the rest of Europe. I wouldn't know, of course, but I'm told that it's easy to get very bored with too much easy access to pornography.

So in keeping with our national obsession, every few months our beloved "peep-show" media manage to associate the Internet with some salacious goings-on as rude pictures are seized, and there is a predictable chorus of baying from Westminster as various ignoramuses start bellowing for the disconnection of the Internet and the castration of all computer users as a precursor to the closure of libraries and burning of all books.

I am told, although I must stress that I am not an expert, that there are many prehistoric cave paintings of "lewd acts", which is only to be expected considering the preoccupation with sex that we have maintained through the ages. We no longer rub squashed beetles into cave walls with our fingertips; technology has moved along. Big deal.

The idea that service providers should be banged up for allowing bytes to cross their networks has also been mooted from time to time. This is of course absurd, and tantamount to suggesting that the Post Office be held responsible for anything in the mail; but with our legislators and that strange but influential stratum of society often referred to as the "Great and the Good" having the technical education of the average mountain goat, reality is still some way from their grasp.

Britain has more anti-pornography laws than any other so-called liberal Western democracy, and they can be applied quite readily to new technology without yet more tedious and expensive acts of parliament.

Moreover, HM Customs and Excise, arguably responsible for anything imported into this country, including pornography, has a wider and vastly more draconian remit than any other agency of the state: police powers of entry are modest by comparison. Customs people have extraordinary powers when it comes to looking for "illegal substances".

They would not need to resort to random searches for online pornographers. Anything shipped around the Internet leaves a trail that the average sleuth would find extremely useful. There are obviously ways to conceal the origin of a message, but the "fingerprints" left along the way are revealing. It's a bit like a burglar catching his jersey on a nail on the fence, and unwinding the thread back to his den.

Courts could prove more of a problem. I wouldn't fancy trying to explain the Internet to that famously daft old beak who wondered aloud if Mr Paul Gascoigne was an "Association or Ruby Union" football player. This is just another of the many issues we have to face when hauling the hierarchy of our technophobic society into the information age.

And from a parental control point of view, firewall software of all sorts is starting to flood out. Smartcard access control will be here shortly, but the issue will boil down to kids being vastly more computer-savvy than their parents.

The bigger issue worrying "authority" is the inescapable fact that the Internet encourages individuality and makes devolved responsibility a reality. People no longer have to be herded together in large administrative units. Authority might have chosen any handy excuse to unplug the Internet, but obviously it cannot now do this without taking down all Telecoms. It will be interesting to see how control freaks in China and in
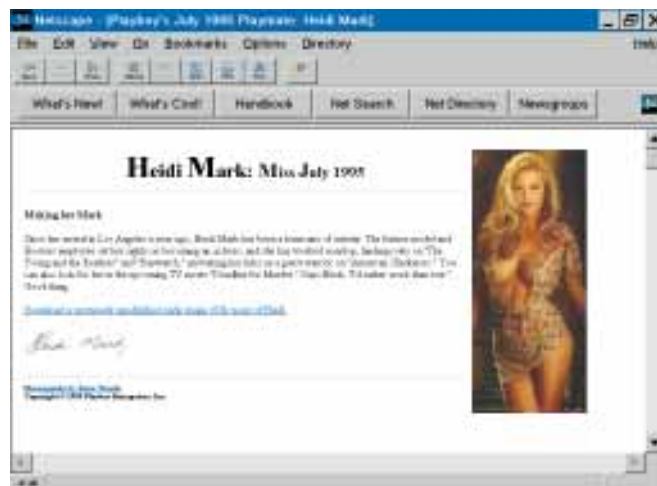
Arab countries cope.

I suppose it was inevitable that the Internet would be used first by mavericks and subversive elements — "pervs of a feather stick together", as someone once observed. But "normal society" is using it for more constructive pursuits.

Thank heavens that the BBC has nailed its colours firmly to the mast of the Internet and is using email and the Web most effectively and positively. It may not be every IT aficionado's idea of perfection just yet, but it's a whole lot more to the point than the mindless and salacious prattle of tabloid journalists and their obsession with online pornography and subversion.

Porn again… the Playboy Web pages register 800,000 hits a month and pull in advertising worth tens of thousands of dollars

ANALYSIS

Uncorking the latest **ports**

Things are hotting up in the world of PC ports, with the familiar serial port about to give way to Intel's Universal Serial Bus. Clive Akass reports.

ANALYSIS

The hullabaloo over Windows 95 has meant that moves for a major change in the basic PC have been little noticed. Intel, backed by no less than IBM, Microsoft, NEC, Compaq and Digital, proposes replacing the familiar serial and parallel ports with a new Universal Serial Bus. And, as nothing in the computer industry can be simple, several rival ports are being touted.

The serial and parallel ports have changed little by comparison with other PC components, mainly because they have only recently become seriously stretched. The standard serial port was used mostly for modems and occasional direct PC-to-PC file transfers, and began to be outpaced only when modem speeds and compression pushed data rates beyond 100Kb/sec.

Fast serial ports are available, but even they perpetuate the oddity of having a minimum 9-pin connector (25 pins on the larger size) for serial data which, given an earth, needs only two wires: to transmit and receive.

The extra pins are used, if at all, for handshaking and status monitoring: a "ready to receive" signal, for instance, can toggle an "okay to send" state in the linked port. This hardware handshaking is very fast but pushes up the cost of plugs and cables; for all but the most speed-critical tasks it can be replaced by control codes in the serial data stream.

The parallel port theoretically needs eight pins for sending eight bits of data simultaneously. In practice, parallel ports have 25 or 36; an unenhanced one can pass 100Kb/sec, although most PCs drive it at about 10Kb/sec.

The early design was unidirectional and used almost exclusively for printers. The 1987 PS/2 parallel port was made bi-directional, allowing the return of status information and facilitating comprehensive control of printers from the PC (not that this has stopped printer manufacturers bewildering users with unreadable LCD displays, and buttons with more permutations than the National Lottery).

The latest parallel ports conform to a standard called IEEE 1284. There are two flavours, the Enhanced Parallel Port and the faster Enhanced Capability Port, which differ in how much hardware handshaking they use. They can use a new, smaller socket called a C port and can transmit up to 2Mb/sec, or 8Mb/sec via a fast PCI bus.

Manufacturer 3M believes C ports will become usual for printer links, and has introduced a range of suitable cables and connectors. Lindsay Powell, senior marketing manager for the range, points out that leading printer manufacturers Hewlett-Packard and Tektronix are already using them.

He sees two major advantages of 1284: it's compatible with all existing parallel devices, and it avoids the confusion of the rival SCSI parallel links. But SCSI, though more expensive, is as fast or faster and lets a number of devices be daisychained from one port. So an alternative scenario is for SCSI to remain the choice for very fast parallel links, with the new USB becoming the general-purpose PC port.

The USB transfers data at a maximum 12Mb/sec (1Mb/sec being a working minimum for video). At a physical level it is hardly more complex than a mains lead: four wires, comprising an earth, a twisted pair for data in each direction, and a 5v power supply. As a result, the first connector on the market (left) costs just $1 in bulk.

Low-drain devices can be powered directly from the port; others can have their own supply. One port will address up to 63 devices via a chain of hubs,

3M's new C ports... under threat from the USB

each a star formation of secondary ports; a device can double as a hub, so that a keyboard might link to a mouse and pen as well as to another hub.

You would normally need only one USB per PC and there would be a single type of connector for all peripherals. USB data is transferred either asynchronously, when it is packeted and addressed with no regard to time; or isynchronously, when it keeps exact pace with a steady source such as a video link, which is guaranteed its required bandwidth.

One major challenger to USB is Apple's Firewire link, based on another IEEE standard, 1394. This provides for transfers up to 400Mb/sec in its most advanced form and backers include Microsoft (again) and SCSI specialist Apaptec. But Firewire, implemented on some PowerMacs, is more complex and expensive than the USB and may replace it only for very demanding tasks.

Dataquest analysts predict that at least one in two PCs shipped late next year, and virtually all a year later, will have a USB. Whether they will also have a Firewire, an EPP, an ECP and/or a SCSI is anyone's guess.

• Full details of the USB standard, which is open and royalty-free, can be obtained from http://www.teleport. com/~usb/index.html. The server refuses to believe that there's a world outside America, so you could try lying when it asks for your address. The Firewire spec is at ftp://ftp.apple.com/pub/ standards/p1394. Both are very long documents.

AMD has been first to the market with this USB port

The only way is up

WIth 4.7 million PCs sold in the US alone in the first three months of this year, a predicted growth rate of 20 percent for 1995, the PC industry in going from strength to strength. **Tim Bajarin** reports from San Francisco.

ANALYSIS

Most market research companies predicted a strong growth for the PC industry this year, but sales have nevertheless been astonishing. The PC industry is pinching itself to see if it is not dreaming.

Last year was the best in many years, with the number of units shipped growing at between 14 to 17 percent. Creative Strategies predicts that the total annual growth rate worldwide in 1995 will be close to 20 percent.

PC shipments rose 23 percent in the US to nearly 4.7 million computers in the first three

Sea of possibilities... 3D will be in this year. This picture was produced by Autodesk's NT version of 3D Studio using a Glint 3D accelerator board with drivers from 3D Labs (01784 470555)

months of 1995, according to International Data Corp. At that rate, some 20 million will be sold this year in the US alone, and worldwide sales will be close to 48 million. Dataquest reckons they will reach 100 million by 1999, barring a major local or world downturn.

Windows 95 will provide further stimulus. Creative Strategies estimates that Microsoft will sell 12 million copies worldwide in the first 30 days of release and an additional 15 million

copies by the end of the year. Perhaps 30 million will be sold in 1996.

The home market is the fastest growing segment of the US, where 5.5 million households bought a PC last year. Creative Strategies reckons US home sales will reach 8.4 million in 1995, and 11 million in 1996.

At present, 35 percent of US homes have a PC, and I think that will be close to 55 percent by 1998. Some will be upgrades or second PCs, but most will be sold into new home settings. This strong growth is being fuelled by cheaper and easier-to-use multimedia PCs, with great edutainment CD-ROMs featuring interactive video, animation and stereo sound, making these PCs great for children.

The other US segment enjoying explosive growth is that of the small office and home office (SoHo) market — 85 percent of the 20 million registered businesses in the US have fewer than 20 staff, and 75 percent with fewer than five. Link Resources predict that the SoHo market will buy 20 million PCs in 1995 and some 26 million by 1998.

If Bill Gates, Intel chief Andy Grove and other PC executives are smiling, you now know why. The PC market is healthy and it looks like it will stay that way for some time.

So, what can we expect for the second half of 1995? Here are my predictions.

• 3D is going to be big, especially towards Christmas. Microsoft and many board-makers plan to push the PC as a powerful games platform, and they need a graphics boost if they are going to compete with, and even out-perform Sega's Saturn and Sony's Playstation. That is why Creative Labs, nVidia and others are rushing to market video graphics adaptors that allow the PC to run 3D images.

• The entire multimedia PC market will move over to quad-speed CD drives in 1995, and jump to eight-speed early next year.

• There will be quite a battle this autumn between Sony, Philips, Toshiba and Time Warner over high-density CD standards. Both are developing a format that will boost CD capacity as much as tenfold. Some of the CD drives in the works will hold up to 17Gb, giving software developers space to add full-motion video, 3D animation and other goodies for games, simulations and new multimedia applications.

• By autumn, 16-bit audio will be standard on just about every PC sold; 3D stereo will also be popular since the surround sound effect adds a whole new dimension to PC games.

• Hard drives will also gain serious capacity even on low-end systems. Home PCs will have at least a 350Mb hard drive and the trend is to offer 850Mb in the mid-range home PCs. We are starting to see 1Gb home systems, but you still pay a premium for them.

Most analysts believe that unless there are some serious problems with the US economy, this Christmas will be the best ever. And that will help keep the smiles on the faces of Bill Gates and Andy Grove, and just about everyone else who makes their living in the PC industry.

Michael Hewitt

Sounding Off

Those fortunate enough to live in the Bromley area can now take advantage of the latest concept in home shopping. Should you suddenly feel that there's a void in your life because you lack, say, tinned ham, just email softcare@areti.demon.co.uk, put "H1: Princes Ham Tin 454gr" in the body of your message, and provided you post your order before noon, your desideratum will be delivered to you, COD, by 6.00 pm the following day. Not so much meals on wheels as spam in a van.

The "Supermarket on Wheels", as it bills itself, carries a complete range of foods, all prefixed with individual code numbers. Canned and packaged goods are delivered the next day. Fresh produce, however, such as meat and eggs requires 24 hours notice to be given, while fresh milk has to be ordered two working days in advance (presumably to allow enough time for the cow to be primed?).

The prices seem reasonable enough. Who can argue with "F297: 1 size egg (large)" for just 10p? Likewise "E18: Burton's Wagon Wheel (choice of radial or cross-ply) is a mere snip at 13p.

I'd imagine the idea is that you draw up your week's shopping list on the Saturday or Sunday, log on and then sit back and wait for the van-borne sustenance to appear over the horizon. Isn't modern technology wonderful? In pre-Internet days, people often starved to death because they weren't able to order their baked beans via the PC.

Actually, the only "modern" thing about this is the means by which the shopping list is transmitted: simple email. Otherwise it's a blast from the past. Those of you under 30 probably won't remember that in the pre-supermarket era, butchers, bakers, and candlestick makers routinely made home deliveries like this. They didn't charge extra for it, either: it was all part of the service. You'd just pop along (or telephone) to the shop and drop off a list of your requirements. Said goods would usually turn up before the end of the day. My local farm even made home deliveries of manure, subject to their horse's ability to produce in reasonable quantities.

Anyway, talking of horseshit, those who espouse the Internet cause so enthusiastically (and naively) appear convinced that the human race is soon to take an evolutionary step and become footless and immobile (or should that be "lose an evolutionary step"?). What other reason could there be for their assertion that within about ten years, all of us will do all our shopping online? What with this, and teleworking, and teleconferencing, the only time you'll need to set stump outside the house will be to oblige the undertaker.

Lots of people get off on this sort of thing, as I discovered recently, having written an article about online shopping (*PCW*, August). For the WWW anorak, it would appear that Nirvana is the ability to browse a virtual Safeway, click on crisps and lager on the virtual shelves, and then have them delivered to the door. The concept (de-techified) would no doubt appeal to the ordinary family man and woman, too. After all, no-one enjoys trudging round the average supermarket these days, especially at the weekend when there are more exciting things to do, such as defurring the kettle or worming the cat. Yet, because of work and/or family commitments, most people don't have much of a choice in the matter. So avoiding the queues and saving time by simply clicking on iconic groceries from the comfort of your own living room, might seem the biz.

Think about what the reality would be, though, given the current state of technology: according to the so-called "father of the Internet", Vinton Cerf, network congestion has now reached what he calls a "dangerous measure". This is all the more worrying, he added, because the Internet is still "modest in capacity." He has a strong point: consider how long it already takes, especially at peak times, just for one Web page to assemble itself.

So what's going to happen when everyone who's already hogging the bandwidth (by sucking down .gif images of Miss Whiplash and Brenda Bigjugs) suddenly finds himself competing for that same bandwidth with a million normal people who just want to visit their online Tesco? Browsing virtual supermarket shelves will become a virtual impossibility. In the time it would take for one graphical representation of a can of beans or a jar of Bovril to assemble itself on screen (let alone bigger things like Cornflakes or Sugar Puffs), you'd be able to motor down to your local supermarket, grab a shopping trolley, do the rounds of the shelves, pay and pack, perhaps even visit the local garden centre, and be back again ready to cook the evening meal.

Nevertheless, I imagine home shopping both for luxury items and simple groceries will eventually arrive when they refine the technology. And then, popping down to the local shops will become as quaint a concept as milking your own cow. But to my mind it will be something of a pity — yet another example of computers depersonalising us. Where, for instance, would the Gold Blend couple be if, having discovered herself to be coffee-less, Sharon Mugham had simply been able to type "G5: Nescafe Gold Blend 100gr jar" into her PC? Then again, the online supermarket does eliminate the risk of Danny Baker suddenly ambushing you as you buy washing powder.

Anyhow, Luddite stick-in-the-mud that I am, I nevertheless wish the "Supermarket on Wheels" all the best. And if they ever start operating around my neck of the woods, I might even give them a try — out of curiosity's sake, if for no other reason. **PCW**

Once upon a time, computers in fiction knew their place and writing about them was easy. Authors could feign profound knowledge while writing absolute rubbish, because the public perception of a computer was a vague and nebulous thing. Describe a room full of grey steel cabinets, winking lights and large spools of tape and you'd set the scene.

Tim Nott

Homefront

Populate it with a few acolytes in white coats and a pipe-smoking Scotsman with a beard and it would "only be a matter of hours" until the hero or heroine discovered the true identity of the serial killer, the flight path to Alpha Centauri or their mortgage repayment schedule.

If the book actually made it to the big screen, there would be the obligatory close-up of the "results coming through"; in green lettering on a tiny monitor, at about one character per second.

Personal computing has changed all that, as more people have not only seen a computer but used one, so any credible modern-day thriller protagonist is expected to be similarly clued-up.

Faced with the twin challenges of fashion and technology, the pre-personal computer thriller writer had two choices. For a short-term profit (over one to three years, say) characters could be festooned with designer labels and drive the latest sports car. More experienced writers, with an eye to film rights and pension plans, would dress and transport their leading characters in timeless fashion: you won't catch James Bond tucking his Biba kipper tie into the waistband of his Mr Fish flares before leaping into a three-litre Capri. Consequently his dark blue suits, Sea Island cotton shirts and vintage Bentley have, like the character, worn well. His hand-made cigarettes might raise a quizzical eyebrow in today's healthily-correct atmosphere, but then, nobody's perfect.

Neither of these traditional approaches works with personal computers. The "classic" approach is a complete non-starter: "Bond slipped the 8in floppy boot disk into his trusty gunmetal-grey IBM 8086. Within minutes its entire 65,536 bytes of Random Access Memory were at his disposal. Tracking down Blofeld would be easy…" This is about as likely as his trading in his Walther PPK for a yellow plastic bow and arrow with rubber suction pads.

The "state-of-the-art" technique fares little better. Some authors try to straddle the gap by chucking in a bit of suitably vague jargon. In Patricia Cornwell's *The Body Farm* (1994) a character has to "Re-partition the hard disk, reload the whole thing because I keep running out of space, allocate more, change a bunch of files." This hardly bears detailed analysis and is really just an update on the winking grey boxes school of writing — wisely, the author hurries on to the safer ground of guns and autopsies.

Complicity, by Iain Banks, is one of the few books I've read that rises to the technological challenge. The hero, Cameron Colley, is a handsome, hard-drinking young journalist with a penchant for illicit substances, exotic sex and giving up smoking. His prized possession is his computer. (An uncannily accurate profile of the typical *PCW* contributor, one might think.) But on page 51 we learn that his PC is a 25MHz 386SX with 2Mb of RAM, which, even though the book was published in 1993, takes an immediate two inches off his macho image. Goodness, Cameron — surely you don't try to run Windows on that? Sure enough, by page 91, he's redeemed himself by buying a 486 laptop with a colour screen. But how long is this going to last? I'll bet, by the third or fourth reprint, this will have the technological machismo of a Sinclair Spectrum.

The answer is obvious. Just as in the real world, with-it technonauts have to upgrade their kit regularly, and so should fictional heroes and heroines. So before each reprint, what's needed is a quick run-through of the book, upgrading as necessary. You might think this could be done by lashing up a few word-processing macros: replace "486" with "Pentium", "16-bit" with "32-bit", "double-speed" with "quad", and so on.

Having taken a sample text through two such upgrades, I can report that it is not that simple. This kind of task is too difficult to be left to the authors, who are anyway far too busy writing their next best-sellers. It is, however, an ideal chance for computer journalists to deploy their expertise.

The former would benefit from a much-lengthened shelf life of their books, and the latter from a percentage of the extended royalties. Successful authors only, please contact timn@cix.compulink.co.uk. And if you haven't a clue what that means, perhaps you'd better stick to historical romances. **PCW**

When you switch off a PC, all the data stored in RAM is instantly lost. But the PC needs to store its basic system configuration when unplugged from the mains. So setup data, along with clock time and date, is stored in CMOS memory. CMOS needs only a very little power to keep it alive. The battery can be either a lithium long-life cell, or a NiCad rechargeable.

Barry Fox

Straight Talking

But long life does not mean infinite life. Manufacturers of the early PCs recognised this problem and put an easily available battery into an easily accessible compartment for user replacement. But no-one does this any more. The CMOS battery is now on the PC motherboard, often soldered to it alongside the control and processor chips.

As sure as night follows day, the CMOS battery eventually begins to fail and the PC loses its time and date when switched off, fouling up diary functions and automated file archiving. Things get worse when the CMOS loses the system configuration, including details of hard-disk type, the number of cylinders on the disc and the correct landing zone. Once this information has been lost, the PC is effectively dead.

If the owner is skilled, and has had the foresight to make a note of the system details, then it is a reasonably easy job to run the BIOS setup program and re-enter the vital details. But for most small-business users, a dead CMOS battery means a dead PC and a service call. It is then easy for an unscrupulous engineer to write the system off as being beyond repair. At best, the engineer has to open up the PC to work on the motherboard, probably clocking up two visits because the replacement battery has to be ordered and takes a week to arrive.

Why do manufacturers create this unnecessary obstacle course? Is it ignorance or cleverly planned obsolescence? By chance I was able to check this out first hand, through my experience with a supposedly reputable manufacturer.

My wife bought a Compaq ProLinea in October 1993. After a few days' use it started to give "time and date not set" error messages. The dealer sent an engineer who replaced the motherboard battery under guarantee. But the same error messages recurred a year or so later.

Compaq sells its products on qualities of reliability and offers a three-year guarantee. So, providing proof of the date of purchase, I asked Compaq whether the ProLinea had a known design fault and whether they would supply a replacement battery. Compaq's Care Centre phoned me to ask for the machine's serial number —

at the same time CompaqCare explained that the motherboard battery is a NiCad rechargeable, and users who get error messages should try leaving the machine on for a few days to see whether the battery recharges and self-cures the fault.

After a weekend's charging, the battery was still as flat as a pancake — time and date evaporated as soon as the machine was switched off.

Compaq then made an important admission: the company had found "a problem whereby on-board batteries were discharging prematurely." The cure, I was told, was to order battery part code 160274-001, open up the mainframe, fit the new battery to the motherboard and re-set some jumper pins. But this is way beyond the average small-business user's capabilities.

No, Compaq could not supply a new battery direct. It had to be ordered from a dealer. Please confirm, I asked, that if I can get the dealer to order the part, it will at least be covered by the guarantee?

Again, no: "Although the ProLinea does come with a three-year warranty", regretted CompaqCare, "this does not cover parts of a consumable nature, which is what the battery is considered to be."

Anyone other than a hobbyist would now have only two options: either junk an eighteen-month-old PC, or pay whatever an engineer would charge to order and fit a new battery to the motherboard.

Switching from helpful husband to working journalist, I asked Compaq for press comment: how could the company possibly justify classing a key component on the motherboard as a "consumable" which is excluded from guarantee — especially as Compaq already knew that some of the batteries fitted to ProLineas had been faulty?

It was like getting blood from a stone as Compaq's comments were issued piecemeal: the Notebook Division, the Desktop Division and the Consumer Division all separately reassured me that CMOS batteries were covered by the main three-year guarantee.

So why is Compaq telling customers that batteries are excluded? According to desktop product manager, David Moore, Compaq discovered that it had been fitting

faulty batteries between November 1992 and March 1993. As a result, the warranty on affected machines had been extended to four years. Compaq had asked dealers, "pro-actively", to track down ProLineas with faulty batteries and offer to replace them. Customers who asked for replacements, got them, too.

But hang on a minute: on the one hand we have Compaq's desktop product manager telling the press that the company has been volunteering to replace batteries and offering an extra year's warranty, while on the other hand we have Compaq's customer relations department telling real-world customers that their faulty batteries are not covered by the guarantee.

"The CompaqCare representative must have been confused between notebook NiCads and CMOS NiCads. He might have missed the note about the warranty extension because it is buried in a five-page document," Moore told me, following through with the written assurance that: "In most cases these were subject to a pro-active replacement programme… your model was the exception." Pull the other one, Compaq, it's got batteries on. **PCW**

Nick Beard

Business Matters

Even the best made software is likely to suffer bugs. The complexity of software means that exhaustive testing is impossible. Like proving that there is no life except on Earth: there might always be something in the one place you have not yet looked. So proving software to be bug free is also largely impossible, except for trivial applications such as PRINT "HELLO WORLD" and programs which are not much more interesting.

Some software development methods are emerging where program specifications are represented in mathematical formats, and about which people can reason with well tried and tested formal methods. However, these are not yet able to prove all programs to be bug-free. Their applicability to commercial development is limited — they are definitely of value, though not in all circumstances.

The business problem an IT team faces is persuading users to understand this. Bugs are a real nuisance once known — it is the background fear of unrecognised bugs which causes the greatest concern. If a series of serious bugs crops up, people can begin to doubt the entire system. The inability to guarantee that there are no others makes it hard to instil confidence.

Companies making mass-market PC software have a slightly easier time of it, since they can usually enrol hordes of users in the testing process. Larger applications vendors (such as hospital information system or financial applications providers) have a slightly harder job. The total number of customers is often lower, so the testing load is spread more thickly. Of course, software companies can and do their own testing to varying levels of competence. The problem with in-house testing is that it is laborious, time consuming and thus expensive. A balance must be struck between delivering code fast, and delivering code which is properly tested. This balance is hard to maintain and customers (all of us who buy software) are of course completely (and reasonably) unreasonable in our demands. We want bug-free software now, at the same price as code delivered by companies which "out source" all their testing to customers. This is a key reason for my being against bespoke software. Since writing bug-free code is so hard, it makes sense to share the testing load as widely as possible — say, with other users of the same systems.

The analyst staff in the IS Department here at HCI are responsible for testing and implementing new code, and for liaison with the software vendors to get bugs fixed. Often the problems turn out not to be bugs at all but user errors, hardware or network glitches, or simply a misunderstanding about what the software was supposed to be doing at that particular point. So we track issues, not bugs. We do this using a simple Access database with a custom-built front-end which enables us to log issues as they arise. Of course, some issues are bugs — and some are very hard to find.

Each issue has a number of characteristics. It has a unique number, a date of logging, a priority, an accession or code number (assigned by the company responsible for the software involved). It also has a brief and a longer description, a history of efforts being made to resolve the problem, and a named individual with responsibility for sorting out the whole thing. Dates are set by which updates are due, and we then print reports each week so we can see where there are hold-ups where issue resolution is behind schedule.

These reports are vital for issue tracking. Careful documentation of what is being done, with deadlines and clear assignment of responsibilities, all make it much easier to instil confidence in the user population about what is being done to fix stuff. The danger is that unless someone keeps an overall eye on the big picture, lots of resource can be swallowed up fixing scores of niggling little problems, when the best solution would be to make one fell swoop and radically alter the approach to the problem. This is the importance of the overall information systems strategy, and the IT director's job is to keep an eye on the whole thing: making sure the strategy is actually being implemented on schedule, and within budget. The other parts of the job are: understanding the business and determining the strategy in the first place; and gaining support for the resources to implement it.

The IS role in a modern facility (as opposed to old-fashioned ones where all IT is decentralised to users who buy whatever they fancy, spending far more in the process) is increasingly to be the holder of process knowledge. This is not a simple technical function. Maintaining software, hardware and networks and delivering PCs, doing the odd bit of coding; all are important, but as systems are integrated, process becomes key to delivering benefit. Most users have, at best, a single department's viewpoint, often a single individual's viewpoint. Organisational process implications of systems activities are generally best understood by systems people. Users just don't always realise it.

• *Feedback and abuse to nick.beard@hci.co.uk*

Letters

Roles for children reveal sexist attitudes
I would like to comment on the article by Paul Begg in the Kid's Stuff section of your July issue. Talking about the Dream Doll's House software, he says: "I was especially pleased to see the Fisher-Price Dream Doll's House as there's very little software available *specifically* for young girls."

I am upset about this remark. It seems that even when I thought we were in the "technical" era, there are still very sexist attitudes from people who should be very "open minded". When I was a little girl, I used to enjoy the chemistry set and meccano as much as the action men, which unfortunately belonged to my brother. I was never told what to play or what was supposed to be for girls.

I would like to think that finding where the mouse is in this software package and how to find the cheese etc is as interesting for girls as it is for boys. Let's try to change the female role (cleaning, taking care of the house and preparing the food, making the house "cute") and make it available for both sexes.

It is up to us to make children understand that they do not have to like a particular game or software because of their sex. It actually becomes very handy when little boys *and* little girls care about tidying up! Let's try it that way and we'll end up with a better society.
**Patricia Vazquez
vazquezp@ss.abr.affrc.
go.jp**

Cabinet shuffle
I've been looking for a useful, sturdy and practical desk or stand or cabinet for my PC for over a year. I fully agree with Michael Hewitt (Sounding Off, June) and everything I have seen so far is ridiculously overpriced rubbish. Places like Argos have no idea about what's needed to support a PC and all the bits, and there are *never* any grooves for the massive collection of wiring.

No computer furniture I have yet seen fits against a wall, not without seriously compromising cable integrity.

And all of it is ugly, it never has enough shelves, the supports for the monitor are awkwardly placed (see the Innovations catalogues, and others) and the space under the monitor support is never large enough for my system unit. I'm amazed that no-one in two decades or more has given any thought at all to this market. They just assume we're content to pay for overpriced, overweight tables with shelves.

Making helpful suggestions to the companies concerned meets with a prolonged, blank silence. They never even respond. There are, I admit, office suppliers who do a half-decent job, but their products are well out of my price range. They don't like small orders, and they tend to produce things too large for a modern house with its pokey little rooms.

Please, Mr Hewitt, to save the sanity of millions of PC users, tell us where you found yours. Please? I know it's advertising, but, dammit, if the other guys produced good stuff, they would deserve it too.
**John A McCoy
jamccoy@maurabrid.
win-uk.net**

Responses to the new-look *PCW*
I have just bought September's issue of *PCW* and must say that I approve of your new layout. I don't know how your advertisers

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Focus on Windows 95

Windows on steroids
I realise that journalism requires the use of catchy phrases and buzzwords to keep your audience attentive. However, your description of Windows 95's "Explorer" application as being like "file manager on steroids" is, to me, somewhat confusing. Does this description mean that it is a powerful, well thought out tool? Or does it mean that it is a bloated, ill-proportioned application which seems powerful but could drop dead at any moment?
**Laurence Barker
laurence@zebedee7.demon.co.uk**

PCW replies: We'll come clean — the offending analogy was first used by a Microsoft employee during an early Windows 95 (then known as Chicago) presentation in Seattle, May 1994. We borrowed the phrase and shamelessly tried to pass it off as our own. As to its true meaning, time will tell. Rumours that Windows 95 is currently undergoing random drug tests are entirely unfounded.

On schedule
Thanks for the great review section on Windows 95. I noticed a reference in the section on Office 95 about Schedule+ saying: "...and it is possible to link the software to Project for Windows 95." How? I've been looking through Help in both applications and can't find any clues on this one, though I'd love to be able to do it.

Talking Win95, here's a disappointment comment. Why couldn't Exchange's address book be linked to Schedule+ (or vice versa), or some means of data import be provided for Exchange?

But here's a not-so-disappointed comment. I thinks it's a brilliant O/S. As a fairly seasoned Win3.x user, it may have taken me a while to get used to thinking "find document, do work" (as against "find application, launch, find document, start work"), but no way would I want to go back. This is much more intuitive.
**Graham Smith
100125,1730@compuserve.com**

Warp factor
I wonder how long the current debates will last? Windows 95 vs Windows 3.X, and Windows 95 vs OS2/Warp? I have been running a selection of releases of Windows 95 since early May and have been generally very happy with it. I recently had the "misfortune" to do some work on a Windows 3.x system; it was a simple test, yuck, help, how antiquated! I didn't realise how familiar I had become with 95, and I just couldn't wait to get back to it.

I never did get to test my post-Christmas copy of OS2/Warp. After six attempts to install it, and indifferent support from IBM, I threw it in the corner in disgust. My first copy of Windows 95 installed in about an hour and, like subsequent copies, quite simply worked.

I like the latest version of Exchange, especially since Microsoft have reduced its complexity, and am toying with the idea of unistalling WinFax. Initially the task bar really annoyed me. However, I changed the options to "Auto Hide" and "Always on Top": it appears at the point where it should be, and now it doesn't annoy me! My scanner has a DMA conflict with my sound card, that's now easy to overcome — dynamically re-configure my hardware, use the scanner, then reconfigure back to my defaults. Easy.

On the Office front, I have been running SmartSuite (minus Freelance, in favour of Corel v5), for some time and liked it. Office 95 was installed at the beginning of July more out of curiosity than need. I find myself gradually converting Lotus files to Office files with the exception of Approach. Office 95 just seems to be easier to use and hangs together better. Word is a definite improvement on Ami Pro, the jury is still out on Excel vs 1-2-3, Schedule is probably better although I prefer the look and feel of Organizer. I'm using both PowerPoint (for simple presentations) and Corel (for complex presentations).

On balance I think Office 95 is better and I really like Windows 95. Given the features of both of these, I am absolutely certain that I will start uninstalling some of my comparable software, and will see a gain, not just in performance, but in disk space as well.

Now, how do I upgrade my DX2/66 to a Pentium...?
**Phil Sinclair
Phil_Sinclair@msn.com**

Point break
I have just read the Windows 95 articles in your September 1995 issue and find one or two serious points missing. Firstly, let me begin by saying that Windows 95 is excellent and streets ahead of Windows 3.1: that's a lot coming from me, as I have an aversion to GUIs for a number of reasons.

Now to the points. There is very little tape support in the backup program provided with Windows 95. There have been a lot of frustrated users on MSN talking about this and the Microsoft answer is that they are not going to provide support for all the drives, that it will be up to the manufacturers.

In tandem with this are claims of similarity between the 32-bit environments of NT and Win95. I make use of a friend's machine using Win95 that has a DAT drive and a very large hard drive that needs backing up regularly. There is no support for the DAT in Win95 but NT has DAT support, so why not Win95 if they are reasonably similar.

And lastly, Win95 does not support an NTFS type file system. One of the major complaints about Win95, next to memory requirements, is disk space consumed. Windows 95 uses an FXT system "similar" to DOS and on large drives consumes huge chunks just for small files — as an example, each "shortcut" is on average 300 to 400 bytes. If an NTFS-type file system were available it would allocate by sector (512 bytes) and not cluster (clusters vary in size, getting bigger as the partition/drive size increases). So for instance, on a 2Gb partition, NTFS would consume 512 bytes for each "shortcut" where FAT consumes 32Kb, a big difference and a lot of wastage on the FAT system. I hear you cry, how many people have 2Gb drives? Well, most large drives up to 1Gb use 16Kb clusters and that is still a sizeable chunk of unused and unavailable disk space.
**Mike Davies
Oxford**

will respond, but from a reader's point of view it's a big improvement in readability.
John Sollars
Brignorth

I'd like to congratulate you on the September layout — excellent! I believe that this makes *PCW* the easiest to access mag in the UK.
Andy Hardy
aph@ahardy.demon.co.uk

Congratulations, *PCW*, you have managed to cloud the issue and fudge the solution (excuse mixed metaphors)! Your new-look magazine with the adverts moved towards the back of the issue does absolutely nothing to help your readers find a given advertisement. Try it and see! Look in the (not so easy to find) index under, say, Dabs Direct: you will see that they are on pages 460/465. Now try finding their advertisement... Easy, isn't it. Page 361, then, er, 364, then 371 to 375, and then... 562 — oops, I must have missed it.
Steve Dyson
steve@sigdel.exnet.com

PCW replies: We've received a number of letters asking for more page numbers in our advertisement section and hope to up the count soon.

Online shopping
Michael Hewitt's piece on online shopping (Cutting Edge Focus, August) was very interesting, but I felt he liked the idea of it more than the reality. Thus far, it is a "lowest common denominator" form of shopping. What's available is less than what could be bought at any bland modern shopping mall on the way home from work.

I thought I would be able to search Virgin's database of available CDs, for example. Instead, I am offered a list of a few top 20 albums. I can get these anywhere.

When my daughter sampled online shopping for a couple of books, she could find nothing she wanted. That afternoon she walked into

Waterstone's and bought both of the (not obscure) titles she sought. She won't bother again until online services offer more, not less than an average high street vendor.

Have you seen PC World's offering on CIS? You'd do much better to telephone them. And if you query stock availability you get a reply four days later. To succeed, the online vendors are going to have to try much harder. Just being online isn't enough.
David Thorpe
100524.726@compuserve.com

Vanishing support
I've read with interest various contributions to this page regarding the status of technical support for hardware and software. However, I now fear that such support could disappear altogether for some users. As a case in point, I recently bought a Dell Pentium PC and had some problems setting up "Microsoft at Work Fax" (I had followed the instructions carefully). I called Microsoft, who told me that since the software was OEM installed, they didn't provide support.

I called Dell who told me that they don't support "advanced features" of the software and anything to do with networks in particular. This leaves me with a new PC with several features which don't work properly, Dell have my money and show no interest in fixing the problem; Microsoft have my money and show similar concern.

In what other area would purchasers tolerate a situation where blatantly faulty goods are sold by unabashed vendors who then deny any responsibility for failure? If I buy a car, I don't expect Ford and Philips to both deny responsibility when the stereo doesn't work. No-one would permit Nikon to claim that the backlight feature on a camera was an "advanced feature" and was thus unsupported.

It's time hardware and software manufacturers started to supply goods to the same quality standards as washing-machine manufacturers, and to take responsibility when things don't work as advertised.
John Stolz
100115.2676@
compuserve.com

PCW replies: For once we do have some sympathy for the suppliers. Providing technical support for computer software is extremely expensive, and even quite simple PC software has far more permutations than the most sophisticated camera or washing machine. At best it will be several years before PCs become as fool-proof as other consumer goods. In many cases, software is OEM'd to manufacturers at little or no cost as software suppliers compete for market share. The hardware manufacturers themselves work on small margins and try to control costs wherever possible. If consumers want to pay low prices, they will have to pay extra for support.

The big issue
Some of us still think it's pretty cool to own a 486SX/25 with 4Mb RAM. Those of us who have managed to get a nice, cheap 16-bit sound card and dual-speed CD-ROM drive may well feel we're at the cutting edge of technology. It's pretty frustrating, then, to buy your first copy of *Personal Computer World* with free CD-ROM, stick it in the drive, and discover that really you need a DX50 with 8Mb RAM to run the damn thing.

All I'm basically asking is, why can't you put a nice, big, readable notice on the front cover, saying "Don't buy the one with the CD unless you've got a great big, macho 1995 PC", so that those of us faithful who've been buying your mag since the days of the 8088 with one 10Mb hard drive (and that was only three years ago) will know to stay in our box and buy the floppy version?

Otherwise, I love your mag.
Peter Brown
Dublin

Doom descends into benchmarking
I would like to propose that you add a new component to your benchmarking reviews. As I once again reach for magazine reviews to help me choose my next machine, it occurs to me that one key benchmark that I really want is never present. The countless DOS/Windows video, disk, spreadsheet and such benchmarks are commonly provided and have formed the basis of my previous choices. However, although I used my previous machines for substantial program development and will continue to do so, I am not critically concerned whether one machine is five percent faster than another for compilation or general Windows performance. It seems that modern machines are good enough at running Windows and compilations that I do not care enough to scramble for the last ounce of performance.

However, I do still care about performance. The most critical application that I ever want to run is one of the new virtual reality games. What I want to know when seeing a video card benchmark or machine benchmark is the frame rate that they can deliver for such games. A five percent advantage in this case makes a big difference. It seems to me that many readers would also very much welcome a games grading system.

The market has just reached the point where there is a dominant, established game that could be used for such a benchmark standard. Everyone has heard of Doom and it is likely that a machine that can deliver a high Doom frame rate will also provide a comparable advantage in future VR games. Doom can be made to display the current frame rate, in fact.

I would propose the following benchmark. Run the following command:
DOOM2 -DEVPARM

Wait for the demo to start. Observe the maximum number of illuminated dots on the bottom right-hand side of the screen. The frame rate can be calculated by
72/(N+1)

This is most easily observed by progressively obscuring the row of dots with a finger as the peaks appear. The highest peak should occur just as the demo starts. This gives a value of 9 for my DX/66 machine.

This example is probably not the best, as I am sure that you have a Doom expert at *PCW* who could provide a better benchmark. If you adopted this additional benchmark, you could keep a step ahead of all the other magazines that did not think of this first. I am sure that with the increasing interest in such games, one of the magazines will do this sooner or later. Get there first! I would be interested in your view on this,
Jeff Rollason
100031.3537@
compuserve.com

Panrix price change
The Panrix Micron 90 reviewed in September's 90MHz Pentium group test was the fastest machine you tested under Dos, Windows and Overall. I would like to inform you that the price you printed, £2,465, was wrong. The correct price is £2,195, effective from 1st August. We hope your readers will welcome the news that The Panrix Micron is now available for next-day delivery.
Siu Lam
Sales Manager
Panrix

PCW October 1980
"It hurts to admit it, but I can't really say that my old friend Graham Barrat has picked a winner with his £4,500 microsystem from Sanyo of France. His machine looks to stand comparison with the Intertec SuperBrain which KGB of Slough is now offering at £1,500 or so. For the extra money, the [Sanyo] Memory System 7000 seems to offer rather more disk capacity."

● R/E the Amstrad PCW8256:
"Could this be the ultimate accolade — a machine bearing our name? It's the latest from Amstrad, the Personal Computer Word Processor, which comes with 256Kb of memory, CP/M Plus, Logo, Basic, the LocoScript word processor and a printer — all for £399."

"At the PCW's price level, it's hard to find any competition... this machine is spectacular value for money for a small business or the home. Amstrad is betting there's enough volume out there in the 'serious' market to support the low price, although I'm not sure how large this market is."

Amstrad's word processor was the start of a very successful phase for the company. Other PCW models followed, leading to the launch of the 1512, the first cheap PC-compatible.

First Impressions

Contents

First Impressions includes the irresistible "Gadgets" spread on page 62. Highlights include the Apple PowerBook 5300 notebooks— the first to use the PowerPC processor, Panasonic's PD System, and 3D Garden Designer to show you just where to place that shrubbery.

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.
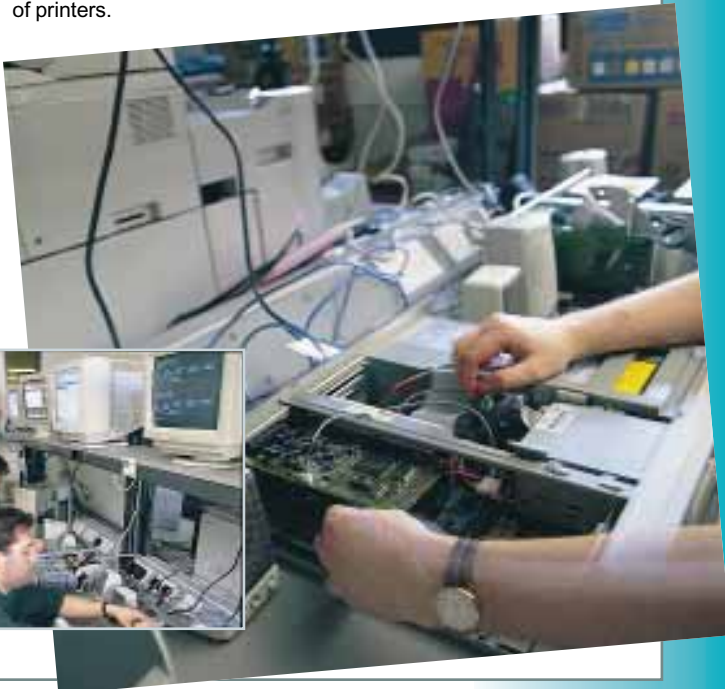
HARDWARE

Apple PowerBook 5300

This new series of notebooks is the first to use the PowerPC processor. Chris Cain takes one for a run and reckons it's the best mobile Mac ever.

With their sleek design, built-in networking and stereo sound, Apple's PowerBooks have always been a little smarter than the average notebook. This month sees the launch of the first equipped with PowerPC processors — these mobile Macs look destined to become the most desirable yet. The new 5300 series comes in four configurations, and *PCW* managed to get its hands on the 5300c/100.

At first glance, the 5300c/100 is visibly different from existing PowerBooks, with a new black casing that's slightly remoulded at the back. I do think that the look of the older 500 series was better, but times change and it's all a matter of personal preference anyway. The keyboard is full size with a 19mm key pitch, function keys and sizeable palm rests for user comfort at the front. Between the rests is the now familiar Apple Trackpad, and a small, single speaker sits opposite at the bottom of the screen (the old 500 series had a stereo pair). The whole thing measures 8.5 x 11.5 x 2.2in and weighs in at 6.2lbs.

The screen on our review model was a superb 10.4in 640 x 480 pixel active matrix colour device, but dual-scan colour and 9.5in greyscale versions are available. There was a small grey patch in the top left-hand corner of our screen, but this apart, the overall display was clear, with vibrant colours. The colour models support displays in both 256 and thousands of colours. Controls for brightness and contrast are on the right. The top-of-the-range 5300c/117 has a screen capable of 800 x 600 pixel resolution.

At the rear are connectors for SCSI, Apple Desktop Bus (ADB), serial/LocalTalk, external video and 16-bit stereo audio in and out. Annoyingly, the video connector requires an adaptor plug which is not supplied, so you'll have to trot down to your local Apple dealer if you want to use this feature. Eagle-eyed Mac readers will have noticed no mention of an Ethernet connector — the machine is not supplied with one as standard.

Ethernet has been more or less replaced with support for PCMCIA or "PC" cards, which offers the option for Ethernet networking along with plug-in modems, hard disks extra memory, etc. A port on the left-hand side has room for two Type 1 or Type II cards, or a single Type III card.

Another change is a move from Nickel Cadmium to Lithium Ion battery technology, providing between 3 and 5 hours of use from a single battery.

Another important addition is built-in infra-red point-to-point LocalTalk communication which allows these machines to talk to each other, and send and receive files without a physical connection. With an infra-red receiver attached to a desktop Mac, and the right software, you can communicate with other desktop Macs. So in theory you can log into your office network without the hassle of connecting leads. One such receiver is the AirDock, made by US Mac specialist, Farallon.

The processor inside the 5300 is a PowerPC 603e running at either 100MHz or 117MHz, depending on the model. The 603e is a new design specifically for use

in notebooks. It differs from the 603 in that it can run Apple's software emulation of the 68LC040 processor (used to run non-native PowerPC Mac software) without the need for an external cache.

Machines ship with a minimum 8Mb of RAM expandable to 64Mb, and either a 500Mb, 750Mb or 1.1Gb IDE hard disk. A 1.4Mb SuperDrive is fitted as standard and can be removed to allow other expansion modules to be connected, such as a Magneto Optical drive (soon to be launched by Fujitsu). The drive simply slides in and out once you release a small, sliding lock, so connecting other peripherals is a piece of cake. Fitting extra RAM however requires the release of three screws and removal of the keyboard (which slides off) before you play with the insides — probably not a job for the faint-hearted.

The PowerBook 5300s come with System 7.1.2, and Apple supplies a small selection of pre-installed software including an eWorld starter kit, Apple Remote Access for controlling and talking to desktop Macs while away from your desk, and three games: the dated but fun Super

Maze Wars, Eric's Solitaire, and the puzzle-based Spin Doctor. Strangely, Apple's standard business suite, Claris-Works 3.0, isn't bundled with this system.

In use, the 5300c/100 proved to be everything you'd expect from a PowerPC notebook and all our tests passed without incident. The only problem was getting it used to the Trackpad, although I did eventually master it after about a week. Extended tests with the IR system could not be performed because Apple had provided only one machine at the time of writing, but tests for file sending and receiving during an early demonstration went perfectly.

PCWVerdict

The old 540c looks better, but if you want the best notebook performance, the 5300 reigns supreme. The best mobile Mac yet.

Price £3,200 (100 MHz 5300c, with 16Mb RAM and 75 Mb hard disk)
Contact Apple 0181 569 1199

HARDWARE

Panasonic PD System

With the latest craze for cheap drives and removable media in mind, Gordon Laing reviews Panasonic's latest phase-change rewritable device and judges it a veritable bargain despite some limitations.

Storage, usually an inadvisable topic to broach at a dinner party, has suddenly become quite interesting. I'm not suggesting that anyone launches into the pros and cons of RAID arrays or argues about the lifespan of CD-R while surrounded by friends or family, good food and drink, but in the safe techno-haven of these pages I feel I can enthuse without fear of making an unforgivable *faux pas*.

Storage is of course where you store things — so far, no surprise. And few would be shocked to learn that in the realm of the computer, typical storage devices include hard drives, floppy discs and CD-ROM drives. All have their pros and cons: some are quick, slow, or expensive while others are cheap, rewritable, or removable; some are perfect, but incompatible with anything else. The list is endless. One thing is certain, however: like RAM or other unmentionables, you can never have enough of the stuff. This is particularly true with large multimedia files floating around, along with people merrily downloading from the Internet.

The latest storage craze is cheap drives with cheap removable media, and Panasonic hopes to solve everyone's storage problems with its patented PD system which uses removable optical media.

Removable media is not a new idea: SyQuest has made a comfortable living over the years with its removable hard-

disk cartridge system. The 5.25in 44Mb or 88Mb versions in particular are the industry standard in publishing for transferring large DTP or graphics files from the desktop to the remote printers. They're quick and easy to use but are reasonably expensive: the current 3.25in 270Mb cartridges cost around £55 each and an internal SCSI drive to read them is about £275.

SyQuest uses removable magnetic hard disks. Another possibility is optical discs, currently available in numerous incarnations. There are magneto-optical systems, using media similar to optical discs but with a

magnetic active layer. A high-powered laser heats the material, resulting in a reversal of the material's magnetic polarity. Clockwise and anti-clockwise polarities represent noughts and ones and are read by a lower-powered laser, and before any data can be overwritten the relevant active area must first be returned to its initial state of magnetisation. Consequently, overwriting on a magneto-optical system is a two-pass process.

Panasonic's PD system boasts the company's own patented Phase Change technology, very similar to that used by phase-change WORM (Write Once Read Many) such as CD-R. The difference with Panasonic's system is that the active layer is made of a material with reversible properties. A very high-powered laser heats that portion of the active layer where data is to be recorded. This area cools rapidly, forming an amorphous spot of low reflectivity. A low-powered laser beam detects the difference between these spots and the more reflective, untouched, crystalline areas.

By reheating a spot, re-crystallisation occurs, resulting in a return to its original highly reflec-
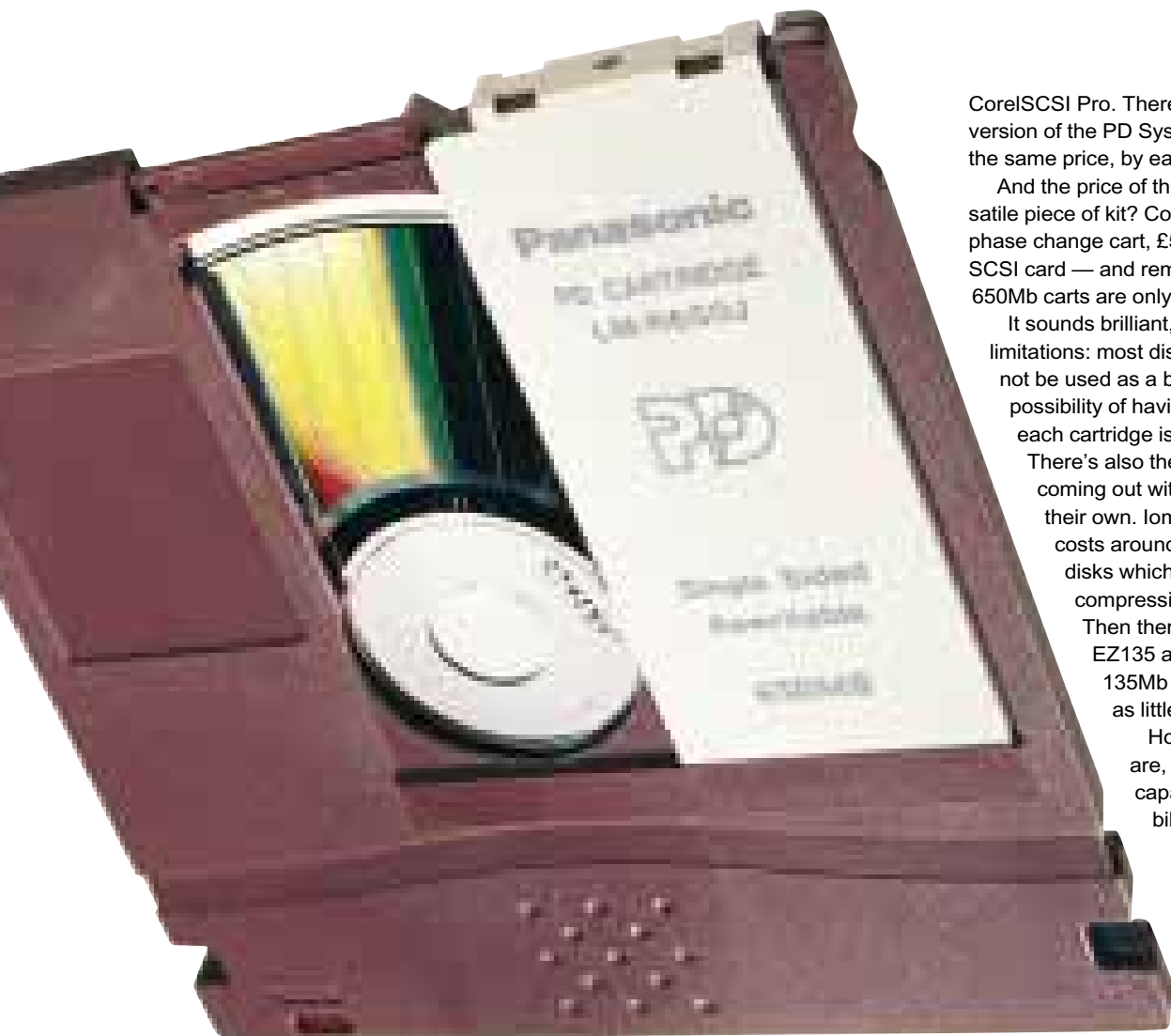
CorelSCSI Pro. There'll be an ATAPI version of the PD System, costing around the same price, by early next year.

And the price of this wonderfully versatile piece of kit? Complete with one phase change cart, £549, or £599 with SCSI card — and remember, additional 650Mb carts are only £39 each.

It sounds brilliant, but there are some limitations: most disappointingly it cannot be used as a boot drive so the possibility of having a different OS on each cartridge is out of the question. There's also the competition, each coming out with alternatives of their own. Iomega's Zip drive costs around £150, with 25Mb disks which fit 100Mb through compression, at £15 each. Then there's SyQuest's new EZ135 at about £150, with 135Mb 3.5in disks costing as little as £12.50 each. However cheap these are, they offer limited capacity and compatibility with anything else. Panasonic's PD System's cartridges may cost £39, but they'll store 650Mb. Just as importantly perhaps, the drive can read normal CDs at quad speed.

Each one of these manufacturers is hoping that its drive will become the new standard — only time will tell. I must admit to being very fond of the PD System and would recommend shelling out extra for the drive, especially if you don't already have a high-performance CD-ROM drive. Never before has that spare 5.25in drive bay in your PC been so hotly contested.

Consequently, Panasonic's single-pass phase-change system is quicker than the two-pass magneto-optical (MO) version. Panasonic believes that phase change is simpler, using less components, and is easier to implement due to the higher degrees of reflectivity involved: typically between 10 and 20 percent (compared to less than 1 percent with the MO system).

The PD System is Panasonic's latest phase-change rewritable device. It looks like an internal SCSI CD-ROM drive until you eject the drawer; then it turns out to be quite deep, in order to take the rewritable cartridges which look like CD-ROM caddies. Each removable cartridge costs £39 and can store a substantial 650Mb. Performance is slower than a hard disk but not much below that of a 3.5in SyQuest.

So Panasonic has solved the cheap, removable, yet reasonably performing

At the bottom of the tray is a five inch circular dip, just like in a CD-ROM drive, and guess what? The PD System doubles up as a CD-ROM drive — and a quad-speed one at that. We measured a sequential transfer rate of 605Kb/sec and overall it performed similarly to other quads.

The same tray is used both for CDs and the phase-change cartridges (although not simultaneously), and only one SCSI ID is required. Under DOS and Windows (or Windows 95 for that matter) two drive letters are required, and since you can't fit a CD and a cartridge into the tray at the same time, you'll find a few occurrences of "No disk in drive X, please retry". Under Macintosh, the desktop mounts whichever media is loaded.

Panasonic can bundle an Adaptec SCSI card if required, for an extra £50, but curiously didn't license Adaptec's EZSCSI software, opting instead for

RAM Doubler for Windows

Double your program and data storage in Windows. **Chris Cain** did, and reckons that not only does the utility work well, it's also a lot cheaper than buying extra SIMMs.

When US-based utility specialist Connectix launched RAM Doubler for Macintosh, it went on to become a "must have" product. Now the company has finally brought its memory management experience to the PC and is hoping to continue its success with RAM Doubler for Windows.

Minimum system requirements are a 386 PC or higher with Windows 3.1, 3.11 or Windows for Workgroups, and 4Mb of RAM. The current version will not work with Windows 95 but Connectix promises an update as soon as it ships. It will be interesting to see exactly what this does

says on the packaging.

dialogue boxes in Windows programs. It doesn't matter how much memory you have installed, once the total available resource space drops to around 15 percent, Windows won't let you load any more programs. If it drops below 10 percent Windows will usually crash, taking all your precious data with it.

As well as ensuring that resources are used efficiently, RAM Doubler cleans up the PC's infamous under-1Mb area where DOS, network software and hardware drivers regularly waste space. It doesn't give you more DOS memory, it's not a product like QEMM or 386Max (although it does work well in conjunction with these), but it does help make sure Windows has enough space to work happily.

Finally, RAM Doubler intelligently compresses data that's in memory but not likely to be accessed again, and intercepts calls to your Virtual Memory swap-file to see if it can speed things up, by compacting information rather than paging it out to the hard disk.

After using the program for a couple of weeks, RAM Doubler for Windows proved as transparent and essential as its Macintosh counterpart. At £69 it's a lot cheaper than buying extra SIMMs, and with Windows' System Resource problems the addition of extra megabytes doesn't always help. This is simply a "must have" utility for anyone currently using Windows 3.1 and with plans to continue using it in the future. If you're more interested in Windows 95, wait for the update later this year. If it works as well as this one, it will be worth having.

Wow, look at all that free memory — well, free memory, anyway

As its name suggests, RAM Doubler doubles the amount of Windows programs and data you can have stored in RAM. It doesn't allow you to use software that requires more memory than you physically have available, but it does let you open more applications at once on your existing setup. How many times have you failed to get Microsoft Word and Excel running together, or had that annoying "Out of Memory" error when you know you've got 32Mb? Install RAM Doubler and your problems will be solved; at least, that's what Connectix

as Microsoft has already improved its memory management routines.

Installation requires nothing more than double-clicking on a setup program and answering a few straightforward registration questions. Once you're done, Windows restarts and that's it — there's no swap-file configurations or changes to Autoexec.bat. In most cases, as with the original Macintosh version, there's no noticeable performance hit on your machine when you start working.

RAM Doubler works by using custom-patented techniques to compress data and make the most of Windows' System Resources. These are reserved areas in memory, split into 64Kb chunks, that track items such as icons, menus, buttons and

PCW*Verdict*

Connectix has done it again. A must for anyone running Windows 3.x.

Price £69
Contact Computers Unlimited 0181 200 8282.

Calera WordScan Plus 4.0

There are no changes to the interface of this veteran desktop OCR package, but it is accurate and fast and does the job extremely well. **Panicos Georghiades** and **Gabriel Jacobs** report.

OCR (Optical Character Recognition) software converts printed text and numbers from a scanned bitmap image to an ASCII or other text file format which can subsequently be read by a word processor or other application. Its uses are many and varied, ranging from publishing to setting up full document image systems.

WordScan Plus is one of the top desktop-computer OCR programs and a long-standing workhorse in this field. Indeed, *PCW* has reviewed several earlier versions over the years, often comparing it with its principal rival, OmniPage. The last time we reviewed it, it was produced by Calera. Calera and Caere (the producers of OmniPage) have always competed for the Number 1 position in OCR software. Sometimes one product has been ahead, sometimes the other; a bit like MS Word and WordPerfect, or Excel and Lotus 1-2-3. However, in December 1994 the companies merged, so it looks like it's all quiet on that front.

The last time we compared the two products, we found that WordScan was faster and more accurate, but that Omni-Page had more features, including an image editor and a training mode. That's still true, but Word-Scan now offers even greater speed and accuracy. As with all OCR programs, results ultimately depend on the quality of your original documents, but in almost all our tests the new version has proven perceptibly faster than before and has produced fewer errors — in fact, up 50% fewer. The user interface hasn't changed almost at all since the last update, but there was little need for any change because in use the program really is child's play.

The improvements in speed and accuracy are no doubt due to the program's new recognition engine based on POWR (Predictive Optical Word Recognition). This 32-bit neural network technology extends OCR from character level to word level recognition. Similar technology has been used in speech recognition and DNA matching, but to our knowledge this is the first time it has been applied to OCR.

Attempting to recognise whole words as opposed to individual letters ought to be dreadfully slow because of the vast number of possibilities. POWR, however, uses sophisticated algorithms which enable the program to home in on the most probable interpretation, no mean feat when you have a choice of 13 languages (US and UK English, French, Brazilian, Danish, Dutch, German, Italian, Finish, Norwegian, Portuguese, Spanish and Swedish).

POWR also helps a great deal with the recognition of poor-quality documents, either those which have become degraded from multiple generations of copying, or those which have started off in a pretty poor state such as standard-mode faxes and 9-pin dot-matrix printouts. On documents of reasonable quality, results are very impressive indeed, giving high degrees of accuracy, especially on point sizes between 4 and 28; WordScan is not too good with larger point sizes.

There are OLE 2.0 links to the three office suites (Microsoft, Lotus and Novell), as well as to email and fax software: you can simply carry OCR operations into many packages using drag and drop. And you can work directly from an image file or a fax card, thus entirely obviating the need in such cases for printed documents. Again, you need only drag and drop an image file onto the WordScan icon for the recognition process to begin.

The program can take input from a scanner in portrait or landscape modes, upside down or the right way up. It can also happily handle documents skewed by up to 10 degrees. This means that you don't have to worry too much about lining your documents up too accurately, something which used to be a major cause of error when using OCR software. Over 35 models of scanner are supported, and if
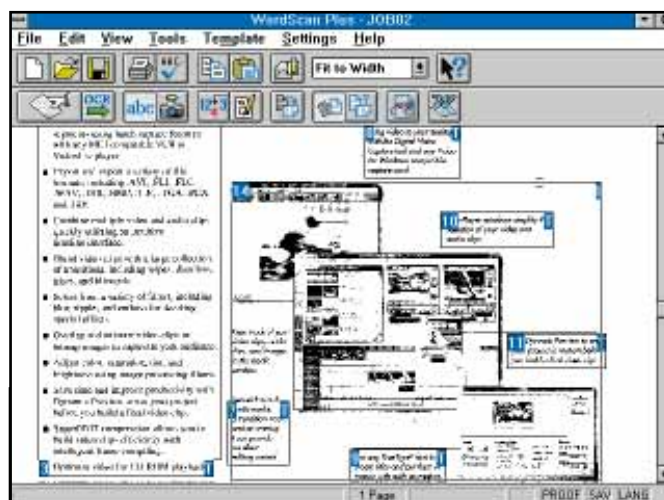
Above *A scanned page with text and image regions automatically assigned by the program* **Right** *WordScan's pop-up verifier: yellow marks uncertain characters, blue is for words not found in the program's spell-checker*

you have a scanner with an automatic sheet feeder, you can run the program in full batch mode. Otherwise, you can opt for deferred processing: scan a number of documents individually, store the bitmaps, and do a batch recognition job. The program can handle double-sided documents too.

After the OCR process has been carried out, a pop-up verifier window displays highlighted suspicious letters and words for you to accept or correct.

On the output side, you have a choice

image formats.

WordScan is able to save regions of a document which you designate as straight image files rather than text to be translated into machine-readable form. These image files can then be attached to pages which have been OCR'd. So, with the kind of DTP facilities offered by modern word processors, it's quite easy to recreate electronically the full version — text and images — of printed documents. A scanner without OCR software will do that too, but the resulting

of over 40 file types, including all the common word processor formats (keeping the formatting of the original document — bold, italics, line spacing and so on), and about a dozen variations of PCX, TIF and PDA

digitised image can't be understood by a word processor, spreadsheet or database.

This is a truly professional program that will handle just about anything you throw at it, and any reservations we may have are minor. We did have a problem during installation, concerning the product serial number, but we've been assured that this has now been sorted out.

Minimum requirements are a 386 with 4Mb RAM, DOS 5.0 and Windows 3.1. We recommend a faster processor and more than 8Mb of RAM. The program comes on 13 disks and takes 12Mb — twice the size of the previous version, which shows that in this case an update is really more of a re-birth.

PCW*Verdict*

One of the top two or three OCR programs for the PC, often found to be the fastest and most accurate of them all. The last version offers even more accuracy and speed but no changes to the user interface.

Price £495 (SRP), upgrade £129
Contact KUK Information Centre
0171 630 5586. Fax 0171 630 5587

HARDWARE

Pioneer DRM-624X

Pioneer revolutionised the CD-ROM market with its six-disc changer. Now it has bumped the speed up and the price down, says Gordon Laing.

Several years ago, Pioneer stunned the computer industry with a groundbreaking new product. The DRM-604X was the world's first production-line SCSI quad-speed CD-ROM drive. Quad-speed still commands respect and admiration today, so imagine everyone's surprise when the 604X turned up before even double-speeds became widespread.

As if it wasn't enough to quadruple the standard at the time, Pioneer fitted its speedy number into a shoebox-sized metal case along with a little inspiration from its in-car entertainment division: a six-disc CD-changing mechanism. Indeed, the 604X used the same six-disc caddy as Pioneer's popular car changers.

The whole idea of a changer is that you load your favourite discs into the caddy, then use a remote means to conveniently swap between them – this

allows you to locate the changing mechanism out of the way. In a car, you can stick the changer in the boot. In the case of CD-ROM, you could pop it under your desk, or even hang it off a server, in a different room.

If you do have a CD-ROM drive shared as a network resource, what disc do you load? With six to choose from, Pioneer's changer proved to be a winner, particularly in the case of large databases or directories which span several CDs.

Then there's the aspect of security. Such discs may be worth a fortune, so Pioneer offered a lockable eject button – no running off with precious goods if the the administrator wants to play god.

The price for all this, was, well, price. Pioneer wanted a hefty £1,280 for the 604X but customers still queued round the block. So much so that Pioneer

stacked three into one box, creating an 18-disc changer, then went beserk and converted an innocent-looking jukebox into a 500-disc changing monster.

Where do you go from there? Several years on, Pioneer has given up charging — or perhaps the consumers have given up paying — the earth for its products. It's not so much the changer that springs to mind, but its single-disc quad-speed SCSI drives whose prices held as everyone else's tumbled.

Fortunately, Pioneer saw the error of its ways and recently dropped its prices all round. In August 1995 we looked at the new 124X SCSI internal drive, boasting not quad but 4.4 speed performance and an Advanced Buffering System for a very competitive £239. There is a purpose to all this history, honestly, since the new 624X reviewed here is basically

a cross between the old 604X changer and the new 124X speedy drive. The really special part is that Pioneer has whacked the price of this new drive down to a remarkable £499.

That about says it all. Beyond the above, Pioneer has streamlined the case so it's a little shorter, with more curves. The two lights which indicated audio (single speed) or quad speed have been replaced with a single, busy LED.

Despite being quad speed, the old 604X was a little slow on average access times, but both access and transfer rate have been improved by fitting exactly the same transport as the 4.4-speed 124X. Sustained data transfer rates exceed 670Kb/s (quad is around 600Kb/s), and average access times are around 150ms; network configurations would also make more use of the Advanced Buffering System.

The 624X is a SCSI-2 device, so you'll need a SCSI card to make it work. We say this every time we review a SCSI device, but the best and most reliable cards we've used are from Adaptec. These range from ISA adaptors like the 1505 costing around £50, to the PCI-bus mastering adaptors such as the 2940, costing £210. Any of these will work with the 624X, which connects via two full-sized SCSI ports.

The software drivers are quite neat. There's only one CD-ROM drive reading mechanism in the 624X, but under DOS and Windows you'll see six drive letters. Selecting one prompts the unit to swap to the desired disc, which takes around eight seconds. Sometimes it's a little infuriating as you wait for it to change over but it's quicker than doing it by hand on a conventional drive, particularly if the drive's on the other side of the room or in another one entirely.

If there aren't enough drive letters available under DOS, an additional utility can assign the unit under a single letter with the help of extra switching software.

On a Macintosh the driver loads as a special extension, offering the choice of six discs on a pull-down menu next to

the Finder. Only the disc currently under the scrutiny of the laser is mounted on the desktop.

By more than halving the price, Pioneer has opened its disc-changing technology to the masses. I can picture many SoHo or even personal situations which would now consider the 624X instead of a single-disc CD-ROM drive. Many games players wouldn't flinch at the price after shelling out thousands on a machine to run Descent that bit smoother – remember that games such as 7th Guest, Wing Commander III and Creature Shock all run over more than

one disc.

Pioneer has no immediate plans to swamp the games and consumer press with ads for the 624X, instead aiming it, like the 604X, as a shared network resource. If this was the prime intention, then I would have liked to see an Ethernet connection, IPX or even TCP/IP support as standard. Third parties offer suitable solutions, such as Microtest's Discport which allows any SCSI CD-ROM drive to be hung directly off a network node. I have just installed the 624X and Discport on our Novell thin Ethernet network and it seems to work like a dream – I'll do a full review next month.

Whichever way you look at it, the 624X is a winner, offering the same excellent performance as the 124X with the convenience of a six-disc changer, in a lovely box for the bargain price of £499.

PCWVerdict

Pioneer has taken its original £1280 six-disc CD-ROM changer, sped it up to 4.4 speed, fitted it in a slighter smaller, better-looking case, and dropped the price to £499. Hurrah!

Price £499
Contact Ideal Hardware 0181 286 5000. Fax 0181 286 5056

SOFTWARE

3D Garden Designer 2

The grass grows as high as an elephant's eye, as James Taylor digs in and attempts to bring order to his personal jungle with the aid of this software

Software that adds to your lifestyle away from the keyboard is all too rare, and 3D Garden Designer 2 is one of these rarities. One of the problems of conventional garden design, on paper, is that you need to draw all your elevations as well as your plan to be able to visualise the overall layout. If you get it wrong, you start again with a fresh sheet of paper. But 3D Garden Design overcomes this.

You start with simple geometrically-shaped plots. The landscaping graphics you add to these can then be viewed in elevation and 3D perspective. The graphics include trees, shrubs and flowers which can be identified on the plan and listed separately in an inventory. You can specify growing conditions (soil type and temperature, aspect, latitude, and minimum air temperature) to help refine plant selection from the database. Both inventory and garden design can be printed out, although the latter is not dimensioned. Pre-drawn gardens, of various types, are supplied for inspiration and practice.

The plant database (over 600 plants) allows selection by almost any criteria imaginable. Each description includes height, spread and colour of leaf, bark and flower, as well as the plant's shape and height in ten years' time and when the plant is fully grown. You can add plants to the database, including shape, colour, season and all the other criteria needed for their selection. Additionally, the database can generate a plant palette showing the current selection, and this can be sorted by Latin name, common name, or height and spread.

When you first place plants in the garden they will appear in size as ten-year-old plants. That's useful enough, but your garden can age before your very eyes, too, showing how big the trees and other plants will be in another ten or even 20 years' time (a very useful feature to prevent you placing a weeping willow three feet from your door) and showing their changing colour throughout the seasons.

Not only this, but when you place a plant or object in your garden 3D Garden Designer 2 checks against the information it holds about your garden and warns you (if necessary) about planting position and distance, soil acidity, temperature, sun and shade. This is a highly practical program.

As in version 1, the program allows you to position objects in plan with the automatic generation of a side view and the ability to rotate either view through 360 degrees. Using virtual reality techniques, you can then go into your garden and look around it, viewing it from any angle; or step outside and see how it looks from a distance. But this is where it gets tricky.

All of 3D Garden Designer's views are in fact *your* viewpoints. So instead of scrolling the image *down* the screen, you move your viewpoint *up* the screen. This translates to using the up arrow to move the garden down the screen, and the down arrow to move it up the screen. Similarly, the left arrow moves the garden towards the right, and vice versa. The zoom only works in elevation rotation and depends on whether you're inside or outside your garden. Any movement is slow.

Two other features make their own contribution to your garden design. The first is the "camera" which lets you record different views as you go, to refer to later, and you can also use it to create a moving video sequence. The second, available only with the CD-ROM version, is a collection of photographs of some of the plants in the database (indicated by a button). But the photo collection is not complete: for instance, considering the extraordinarily large number of Acers included, three photographs seems mean, and no photographs at all of Wisteria is positively miserly.

3D Garden Designer runs under DOS or Windows, requires at least a 386 processor, 580K conventional memory, and a VGA colour monitor. To look at the photographs you need a CD-ROM drive and VESA-compatible display.

Above *The plant palette holds your short-list of preferred plants which can be positioned to suit in your design*

Right *The plant database allows selection by practically any combination of criteria. Some entries, indicated by a button, have associated CD-ROM photographs*

HARDWARE

Pentax PocketJet

This little thermal printer provided reasonably good results, but Adele Dyer warns that you will have to dig deep into your pocket to buy it.

Like desktop printers, portable versions have been getting smaller and smaller over the years: from briefcase size, to notebook size, and now to pocket-size. Although the Pentax name may be more familiar in the photographic market, the company has also been making computer peripherals for some time. The PocketJet is its latest entry into the portable printer market.

Although the prefix "pocket" often raises doubts, the PocketJet is nevertheless small and light. Pockets the size of a small rucksack are usually needed to transport anything that is so-called "pocket-sized", and in the case of the PocketJet your pockets should be at least a foot deep. However, the other dimensions are modest: one inch high by two inches deep. It weighs only slightly more than 1lb, including the rechargeable battery.

The problem of fitting a large parallel port to a small device is solved by using an inch-wide connector at one end. Pentax supplies a suitable cable with this plug on one end and a standard PC parallel plug on the other.

As it's a thermal printer the spares are kept to a minimum, but this does mean having to use thermal paper (normal on one side and like fax paper on the other) which will inevitably fade in time and is not as pleasant to use as plain paper.

There is no paper feed, so you must carefully manoeuvre each sheet into the printer individually and hold it there until the printer is ready to grab it. The instruction book suggests you hold it in place, but I discovered it was quite happy to pull through by itself.

As for the actual print quality, it is reasonably good. Simple text documents are clear, even in tiny point sizes, and spreadsheets are well reproduced too. While not specifically designed to handle graphic images, particularly fine shading, it handled solid areas of black well, without banding.

However, not all Windows applications are easy to set up properly. When I tried to print spreadsheets I hit an annoying problem: the formatting constantly split away from the rest of the spreadsheet, no matter how I adjusted the page setup. To be fair, it only happened in Excel and could have been caused by overlarge file sizes, but this was still disappointing and could be disastrous if printing Excel spreadsheets were to be your prime reason for choosing this printer.

There is an increasing number of portable printers on the market using a variety of different printing techniques, from inkjet to thermal wax — the thermal wax Citizen PN-60, for instance, which uses plain paper for around the same price.

Considering the limits of the PocketJet — it is black and white only, uses thermal paper and has no paper feed — its price in relation to those of its competitors might prove to be a stumbling block.

Arc en Ciel address utility

You can't get (ad)dressed without it — a postcode, that is. And in the wake of the Royal Mail's Postcode Address File have come numerous address and postcode utilities, of which Arc en Ciel's is one. **Eleanor Turton-Hill** looked at it.

Postcodes were introduced by the Royal Mail in 1966 to speed up the sorting of mail. It took eight years to complete the full postcoding system for the UK, finishing in 1974. Using sorting machinery and OCR equipment, postcodes these days allow letters to be sorted up to 20 times faster and more accurately than by hand, whether the address is hand-written or typed.

Although the postcode system was originally developed to make the postal service more efficient, it's obvious that a complete listing of all UK addresses and postcodes is an invaluable source of information to businesses. About a year ago, the Royal Mail wised up to this fact and produced a Postcode Address File (PAF) on CD-ROM. This contains postcode and address data for the entire UK — that's over 600Mb of data in the form of 25 million UK addresses, 1.25 million business addresses and 1.6 million postcodes. The standalone version, Address Finder National, costs £445, and a second version, the Address Manager, costs a massive £1,200. The latter contains ordinance survey references and grid references and has an export facility.

Recently, a spate of address and postcode utilities based on the Royal Mail's PAF have appeared on the market. These attempt to provide improved versions of the PAF by including facilities which help to integrate the data more effectively with existing applications, provide data correction utilities and improve the speed of data access. The offering reviewed here, from Arc en Ciel, has several characteristics which make it easier to install and use than the Royal Mail's own system.

Firstly, it's available on disk, unlike the PAF which is available only on CD-ROM. That's not to say that it's impossible to get the data on disk from the Royal Mail. You can; but there are over 120 disks and the data takes up over 600Mb of your hard disk which is hardly a practical proposition. What really puts a damper on the idea is that the disk version, unlike the CD-ROM version, has not been regularly updated.

The great thing about the Arc en Ciel application is that by using compression techniques, it manages to pack the entire PAF into just under 10Mb. The application comes on eight separate disks, each of which represents a different geographical area, and the program allows you to install as many or as few areas as you want.

The address application itself comes in the form of a small dialogue box offering simple searching utilities. The main screen acts as a simple address retrieval system — enter the full postcode, click on the "lookup" button, and the corresponding address appears. If you don't know the full postcode, a "search" button provides more sophisticated ways of retrieving data. This requires the first letter of the postcode, which narrows the search down to a specific area, followed by the complete or partial name of the street. A word contained in the street name will often produce a lengthy list of results. The word "queen", for example, produces all the street names within the defined area which contain that word, e.g. Queens Road, Queensway, Great Queens Avenue .

As an independent utility, this application works well. It sits in the corner of the screen and acts as a reference tool when you need to verify information. Retrieved data can be copied over to other applications using the "copy" button. But as well as working independently, it also integrates with MS Word and WordPerfect. Within Word, a macro is automatically inserted during installation and can be invoked using a simple key combination like Ctrl-A, which allows you to type a postcode into a document and immediately call up the corresponding address
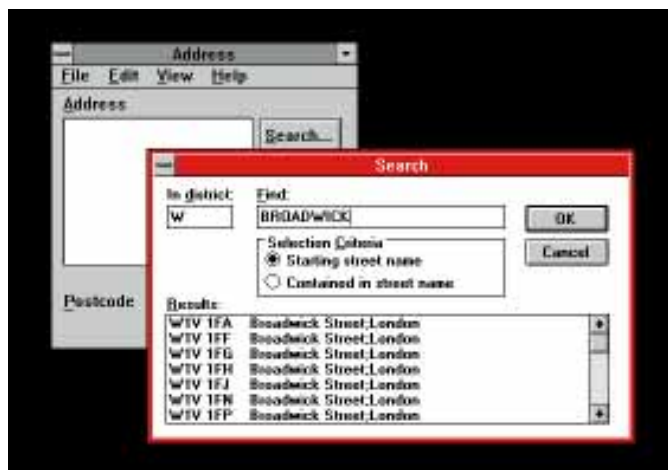
Above *If you don't know the full postcode, you can search the database using a distinct letter*
Right *Comprehensive help facilities are incorporated into the software*

which is written directly onto the document.

For programmers who want to integrate data into custom applications, there's a separate executable file provided called addressc.exe. This is a function which can be called in code to accept a postcode in the form of a character string and return an address. Unfortunately, there's no facility for searching the database in more sophisticated ways. The only way of narrowing down a group

of records is by setting up a loop which continually calls the "addressc" function.

The major advantage of this system over others is its price — just £149 with an annual charge of £98 for data updates. Compared to similar products like the ones from Hopewiser and QAS Systems, the integration utilities on this application are rather limiting. On the other hand, this is the only version of the Royal Mail's PAF which fits neatly on your hard disk into a space of under 10Mb.

PCW*Verdict*

Compacts a vast amount of data into a very small space and incorporates simple searching tools. Well worth £149.

Price £149 (£98 for annual updates)
Contact Arc en Ciel 01273 721069.
Fax 01708 872389

HARDWARE

Adaptec APA-1460 SlimSCSI

Installing the PCMCIA SCSI interface used to be tricky and confusing. The introduction of Windows 95, as Simon Rockman discovered, has made it effortless.

This was very nearly the shortest short review ever — the Adaptec PCMCIA SCSI interface worked.

It worked because it was first tested using Windows 95. The prime reason for using the card was to install a newer beta onto a Dell Latitude which was already running Windows 95. Plugging the card into the slot triggered Windows 95's Plug and Play, which recognised the card and asked for the right Windows driver disk. That done, the CD-ROM drive appeared as drive D: and everything was tickety-boo.

Installation under earlier iterations of Windows is less straightforward. Adaptec includes the EZ-SCSI software with the card. When EZ-SCSI was launched, it seemed just a sensible solution to the severe problems everyone encounters when trying to set up SCSI devices. Over the years, it has proved invaluable.

In a machine which has working card and socket services, setup is pretty straightforward: EZ-SCSI installs the software after the socket service power-up. In a machine without the card and socket services, you have to deal with the problems of memory areas and interrupts. This used to be a common nightmare but any recent notebook should not cause problems.

From then on it's plain sailing. The card will support the regulation seven SCSI devices, providing they are correctly daisychained. Being a SCSI-II device it will run at 10Mb/sec, but this is
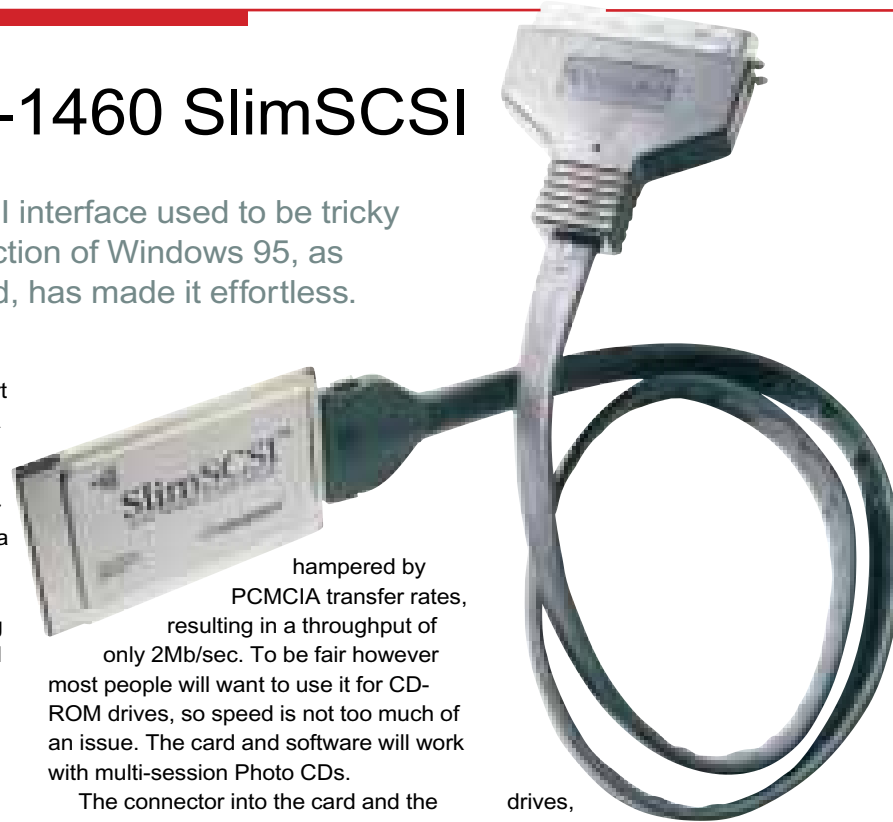
hampered by PCMCIA transfer rates, resulting in a throughput of only 2Mb/sec. To be fair however most people will want to use it for CD-ROM drives, so speed is not too much of an issue. The card and software will work with multi-session Photo CDs.

The connector into the card and the cable itself are flat, leaving space for another adjacent PCMCIA card, so your only concern is power. Adaptec claims that the APA-1460 is relatively low-power at 0.3w when running and 0.2w in standby. Adaptec also claims that it is rugged, and this seems true. The cable plugs into the PCMCIA end with a couple of press-in clips and feels secure.

It uses a screened ribbon cable which terminates in a standard 50 connector, although a high-density version is available. At 3ft the cable is a little on the short side, which is fine if you have the first device on a desk next to the notebook but isn't quite as convenient if you want to use the machine on your lap with a cable to the attached devices. The SlimSCSI should be compatible with any SCSI device, but to be on the safe side Adaptec lists a handful of CD-ROM drives, SCSI tape drives, magneto-optical

drives, removable hard drives and scanners which the card definitely does support.

All hard disks *should* work, but make sure that you are not reading from or writing to the device when you remove the card. Windows 95 has special protection for this – you can ask the software when it is safe to remove the card. Ignoring the warning will cause a crash.

PCW*Verdict*

A good, reliable way to add SCSI to a notebook, but a little pricey.

Price £195
Contact 01252 811200.
Fax: 01252 811212

Vitec Video NT MPEG encoder

It's French, it's flash, it's a real-time MPEG encoder PC
card for just £400. Video on the PC does come cheaper,
says **Tim Frost**, but not at this quality.

From a starting price of £150,000, professional MPEG encoding systems
have rapidly dropped to an entry level of
£15,000, and earlier this year ReelMagic
launched Producer, its PC MPEG
encoder card for just a few thousand. But
a new Video NT capture card from the
French company, Vitec, simply
astonishes in the way it has pushed back
the MPEG encoding barrier by producing
a real-time MPEG encoder PC card for a
mere £400.

The card looks nothing much at all. It
is half-length ISA with three main chips
on it, a pair of Philips video in/out, and the
VN422 video processor that does all the
MPEG or AVI work. On the back is an S-
VHS socket, a phono socket for compos-
ite video and a 9-pin D for connection to a
SCART socket.

The card has got to be seen as an
MPEG alternative to a standard capture
card and will work on most 32-bit PCs,
although the faster the PC, the faster the
frame rate can be recorded.

The Vitec NT is there purely to get
video onto the hard disk; it is not a replay
card so you will need an MPEG video
replay card and a SVGA card as well
(Reelmagic's Rave combined
SVGA/MPEG card was used on the test).
The Vitec sends its data via the normal
PC bus, so additional connections, either
internal or external, are not required.

The software loads easily, although it
does come in several sections which is a
bit of a pain. As with all MPEG/video
products, this is not bullet-proof and you
may (or may not) have difficulties running
the system properly on some setups.

The whole suite of software has been
designed to either capture MPEG directly
from a video source, or use AVI as an
intermediary editing format and then to
convert the final AVI movie to MPEG for
storage and playout.

"Imager" is the video capture software,
which encodes the incoming video in
real-time as MPEG or AVI files. If you are
capturing in MPEG (which cannot be
edited at the moment, although editing

Video in view
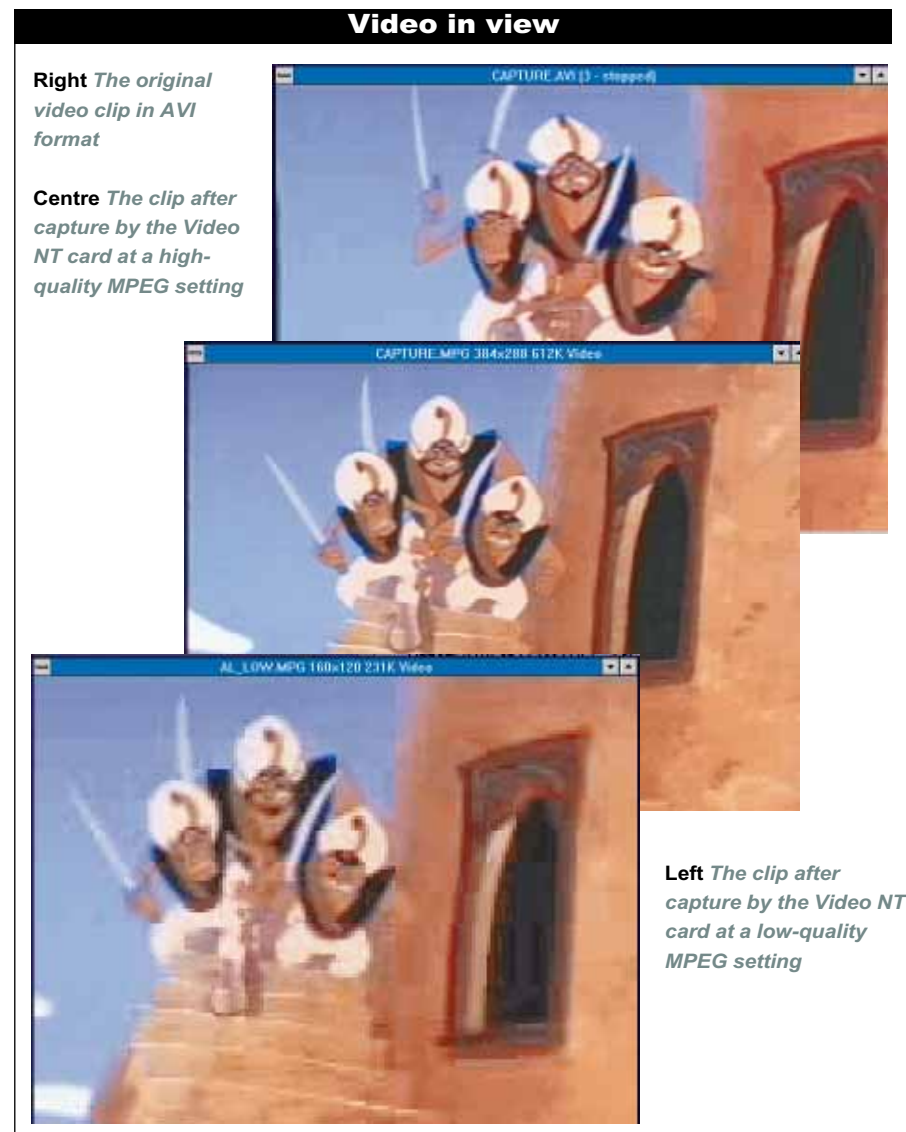
Right *The original
video clip in AVI
format*

Centre *The clip after
capture by the Video
NT card at a high-
quality MPEG setting*

Left *The clip after
capture by the Video NT
card at a low-quality
MPEG setting*

software is on the way) then it is simply a
matter of defining the image size, the
quality level and frame rate and setting
the capture going.

One obvious limitation is that MPEG
capture is at 384 x 288 resolution at the
best. But by using the best compression
quality, these MPEG images (at a maxi-
mum of 15 frames/second) can be
replayed quite acceptably full screen. The
other serious limitation, if you wanted to

consider this card as a VCR replacement,
is that it only captures sound as a sepa-
rate wave file (using your sound card).
These files cannot be easily replayed at
the same time as the MPEG images, so
the Vitec should be considered as a
provider of mute images of decent
quality.

The MPEG image quality is a move-
able feast with three variables: frame
rate, resolution and compression. The

frame rate is user definable; you can even use it for security camera-type stop frame, with each frame recorded from 1 second to 18 hours apart. In the normal video capture mode 15 frames per second is possible in all image sizes up to 384 x 240 (providing your PC is fast enough) and this rises to a full 24fps when working at the smallest image size (160 x 120).

With MPEG you can blow the image up to full screen, but of course, the lower the resolution, the rougher the images become when enlarged. The compression ratio can be altered from x2 to x20 and each time you double the compression rate, you halve the amount of disk space required to record the file. x2 gives the best quality, and x10 is about as far as you can reasonably go before a larger image starts being lost under the blocks that make up the MPEG image. For small colour images, going down as far as x17 still produces recog-

nisable faces at a minuscule transfer rate of 6Kb/sec. Running at 320 x 240 and at x4 compression produces acceptable video-type results for quarter or half-screen replay, while consuming under 130Kb/sec.

The software suite includes Video Clip, a neat AVI editing package to construct AVI movies (including morphing) which you can then convert to MPEG using "MPEG Maker". There is also the software-only MPEG Player, which needs nothing more than an SVGA card to play out MPEG files at a few frames per second. This means that MPEG files can be viewed (albeit rather jerkily) by anyone with a PC who hasn't yet invested in an MPEG card.

In sheer image quality terms, the MPEG file is noticeably better than AVI while using at least a third less disk space. MPEG hardware's big advantage is that it always plays back at the right

frame rate, with no AVI jumping.

For MPEG encoding, the Video NT's £400 is stonkingly cheap; but at that price it has a lot of competition with more traditional capture cards that also offer audio. For the producer of video clips, with one eye on the near future when MPEG playback cards become as common and cheap as sound cards — or you just want to be the first with your own MPEG files — then this Vitec is a must-buy.

PCW Verdict

There are cheaper ways to capture reasonable-quality video on the PC. But if you want MPEG, the Video NT is simply the only low-cost answer — and it works in real time.

Price £400
Contact Ideal Hardware 0181 286 5000.
Fax 0181 286 5056

SOFTWARE

Key Presenter for Windows

Have you ever wanted to do a couple of presentations but been prevented by the cost of the software? **Paul Begg** presents his view that this product could be the answer.

Presentation software is a strange area: if you do a lot of presentations, you will almost certainly be geared up with all the high-end state-of-the-art presentation packages that provide the quality glitz you require. On the other hand, if you don't carry out many presentations but simply want to jazz them up, the price and complexity of the software will probably have proved prohibitive.

There have been a few budget-priced presentation packages, but generally you are looking at something in the region of £100 — still a lot of money for something you don't use very often. To break into the presentation market, you need quality software priced below £50 and which is so easy to use that you can be up and running with it even when it's been gathering dust for the past six months. Such an animal is Softkey's Key Presenter for Windows. It is easy-to-use, has some fairly heavyweight features (it'll double as a pretty neat drawing package) and will have a street price well within the budget of many small businesses.
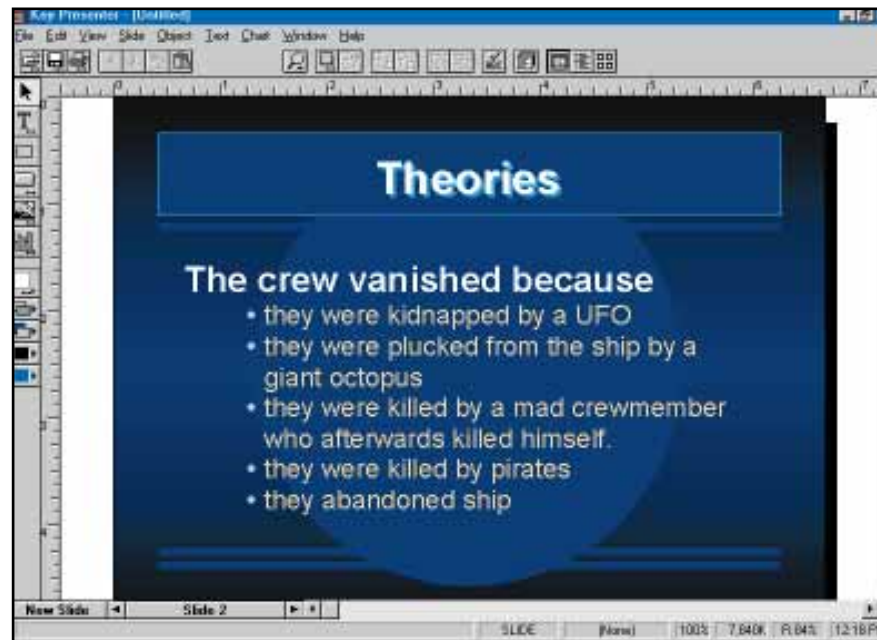
Key Presenter has the features you would expect from a top-end presentation package: there's a full-screen editor

Good-looking presentations at a great-looking price

for designing slides, an outline view of the text, and a slide sorter. Each of these "windows" offers different tools, all of which are available from the Slide View window.

Outline View displays a text outline of all the slides in your presentation. This not only gives you an overview of the text across multiple slides, but enables editing and cutting and pasting as well. With the Slide Sorter you can see all the slides in your presentation, rearrange them and rename them. Using the Speaker's Notes button, you can create notes to accompany the presentation — useful not only as a memory jogger, but also as a good place to store names, titles and other facts and figures.

Creating slides is easy: just select a design from any one of an excellent collection of templates supplied, or create your own (there's a small library of clip-art to help you), and then add your text and personal graphics. You can choose colours and fonts for your text messages, and you get a full range of charting features too, including 3D rotation of charts. As well as this, there's a spelling checker to save you from embarrassment caused by those nasty typographical errors that everybody notices. And when you've done, you can output (use) the finished presentation in many ways: as slides, overheads, printed handouts, and so on. The choice is yours.

Key Presenter doesn't so much as nod in the direction of multimedia — there's no provision for adding narration, music or sound effects to your presentation, and you can't do anything so glitzy as to add animation. But these weaknesses aside, Key Presenter comes at a good price and doesn't gobble up system resources. It'll run on anything from a 386 with 4Mb of RAM and takes up only 6Mb of hard disk space. Overall, the price is persuasive.

PCW_Verdict_

Easy to use, and produces professional results This is unbeatable value for money.

Price £46.95 (incl VAT)
Contact Softkey 0181 789 2000.
Fax 0191 789 5626

Rescue

There is nothing worse than a disk disaster, except perhaps an omnibus edition of Eldorado. **Paul Begg** reckons Rescue could be your insurance in the event of the former. The latter — it's too horrible for even him to contemplate.

Stick a pencil through a floppy. Go on, make a hole in it — that's right. Now try and read the disk...

Florida-based company, AllMicro, describes Rescue as "the most comprehensive, user-friendly data recovery software available." They go on to claim that it can recover data even from a disk the operating system can't read. Of course, to properly test this claim you must have lost some data, hence the encouragement to stick a pencil into a floppy.

Rescue has its own operating system, that overrides DOS, to directly move the disk heads itself. This is different from most other data recovery software which tries to repair the damaged part of the disk, then reconstruct the data. With Rescue, even if you are missing your boot sector (that's the bit of your disk that contains all the start up or boot information) you can still attempt a recovery.

It's ready to run right out of the box. But you don't have to install it to your hard disk — it can be run either from DOS or from Windows.

At the top of the screen are three text boxes telling you the status of Rescue. The first describes the drive that Rescue is reading, the second tells you what Rescue is doing, and the third refers to the sector being read. On the right-hand side is a scroll bar which you can use to view one sector at a time. On the left is a list of files and directories. At the bottom of the screen there are nine buttons that perform various functions such as browsing sectors, searching for text strings, or exiting the program.

All you have to do is highlight the file(s) or directory(s) you want to recover and — hey presto, Rescue does its thing.

Rescue comes with Anyware Antivirus which detects viruses during the boot up of the system; and a backup program called Backit Lite for Windows.

So did I stick a pencil through a floppy disk? In the name of science, I did. I also recovered the data on the disk — except where the hole is, of course. So, in these days of shortages, does anybody want to buy a slightly damaged floppy disk? It's going cheap…

PCW_Verdict_

A to-be-considered insurance in the event of disk disaster, but it could do with being cut in price by at least half.

Price £99.95
Contact POW! Distribution 01202 718725.
Fax 01202 715600

So simple to use — how to retrieve data following a disaster

Wacom Graphic Tablet Pens

There's nothing like a graphics tablet to clear those arty headaches, and there's certainly nothing like tablet manufacturer Wacom's new range of pens. Better ergonomics and easier handling are offered by widening pen barrels, while those disconcerted by the lack of marks left by tablet pens should check out ink ballpoint and lead-propelling pencil models. Last but not least is the new standard pen which boasts an eraser at the other end of the barrel — tablet pens have never been more intuitive.

Price **POA**
Contact **Wacom Computers Unlimited 0181 200 8282**

Roland Sound Canvas

Roland has managed to squeeze 364 instruments into a Type II PCMCIA card. However, there's only enough room to play 16 of them at once. The SPC-55 also offers professional-quality reverb and chorus effects and sampling capabilites. Not only this, the card has an MPU-401 MIDI interface so you can make music whereever you go.

Price **£322**
Contact **Roland 01252 816181**

Scoutmaster GPS

The ultimate handheld accessory for people who need to know exactly where they are. Trimble Navigation's Scoutmaster is intended to do for the sextant what the guillotine did for the French aristocracy. It uses differential GPS (the most accurate kind) to pinpoint your location to within 10 metres. It's small enough to fit in your pocket, light enough to carry anywhere and, with a suitable cable, you can even connect it to a PC.

Price **£702**
Contact **Trimble 01256 760150**

Virtual Pilot

Learn to fly any aircraft, car or even spaceship with Virtual Pilot from Evesham Micros. It has been designed to provide ultimate precision amid the scariest of dog-fights and is compatible with the Thrustmaster Joystick range. It clamps securely to the desktop and requires no more than a standard game port.

Price **£68 Evesham Micros**
Contact **01386 765500**

Wireless Keyboards

Not only does this wireless keyboard make your desk the tidiest in the office, it increases productivity. This is because you can carry on working while walking down to the coffee machine — it works, we tried it. It works exactly the same as a standard keyboard and requires no additional drivers.

Price **£66**
Contact **Reed Cosine 01929 550727**

Gadgets
PCW Gadget Photography by David Whyte

Long term tests

HARDWARE

HP DeskJet 320 Printer

1 YEAR TEST

Jonathan Thaw invested in a 320 about a year ago, and has been reaping the benefits of clear, portable, colour printing ever since.

Anyone who bought an HP inkjet printer back in the earlier months of this year would have been disappointed to see their "new" printer become obsolete overnight, as a whole new range of inkjets was introduced for superior quality and value for money. The only printer that survived was the relatively new DeskJet 320. Some might be put off by the fact that it seems a little flimsy and may not look quite at home on their desktops, but over the last year of intensive use, it has proved an excellent machine.

Despite a few minor limitations, the DeskJet 320 is probably one of the best printers around in terms of value for money. Its biggest advantage is its versatility — it will quite happily sit on your desktop or in a briefcase, and weighs only 1.96kg (4.3lbs). On the road, paper insertion is a little fiddly, but on the desktop, the 60-page feeder handles paper very efficiently.

The printer offers 600 x 300dpi resolution and although this is still not up to the quality of the more expensive laser printers, the colour option compensates for this. The colour output is similar to that of the later DeskJet 500 and the newer 540.

But this is where you encounter the printer's first snag: it won't hold colour and black cartridges at the same time. Not only does this mean that blacks will

have to be dithered (where colours are combined to give a black effect), reducing the life of the cartridge, but there's the added hassle of constantly replacing the two cartridges. The biggest inconvenience is when you have a page full of black text with a thumbnail picture somewhere in the middle, and this scenario should be avoided to conserve the life of the colour cartridges, which are very expensive. This, though, is the price you pay for the printer's portability and versatility, and HP are good enough to supply a special storage container for the cartridges with the optional colour kit.

The 320 can print efficiently on specially coated transparencies and paper, although this is expensive. (The glossy paper gives the best colour output.) The feeder integrates well with the printer and paper jams are rare.

Control of the printer is simple but by no means limited. The six buttons on the front panel provide access to the various options by means of a clever system whereby the cartridge moves down a list of options listed inside the printer. The print driver for Windows rarely encounters problems and gives many options about the printer, print media and quality despite being a little slow with long documents.

A printer of this size would definitely not be suitable serving a small network and is more comfortable with a small workload. But it offers perfectly good black printing with the option of fine colour, and this, together with its portability and versatility, means that it's well worth the low price.

The HP 320 — a paragon of portability and versatility

PCW *Verdict*

Good print quality, with real portability and versatility, make the DeskJet 320 a real winner.

Price £229 (approx.)
Contact Hewlett Packard 01344 369222

Corel Ventura 5.0

After eight months' use, AR Landall finds the latest incarnation of Ventura "a brilliant product with some amazing flaws". Intrigued? Read on.

8 TEST **MONTHS**

I've always had a love-hate relationship with Ventura. I don't use it every day, but I do use it regularly enough to have got used to many of its little foibles. In fact, it's certainly easier to use than its reputation suggests. I've always liked the frame-based approach, which allows easy and powerful integration of graphics and text. Version 5.0 is a major upgrade and the first real step forward for years.

A good deal of effort has gone into making the program competitive again, and it shows — it feels much more like a true Windows application. Many of the facilities that users had demanded are now there: the ability to override paragraph settings; a usable text flow around graphics; vastly improved editing;

The Jekyll & Hyde Ventura 5.0 is good and bad in equal measure

rotation of text; the ability to move objects onto the Pasteboard; the abolition of width tables; and an up-to-date 3D interface with tabbed dialogue boxes etc. There has also been a general "Corelising" of the product, including a plethora of useful roll-ups.

Many of the niggly things have been addressed too, such as a Whole Word Only option for Search and Find and an Undo feature that actually works. There's

also the ability to move files rather than just copy them. The spell-checker, though, is still caught out by Ventura's own markers! And there's no UK English option either.

But once past the shiny new interface, I soon discovered that, despite the delay in shipping, this release was rushed out too soon — there's a definite incomplete feel about it. For a start, certain illustrations in the manual don't match what appears in the program and some of the information is clearly inaccurate. For example, the manual says: "Tip: You can expand the Refs & Markers list by dragging the roll-up's bottom border downward." Oh no you can't. There's no re-sizeable border and the picture of the roll-up is different from that in the actual program. (This is also true for the Manage Publication dialogue box.) Although not a major problem, it doesn't inspire confidence. And annoyingly, although Ventura can import Word 6.0 documents, it saves them in Word 2.0 format. This can create problems if you re-open them in Word and save them again.

Ventura is also one of the most unstable applications I've got. This aspect of the program hasn't improved much, and it falls over far too easily despite its voracious appetite for memory. I save my work regularly.

The publication metaphor is developed further in this release and you're forced to use it, because all files are now saved in *.pub format. Every publication file contains one or more chapters (*.chp) and you can add or delete chapters as you wish. It works reasonably well and you soon get used

to the idea.

But Ventura doesn't go out of its way to be helpful. Astonishingly, you can't choose to print all odd or all even pages for a multi-chapter publication; you're forced to do it a chapter at a time. This is a problem if you don't have a duplex printer and want to print on both sides. Nor can you set the auto-numbering feature to work automatically across a publication — the start number has to be set manually for each chapter, which is a pain.

On a more positive note, one of my favourite features is the booklet format. I love it because it makes the production of A5 booklets, which is the main reason I use Ventura, so much easier. It allows me to choose an A4 base page and produce a folded A5 booklet. All the page numbers, headers and footers appear in the right place. Laying out and formatting a booklet manually can be a real nightmare — this is just the sort of thing computers should be harnessed to do, and it's a tremendous productivity boost.

However — and this illustrates my point about the incomplete nature of the package — where printing is concerned, Ventura shoots itself in the foot. A booklet is printed in sheets rather than pages: each sheet containing four different pages, two on each side. But you cannot specify "print all back", "print all front" or "print sheet x", and this is a serious oversight. There are workarounds, but it's far from satisfactory.

So the love-hate relationship continues, but perhaps more love than hate these days. It's a brilliant product with some amazing flaws. But at least Corel seems to have a vision for Ventura which had previously been sadly lacking.

PCW*Verdict*

Not perfect by any means, but a great package nonetheless.

Price Full product: CD £349; Disk £395. Upgrade £79
Contact Corel 0800 581028

Visual Basic 4.0

The long-awaited Visual Basic 4.0 is here, having been delayed along with Windows 95. Tim Anderson looks at the latest beta and finds substantial new features.

The original Visual Basic (VB) introduced a new way in which to program. Those not won over by its captivating visual interface were wooed by its support for VBX components, on offer from countless third-party vendors.

When version 3.0 added a built-in database engine borrowed from Access, VB's momentum became unstoppable. But that was two and a half years ago. A VB-like interface is now commonplace in development tools, and developers have become frustrated by the slow performance of VB's interpreted Basic, and with its lack of support for power features like pointers and call-backs. Borland's Delphi supplies all this along with a true object-orientated programming language, leaving Visual Basic under pressure to compete.

Delayed along with Windows 95, Visual Basic 4.0 finally delivers Microsoft's answer. But those hoping for a native code compiler, or fuller object orientation, will be disappointed: instead, VB 4.0 majors on support for OLE 2.0 and Windows 95, and provides new features for client-server database development. At first glance, it seems that Microsoft has been more concerned to promote its new technologies than to provide what the VB development community has been demanding. But closer investigation reveals substantial technical advances over VB 3.0.

On the surface, Visual Basic 4.0 looks much like older versions. But looking deeper, the menu structure has changed, with the old Debug menu now part of Tools, an Insert menu for adding forms and modules, and a new Add-ins menu.

VB 4.0 comes in two flavours. The 16-bit model runs on Windows 3.1 as well as Windows 95, and supports both VBX and 16-bit OCX controls. Since the standard edition of VB 4.0 doesn't include the 16-bit version, Microsoft clearly wants to promote the 32-bit edition which runs only on Windows 95 or NT and uses 32-bit OCX only; no VBX controls. It adds a number of extra features including a toolbar control and a rich-text edit control for the display of formatted text. These encapsulate elements added in Windows 95 and NT 3.51, so there is no chance of them working with earlier versions of Windows.

Versions of VB have proliferated to the point of confusion, with the old Standard/Professional split continuing and a new Enterprise edition for client-server development. Despite the superficial resemblance all these VB variants are greatly changed from version 3.0, using Visual Basic for Applications technology to bring them into line with the language first found in Excel, and eventually migrating to all the Microsoft Office applications.

VB 3.0 was extensible primarily through VBX controls. With Office 4.0 came OLE automation, enabling objects in other applications to be assigned to variables in a VB application and controlled through properties and methods. For example, an Excel spreadsheet could be opened, modified and saved.

Visual Basic 4.0 takes OLE technology further, integrating it seamlessly into the development environment. A custom control dialogue lists all the OLE insertable objects and OCX controls available on the system, and those which are checked appear in the VB toolbox. Once you get over the thrill of seeing Excel sitting on your VB form, you may wonder whether you really want to use a 4.5Mb custom control in your application. But the integration is impressive. Visual Basic's development environment is itself now an OLE automation object, which means add-ins and wizards are easy to create and will no doubt proliferate.
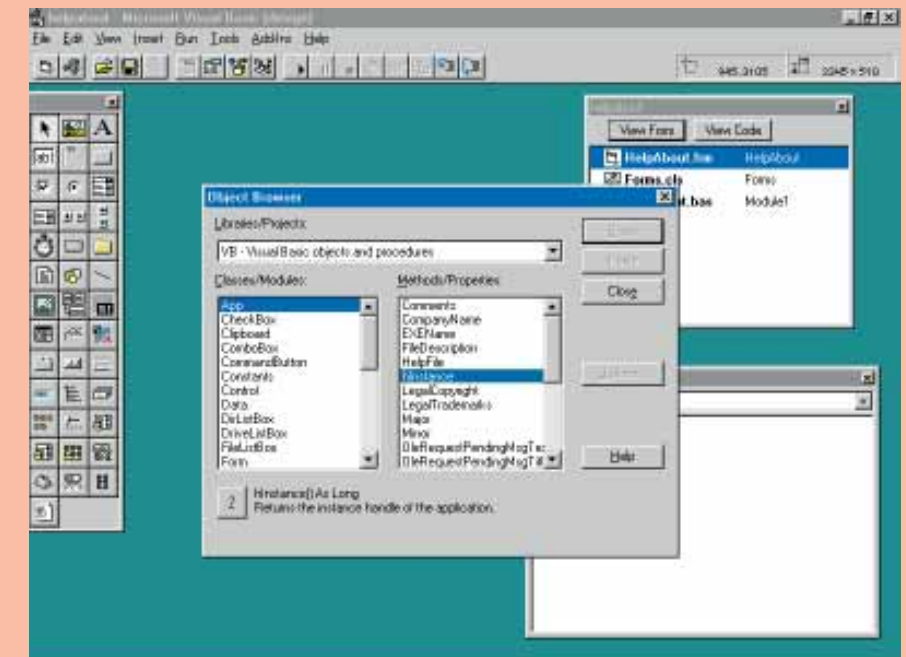
Familiar through Excel and the Office Development Kit, the Object Browser

Visual Basic and Objects

VB has moved closer towards object orientation but is still more accurately described as object-based. There is a new kind of module, a class module, in which you can create custom object types with their own properties and methods (though not events). This certainly makes it easier to code well-structured applications, but as an object model it's feeble, with no support for inheritance, polymorphism or operator overloading. In one sense this leaves Visual Basic seriously behind the times when other languages like Delphi, Visual dBase and Microsoft's own Visual FoxPro offer much fuller object-orientation. But there is a philosophy behind VB — it is the philosophy of components and of OLE 2.0. Microsoft

Creating an OLE Automation Server

OLE automation is VB 4.0's big new feature. This demonstration shows how easy it is to create an OLE server that will work with any OLE automation client application. At the moment these are limited in number, but since Microsoft is making it a key feature of Windows, it looks likely to be supported by most Windows applications and development languages before long.

Our Visual Basic 4.0 beta came supplied with sample code to display an About box, but we thought we should give a more useful example. The OLE server that follows is for any application that requires access to an address database. It enables you to select a name from a scrolling list, and returns the full address to the client application. The sample database contains around 10,000 names.

*The project begins much like a VB 3.0 application, with a form, a data control, and (new to VB 4.0) a data-bound grid. The bundled data grid is made by Apex, developers of True-Grid. By setting properties, the data control is bound to an SQL query (in this case, "SELECT * FROM CUSTOMER ORDER BY SURNAME"), and the grid is bound to the data control. Code in the click event of the OK button assigns the current address to global variables, so it can be accessed by other modules in the project after the form has been unloaded*
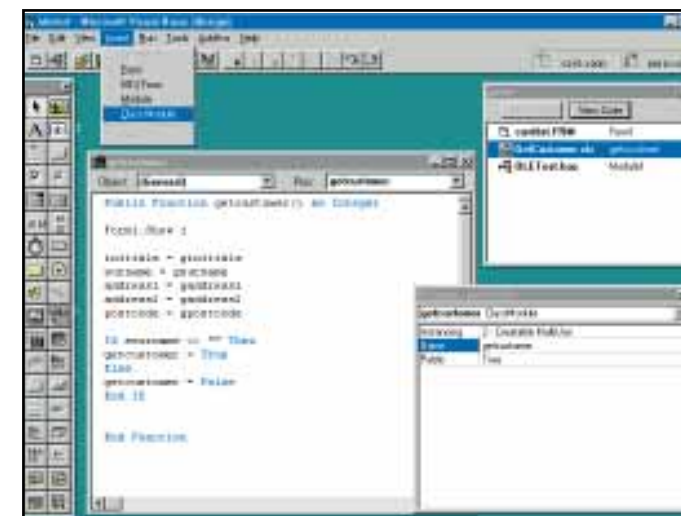
There is a new kind of module in VB 4.0, called a class module. Class modules enable custom object types to be defined in VB, with their own properties and methods. They also support two events, initialise and terminate. To make a class into an OLE automation object requires several steps. Each class has three built-in properties: Instancing, Name, and Public. The Instancing property must be set to Creatable (either Multi use or Single use). Then, the Public property must be set to True. Finally, the Name property determines the name of the resultant OLE object. That done, any variables declared as Public in the class module become properties of the OLE object, and any Public procedures or functions become methods. You can also define private properties and methods to hide the internal workings of the object. This is encapsulation. The function shown displays the data access form, and copies the current customer details into public class variables, so they are exposed to client applications

The Visual Basic interface is outwardly little changed in version 4.0, but with OLE automation far more extensible

Now at version 3.0, Crystal Reports for Visual Basic is greatly improved over the old VB version

argues that the main purpose of object orientation is reusable code, and that VB offers this reusability with its support for OCX components, OLE automation, and now a new feature — native VB OLE servers.

A common gripe among VB developers was the inability to create DLLs. You still can't, at least not in the old sense, but VB 4.0 offers an alternative which is to create an OLE automation server. This allows you to expose properties and methods to any application able to be an OLE automation client *(see panel, "What's new...", page 100).*

Since VB applications can be both client and server, this opens up interesting possibilities for VB developers to create specialist OLE components that can either be linked together, or with non-VB applications, to form custom solutions. Unlike a C++ or Delphi object, useful only at development time and in its own native environment, an OLE object library is continually available to the entire Windows environment — in some circumstances, even across a network. The argument has some force, although the old-style DLL offers much of this functionality together with the added speed of fully-compiled code. OLE imposes a performance penalty, and when you add the further penalty of VB's runtime interpreter, it is clear that a VB OLE server will not perform briskly. That would appear to sum up VB's new OLE capabilities: a hugely impressive concept, but
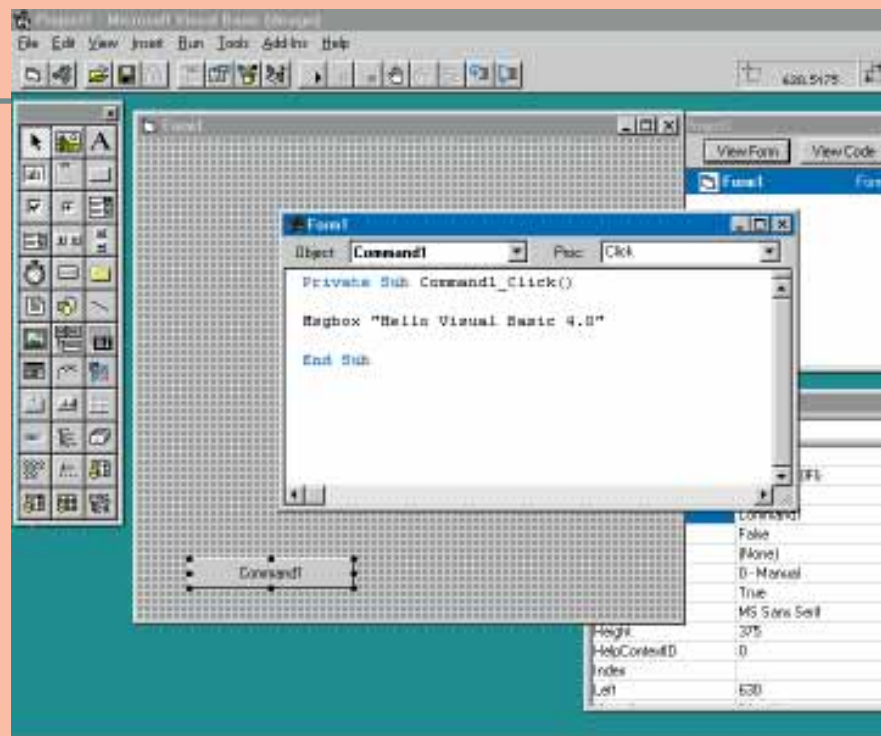
with serious question marks over its real-world usefulness.

Visual Basic and databases
Visual Basic 4.0 will delight database developers. VB 3.0 offered programmatic control of most of the features of the JET database engine, but not all — the ability to set up security or enforce referential integrity was missing. VB 4.0 introduces a new data access objects (DAO) interface that overcomes these problems. Even new features of JET 3.0 (like database replication) are supported in Visual Basic.

Existing VB developers will find DAO familiar since the underlying model is similar to version 3.0 which had dynaset, snapshot, and table objects. The new model is tidier, with a single recordset object that can be of any of the latter three types. Several new objects are available, each with appropriate collections, properties, and methods: DBEngine, Workspace, User, Group and Relation.

DAO is great, and builds on VB 3.0's database capabilities to offer comprehensive data management based on SQL,

but easily applied to local databases. The new DAO means that old VB 3.0 code will not run without changes. This can be overcome through a compatibility add-in which allows the old code to work against the new JET engine. But a better solution is to rewrite those bits of code which no longer work — the changes are trivial to make.

Some long-standing niggles have been removed. For instance, the data control can now be pointed to a table and has an index property that works; the bound controls include a data grid; and

the manual contains a helpful chapter entitled "Writing SQL Queries". Reporting is via an improved version of Crystal Reports which can now be bound directly to a data control, although Microsoft points out that VB developers could also consider driving the new Access 7.0 report writer through OLE automation.

VB 4.0's Enterprise edition is aimed at the client-server developer. One of the problems with Visual Basic 3.0 was that it forced a choice between easy but slow access to SQL servers through JET, or

much improved performance through direct ODBC calls that were arduous to program. The direct ODBC route may still have advantages, but there are now two other options. The Remote Data Control is an ODBC-based data control which bypasses JET, but still works with all VB's data-aware components. Better still, a new Remote Data Objects (RDO) interface is a wrapper for the ODBC API, making it substantially easier to program. Microsoft describes it as "Performance tuned for SQL Server 6.0 and Oracle 7." RDO offers several key features for client-server development such as control over server-side cursors, and the ability to limit the number of rows returned from a query. The Enterprise edition also includes a customised version of SourceSafe, and the ability to create remote OLE automation servers *(see panel).* First impressions are that VB 4.0 is far better suited to serious database development than its predecessor.

OLE with everything?
Visual Basic 4.0 has clearly defined strengths and weaknesses. VB developers who are not interested in either OLE or database work will be disappointed.

Creating an OLE Automation Server (continued)

Using project options, the OLE server option is selected. The project name, new in VB 4.0, will be the library name containing all the OLE objects in the project. A description can

be entered, to appear in OLE class browsers. Note that OLE servers' projects are almost always set to start up from Sub Main, and not from a form. This is done here, even though Sub Main is empty, so that the project compiles correctly
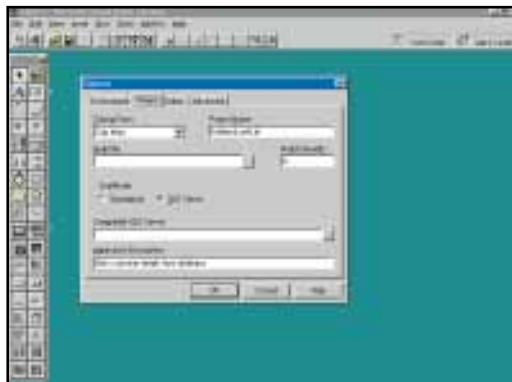
VB 4.0 has two compilation options, "Make Exe" and "Make OLE DLL". Either can create an OLE automation server, the difference being that .EXE servers are out-of-process servers and .DLL servers are in-process, which run in the same process as the client application for greater speed and efficiency. You cannot create DLLs with the 16-bit VB 4.0, although you can still create OLE automation EXEs

Over in Excel, the VB OLE Server has magically appeared in the list of "References", OLE objects accessible from Visual Basic for Applications. When it was compiled, VB put the necessary information into the Windows registry (a

corrupt registry is the dread of OLE programmers). A short piece of VBA code in Excel creates the object, using the project name and class name set in VB 4.0. The routine gets a customer address and inserts it into an Excel worksheet
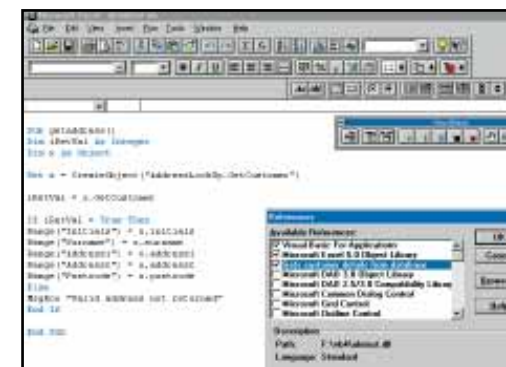
Finally, the OLE server is put to work: a button in Excel calls the VBA routine, and the VB form pops up over Excel. Once selected, the address appears in the Excel spreadsheet. This is especially impressive when you consider that the VB application itself contains an OLE object; the data grid OCX. The ability to create OLE servers substantially expands VB's usefulness.

Excel can literally be treated as a VB custom control if you don't mind your application running like a slug

The Code Profiler is both useful and a good demonstration of what can be achieved by add-ins

What's new in Visual Basic 4.0

● New architecture uses Visual Basic for Applications engine
● Development environment extensible via add-ins and OLE automation
● Conditional compilation with #IF ... THEN ... #ELSE
● Line continuation character in code
● Menu and toolbar negotiation for in-place OLE editing
● Class modules for custom VB objects
● OLE controls (OCX) replace VBX format
● New Collection data type
● Property procedures
● Forms can have public properties and methods
● Use insertable OLE objects as custom controls
● Data aware grid and list controls

Professional Edition
● Separate 16-bit and 32-bit versions
● New Data Access Objects with full control of JET database engine
● Windows 95 controls, including rich text edit control
● Create OLE automation servers
● Code profiler
● Full programmatic control of JET
● Resource compiler works with standard Windows resources

Enterprise Edition
● Remote Data Control
● Remote Data Objects for fast SQL server access
● SourceSafe for team development
● Create remote OLE automation servers

Performance is no better, the core language not much changed, and power programming features like inheritance, pointers and call-backs are still absent.

It is primarily a product for 32-bit Windows, and judging by Microsoft's half-hearted attitude towards 16-bit VB 4.0 (omitted from the Standard version), it may be wise to stay with VB 3.0 for 16-bit programming and enjoy a runtime DLL one-third of the size. But Visual Basic remains the easiest way to program for Windows, and that, combined with presumed strong third-party support for OCX components, endows version 4.0 with a substantial attraction.

From the point of view of Database development, it addresses many of the frustrations of version 3.0. Although lack of object orientation is a disappointment, in every other respect VB stands up well as a database development tool against specialist products like dBase, FoxPro and PowerBuilder.

Finally, there is OLE and the possibility of creating universal Windows components without stepping outside the safe environment of VB. It's a great concept, but one which depends on OLE becoming a dominant standard and which will only come into its own when and if 32-bit Windows becomes the norm. The ability to create OLE servers is likely to appear in competing products soon. There's plenty of choice among Windows development tools, and Visual Basic is settling into a new niche, for database development and as a high-level language to drive Windows. It has its place, but for general development does not look as good against the competition as it did two years ago.

PCW *Details*

Standard Edition
32-bit Visual Basic with basic controls only.
Professional Edition
32-bit and 16-bit Visual Basic with additional controls and full database programming.
Enterprise Edition
The Professional Edition with remote automation technology, remote data control and remote data objects, SourceSafe for team development.

Prices Not available at the time of writing.
Contact Microsoft 01734 270001
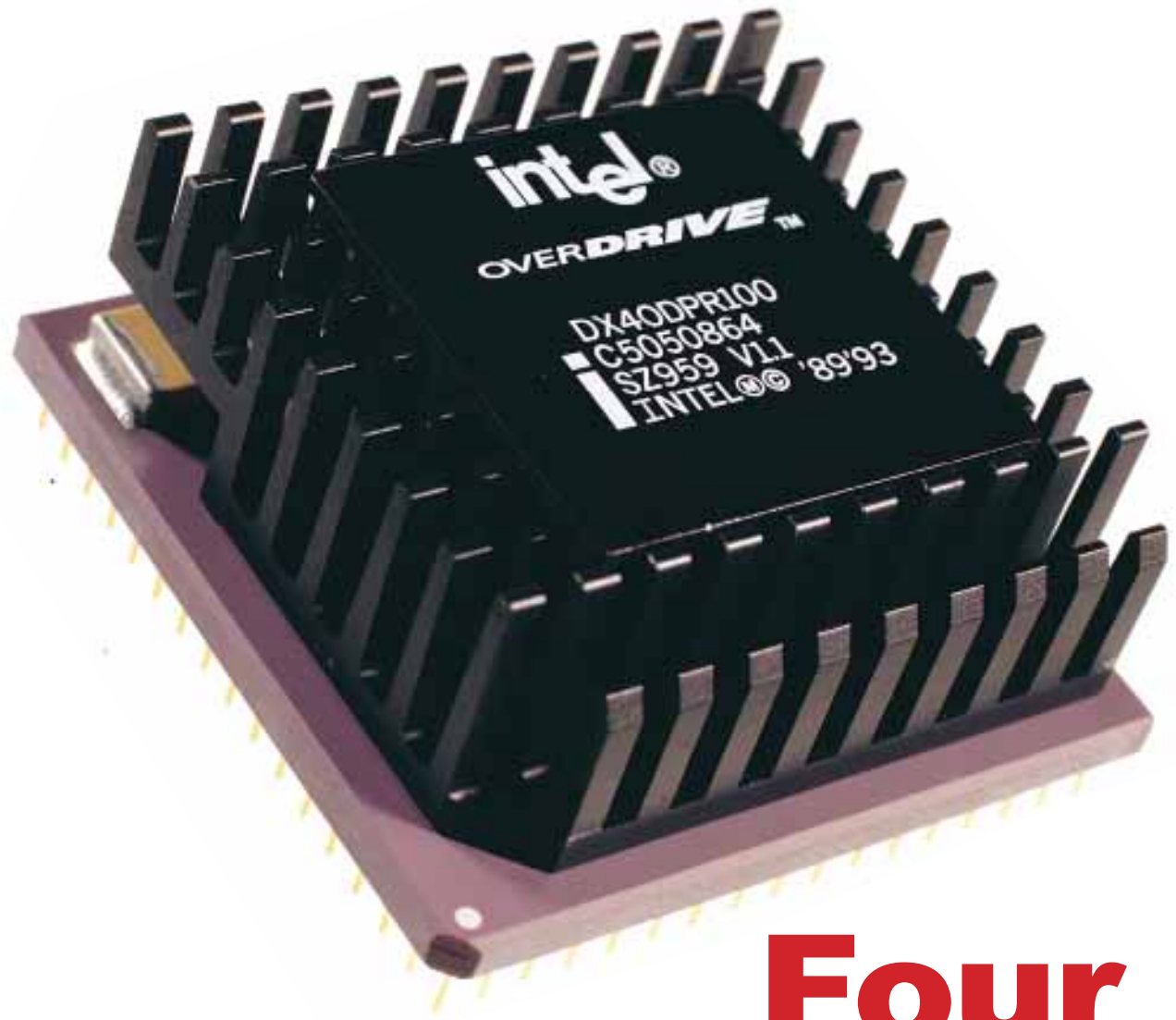
Four your Pleasure

Intel intends to end production of the 486 to make way for the Pentium, so there are DX4-based bargains to be had now. But are they worth buying, or can you upgrade performance by adding the DX4 overdrive chip to your existing system? Nick Lawrence investigates.

No matter how much the desktop PC market changes and how fast computers become obsolete, it seems that there are always three price points dictating the performance a user will get. £2,500 will always buy somewhere near the latest and greatest — usually involving a chunky mark-up for the privilege of owning such a cutting-edge slab of silicon; £1,500 tends to be the right price for users who want something fast that won't get left too far behind over the next couple of years, but who don't want to break the bank.

At the £1,000 point things become interesting for the home market. Compared to most home electronics such as videos and TVs, £1,000 is a lot of money to spend, even more once VAT is

taken into account. But the latest speed demon is generally out of the price range of the average home user, and ironically, the kind of applications run in the home are often more demanding than standard office applications. The latest games and CD-ROM releases tend to need more power and memory than the average spreadsheet or word processor.

Intel is starting to ramp down production of the 486 family, partly to make way for Pentiums and the forthcoming P6, and partly to try to kill off the market for its competitors such as AMD and Cyrix. By the beginning of 1996 Pentium is likely to be the entry level, but in the meantime there's a great opportunity for users with an eye for a bargain to pick up DX2- and DX4-based PCs at rock-bottom prices.

Which 486 should I buy?

In the current market we wouldn't recommend buying anything under a DX2/66, and even these, though still serviceable, are not a very future-proof deal for those buying new. DX4/75s are not as good a compromise as they seem because their board speed is 25MHz, which means that your peripherals will run a little more slowly than they would if you picked a 66 or 100, which are both based on a 33MHz board speed. DX4/100s are the class with the performance required for games and business usage; their price tag of around £1,200 at the time of writing may well have dropped to the magic £1,000 mark by the time you read this.

If you choose to skip the 486 market and jump directly to a Pentium, go straight for a P75 and miss out the P60 and 66 processors. Partly because of the overheating problems that afflicted many of the earlier P60s and 66s, but mainly because a well-specified DX4/100 will outperform both of these in many applications. You may also want to consider AMD's 120MHz 486, which we have not yet been able to try out for ourselves but which looks like a good performer at a reasonable price.

What many new users fail to realise is that it is not just the class of processor that makes a difference. The amount of memory and L2 cache you have are perhaps two of the most important factors in the speed of your system, along with the type of graphics acceleration, the speed of your hard disk, and a thousand other factors. A DX2/66-based system can outperform a DX4/100-based system if the components in the former are of much higher quality than those in the latter. For example, one vendor is rumoured not to

supply customers with L2 cache unless it is specifically requested and the customer pays more, which makes its systems look particularly cheap but they perform particularly poorly.

For this reason, we have asked for what some may consider a high specification for the class of processor involved: 8Mb RAM, 500Mb hard disk, 15in monitor, 4X CD-ROM drive, 16-bit sound card, and extras such as speakers and bundled software. We left the specification more flexible than usual, with the proviso that the machine should be suitable for games and light business usage in the home, rather than it should match the specification exactly.

For those with good overall systems but a lower-end 486 CPU, upgrading could well be a viable option. We have therefore also looked at two Overdrive processors, one from Intel and one from AMD, to examine their respective performance.

Adams Accura Value 486MM

Adams Technology, winner of our recent

P90 group test, has elected for a tilt at the budget end of the market. At £1,199, this is the cheapest system here.

The case opens easily with a thumb-screw, to reveal an ABIT motherboard on the left which takes up a smaller space than many. It uses the SIS 85C496 chipset, but despite having two EIDE channels on board misses out the other I/O functions. These are supplied on a separate card in an ISA slot. This uses a Winbond chipset to control the floppy drive and serial and parallel ports. Adams has put the hard disk on one of the EIDE channels on the motherboard rather than using the controller on the card, which would have been much slower.

An advantage of having three IDE channels is that you could support up to six devices, of which three or four could be hard disks and the others, a CD-ROM and a tape drive. There is room for another internal 3.5in device and another front-facing 5.25in device, although it's unlikely that so many devices would be needed on a machine intended for games.

The graphics card, a Number Nine FX Vision 300 with 2Mb of RAM, will provide all the graphics performance required, and the 15in ADI monitor provides a clear picture with MPR II power-saving features. Sound comes courtesy of the Creative Labs SoundBlaster 16 Pro, which is best suited to wave files rather than MIDI, and though the speakers are little 5 Watt Labtecs they can put out enough sound to keep the kids happy while playing Descent.

The CD-ROM drive is an ever-popular Toshiba XM5302B, the quad-speed model included with all four systems here. Read/write storage is provided with the 500Mb IBM hard disk drive.

Adams can supply either Windows 95 with Novell PerfectWorks and a bundle pack of five CD-ROMs, or Win OS/2 Warp 3.0 with the Bonus Pak and Lotus SmartSuite for OS/2. Whether the former's support for games is all that Microsoft would like it to be remains to be seen, but this system is well suited to the games player ready to move up from the Nintendo to a proper computer.
Price £1,199
Contact Adams Technology 0161 877 8822

Armari Rocket II EDRAM DX4-100

Armari is the only supplier we know of in the UK with an EDRAM machine. They are more widely available in the United States and some more technical users are kicking up a big fuss over their performance. EDRAM refers to (yet another) new type of memory which offers 15ns performance in main memory. In fact, it has been around longer than pipeline burst synchronous cache and EDO RAM, but has yet to hit the big time in the same way.

EDRAM offers big performance increases over standard machines, but there are penalties: a specific chipset is required which restricts the choice of motherboards; that chipset, the Opti Blackhawk, supports only VESA and not PCI. VESA cards are on their way out, and although it's still possible to buy them, it puts a question mark over the system's long-term prospects. Also, there are few suppliers for the RAMTRON memory this system uses; and there is no Pentium chipset which supports EDRAM, and there will be none until the end of the year.

The system has two cards which use the VL-bus architecture: a Diamond Stealth 64 DRAM with 2Mb RAM, and the I/O controller. The latter is a CMD 604 with the ability to support up to Mode 5 EIDE on both channels, although Mode 4 is the highest speed of hard drive we have seen, with the ability to transfer 16Mb/sec in burst mode. A Quantum Fireball using Mode 4 is supplied as the 500Mb hard disk. A DTC 2278 will have been supplied instead of the CMD card by the time you read this.

The other component which is destined for replacement is the Toshiba XM5302B, and this is due to become a Pioneer unit from the beginning of September. The Pioneer has a 150ms access time, rather than the 190ms of the Toshiba.

A SoundBlaster AWE-32 is the best card for MIDI musicians because of its support for WaveTable sounds, and it has been included here. It is also great at playing sounds from games, which it can pump out through the Typhoon speakers at 10 Watts per speaker.

Expansion is catered for with the single free VESA slot and the four free ISA slots for expansion cards. RAM can be mixed between EDRAM and FPM DRAMs (standard memory), which both come in 72-pin SIMMs. As supplied, one of the four SIMM slots is filled with an 8Mb SIMM.

This system is one for the more adventurous and technical user on a budget. If that fits your description, this is well worth a look.
Price £1,399
Contact Armari 0181 810 7441

Compaq Presario CDS942

Compaq is the only supplier to put its system in a tower case; it is the same as can be found on the Prolinea we had for our P90 group test last month. Both sides open with the aid of three thumbscrews, and a very neatly laid out interior awaits the user.

On one side there are five ISA slots, two EIDE connectors, a floppy disk connector and a lot of empty space. On the other is the main system board, containing six unfilled SIMM slots (the 8Mb RAM is soldered directly onto the motherboard), an empty cache-on-a-stick socket, a Cirrus Logic GD-5434 graphics chipset and an AMD processor running at 90MHz rather than the usual 100MHz. There is also an ISA slot which has been slightly modified to take proprietary Compaq cards such as Ethernet.

The sound is integrated onto the board, using a SoundBlaster-compatible ESS chipset. It goes out through 4 Watt Labtec speakers.

The Compaq's setup is a little strange: when you turn it on, it comes up with a software setup screen which asks you for your name and company and then proceeds to spend nearly two hours setting up your software for you. This could easily make it very frustrating when you get home with a new PC and promise the kids that they can play Doom as soon as you set it up, only to find you have to wait while the PC appears to go mad, flashing up images and rebooting every couple of minutes.

The software supplied is pretty decent however, consisting of Works for Windows, Money, the Microsoft Entertainment Pack, Encarta, Dorling Kindersley's The Ultimate Human Body CD, Tabworks, and some proprietary software to take care of the Presario under Windows. There is also a free upgrade to Windows 95.

Unfortunately, this PC's performance was very poor indeed. Its lack of speed can be largely attributed to its lack of L2 cache, although the poor disk performance is probably due more to the small size of the hard disk (420Mb) and the inverse of the rule that the speed of the hard disk increases with its size.

Compaq is a supplier of great repute so it is a shame that there are such flaws in the design of this home-based PC. Nevertheless, it will have a large and well-deserved market among those who value the security of the Compaq brand name.

Price £1,361 plus upgrade from 14in monitor (around £100)

Contact Compaq 0181 332 3000

Dan Premium 486

Dan Technology has risen in only a few years to become one of the foremost British PC suppliers, and one of the most recognised brand names around. In this desktop case there is an ASUSTeK PVI-486SP3 motherboard. The great oddity of this SIS-powered board is the combined PCI/ISA slot which features in the middle of the board; this is
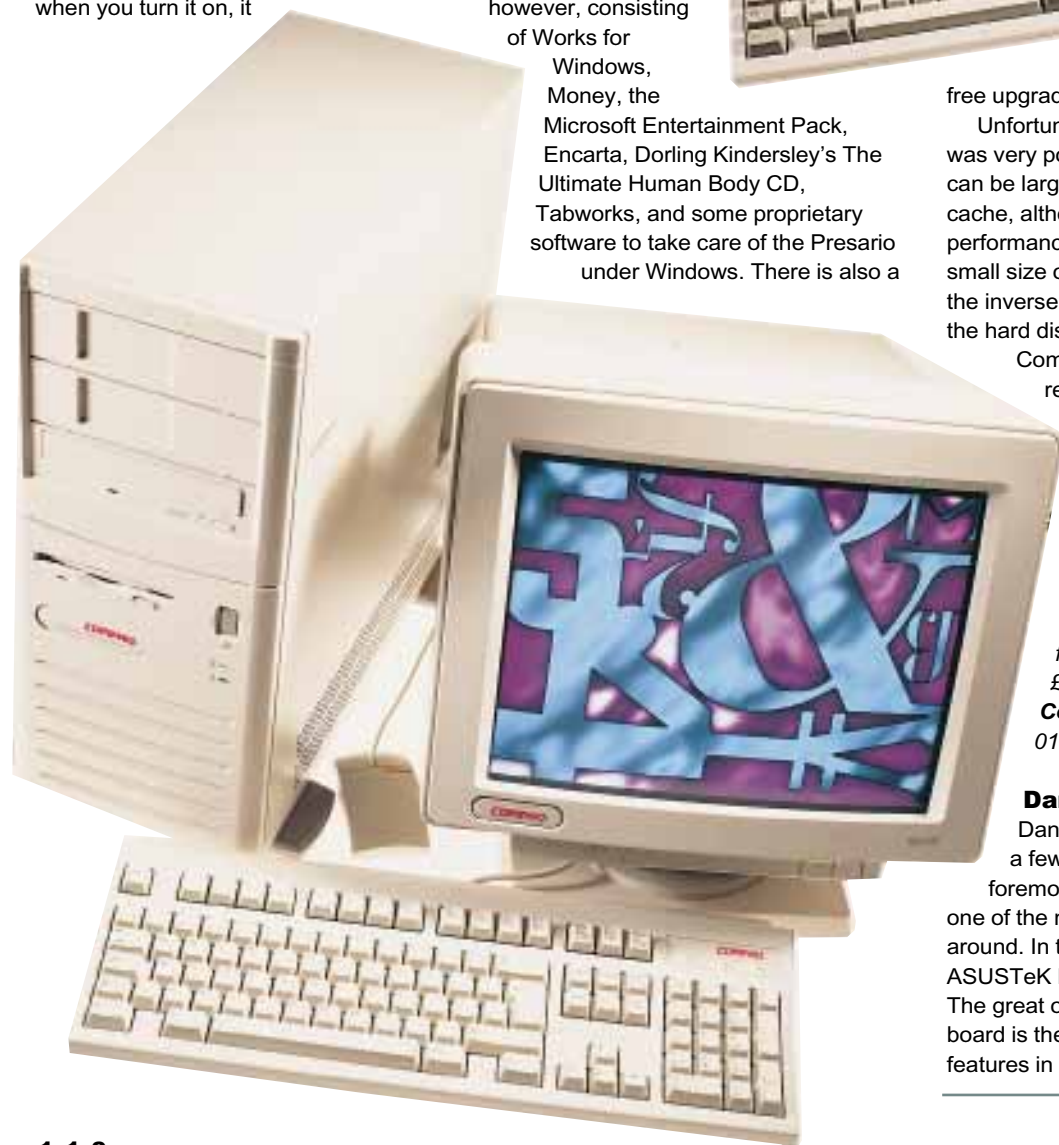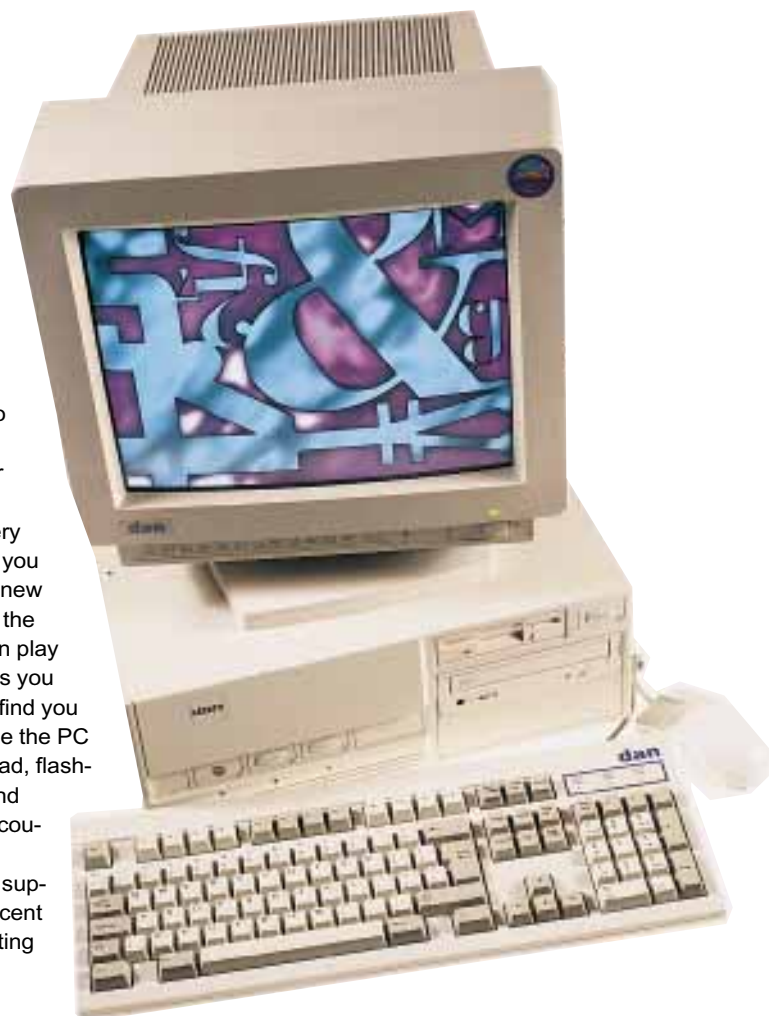
a proprietary slot that can be filled with forthcoming cards from ASUSTeK. We have heard about but not yet seen the first of these, a combined sound and graphics card with an S3 Vision868 (the same chip used in the Diamond Stealth 64 VRAM) powering the graphics, the Creative Labs Vibra 16S audio chipset, a Yamaha OPL3 synthesiser, a WaveTable upgrade, Plug and Play compatibility and 2Mb EDO RAM.

The cards currently surrounding the AMD DX4/100 processor are a Diamond Stealth 64 DRAM graphics card using the S3 Trio64 chipset, and a SoundBlaster AWE-32 sound card, at the top of Creative Labs' soundcard range due to its support for downloadable MIDI sounds to use with its WaveTable capabilities. Two PCI slots and two ISA slots, as well as the proprietary slot which can be used as a PCI, are available for expansion.

The Toshiba XM-5302B 4X CD-ROM drive has its own IDE channel, and the 80 Watt speakers should be more than loud enough for any game or audio CD. A CTX 15in monitor, the usual offering

from Dan, is clear with good resolutions.

If you use a lot of bundled software, Dan computers have a good offering. On top of the usual DOS/Windows combination (which will have changed to Windows 95 by the time you read this) a Lotus bundle and a Microsoft bundle combine to give you SmartSuite and Office together. It is unlikely that you will need both, but it is good to know that you have the option. Various other software, including games, is thrown in.

With a score of 3.58, this machine comes in between its direct competitors Adams and Armari. Its price tag of £1,448 makes it expensive compared with the other systems, but the components are high quality and the bundled software will make a big difference for many people.

Price £1448

Contact *Dan Technology 0181 830 1100*

Conclusion

The four systems supplied here appeal to different sectors of the market. The Adams Accura is best for the real budget end of the market, with its low price tag

and good support contract. The Armari Rocket II is much more suitable for those who understand chipsets and motherboards and are willing to take the plunge with something unusual. The Compaq Presario is for those who like to play it safe, while the Dan Premium is a good all-round system.

For those contemplating the upgrade to DX4/100 from the 33 (or indeed from 25 to 75) the performance gains are dubious. The price tags are pretty hefty for the performance increase, casting the benefits of the Pentium Overdrive (and the P6 Overdrive for Pentium systems) into even more doubt as the law of diminishing returns kicks in. Unless you have a particularly well specified system , you will have to weigh up the performance increase against the possibility of putting that money towards a more up-to-date system or even just more RAM, which for users with under 8Mb may prove to give better performance gains.

Together, the systems and processor upgrades here conspired to prove one point to us: the 486 may be wheezy, but there's life in the old dog yet.

Intel and Kingston Overdrive Chips

What about those people with perfectly serviceable but ageing 486SX and DX systems; is it worth the upgrade to 100MHz? We took an Intel DX4 Overdrive and a Kingston Turbochip and slotted them into a standard DX33 system.

The system we used for benchmarking was an IBM 433DX/sp, released from its usual duties as one of our printer-testing machines, to make the existing setup as realistic as possible. It features an on-board S3 464 chip with 1Mb RAM for the graphics, 8Mb RAM (knocked down from the usual 16Mb to make it more realistic), and a 500Mb hard disk on EIDE partitioned into three with the primary boot sector taking 120Mb. The processor was in a ZIF 3 socket, which made releasing it as easy as pulling a lever. The hard disk mounting casing had to be removed from the computer's chassis before we could get to the processor, but this is not an arduous task; only requiring the removal of three screws.

If you have a 25MHz-based system rather than a 33, you will not be able to get 100MHz performance but will have to stick at 75MHz by buying a different chip. The DX4, despite its name, is in fact a clock-tripler rather than a quadrupler. Luckily, our system was a DX33 so we were able to get the maximum potential out of the 486-class family: only an AMD 120MHz upgrade chip

could have pushed it further, and we have so far been unable to get hold of one.

The Intel chip comes in a simple flat pack, with a heatsink adhering to the top and a couple of sundry chips between the chip and a raised part of the heatsink. It fits easily into the socket and requires no jumpers to be changed on the motherboard. The Intel Overdrive Upgrade Guide provides a large quantity of reassuring-looking charts measuring iCOMP performance, but anyone with experience of different benchmarks knows that these are based more on Intel's marketing strategy than on real-life performance.

The only difference in the installation procedure with the Kingston model is the height of the chip, which may cause problems if you have an expansion card which reaches over the processor slot. For those people with ZIF levers which reach right over the processor, which wouldn't otherwise fit due to its height, there is a way around the problem with a pin extender, which allows the lever to close, into which the processor can fit.

At least part of the height is due to a fan on top of the processor, which some would argue is not strictly necessary. Nevertheless, it is good to err on the side of caution, especially if you intend to overclock.

The results of the performance tests are interesting. The Intel's 16Kb cache, as opposed to the 8Kb on the AMD chip inside

the Kingston packaging, makes for a performance of 1.89 against the Kingston's 1.52 (the benchmark IBM machine scored 1.34, and these results are all measured against a score of 1 for an Apricot XEN-PC with 8Mb RAM).

The only reason Intel's competitors have set up is to supply the same type of chips at a cheaper price, so it comes as a surprise to see the price of the Kingston at more than that of the Intel (a street price of £199 against £180 respectively). Considering the relative performance and reputations of the companies, the Intel chip does look like a much better deal.

The real question, though, is whether it is worth upgrading at all. Although the increase in performance of the Intel Overdrive over our standard DX33 looks small, it works out at a 50 percent increase in system speed while running everyday business applications. Whether this is enough of an increase to justify the price is debatable, and certainly it would be a good plan to try hacking and slashing the amount of TrueType fonts in Windows, defragging your hard disk, and other more mundane measures before forking out.

Price Kingston: street price £199.
Intel: street price £180

Contact *Kingston: Datrontech 01252 303500. Intel 01793 696000*

Windows 95:

today's specials

By the time Windows 95 launched on 24th August, the first applications were already starting to appear. In this article we preview some of the first Win95 apps to arrive in the *Personal Computer World* office.

Microsoft has bet the farm on Windows 95 and so the developer community has been stirred to produce the widest possible range of applications. To promote those programs which fulfill the remit of being true Windows 95 programs Microsoft has instituted the "logo programme", whereby any program which is truly a Windows 95 program can be submitted to Microsoft, it will be tested to ensure that it meets the criteria — long filenames, OLE 2.0 support, the correct presentation of icons and file handling — and if it does, the manufacturer of the software can put the "Windows Compatible" logo on the box.

Microsoft has worked hard internally, producing compatible versions of nearly all its own products including Works and the newly acquired Autoroute. It has worked with friends like Visio and with old rivals such as Philippe Kahn, formerly of Borland and now of Starfish. Even new names on the scene like Xara have benefited from Microsoft support. The result is a well-rounded collection of applications ready to fill your hard disk.

Visio 4.0

Ten disks show how much Visio has grown since it was a simple drawing program. In fact, it has grown so much that

Visio 4.0 will have a sibling, Visio Technical, which takes some of the more vertical applications of the software, such as electronic schematics and process control, out of the mainstream and into a special version. This will be available in the new year after a thorough programme of Europeanisation. The American version of Visio Technical ships, over there, with this new version.

All the major software houses claim to work closely with Microsoft, but more than anyone else Visio Corporation seems to have the ear of the software giant. The result is a program which feels more like a Microsoft application in the Office mould than either Works or Autoroute; and similarly, Visio 4.0 offers more discoverability and a number of Wizards.

There is a new spell-checker which uses the Microsoft-compatible dictionaries, and a number of changes which have come about as a result of an extensive Visio 3.0 wish-list. Freehand drawing has had splines added, layers replace the system of pages, and a user-definable snap-to grid replaces the system where Visio decided the size of the grid. With a nod to Visio's capabilities as a presentation graphics program, the colour palette has been extended and there is a format painter which gives a consistent feel to pictures; the best way to do this however is to use stencils, the term Visio uses for the palette of shapes that some programs would call a template. In Visio 4.0 the stencils are dockable, which makes them easier to arrange and speeds up complicated designs where you might need access to a number of stencils.

Visio, the company, claims that it is not out to oust CorelDraw but there *are* file converters for Corel and Micrograpfx Designer. These file filters are supplemented with a flowchart converter which takes ABC Flowcharter and CorelDraw shapes and turns them into Visio smart shapes. The smart shapes now have more attributes and there are a lot more of them: over 250 have been added, including Mind Maps for drawing ideas, and 3D shapes with shadows. These are defined by a vanishing point which can be moved around. The end result is a chart which looks as though it is bursting out of the page.

Visio charts can be described as text: an Organisational chart wizard takes information from a text file or Excel spreadsheet. This is ideal for a rapidly growing organisation where people move around a lot and need to know who does

what. Project timelines can be automatically charted from Microsoft Project data, plus there are links making Visio useful for developers who want to drive charts through OLE automation. This is relevant for process-control environments where graphics may need to change as machinery works on chemicals or a

Visio 4.0
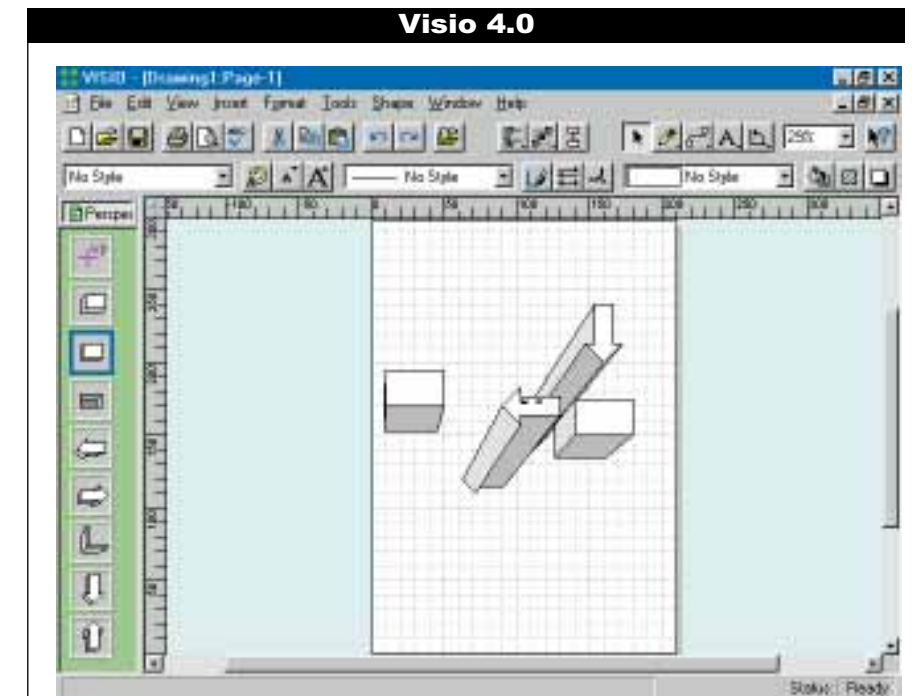
Existing Visio owners will feel very much at home but new templates add a lot to the program

Works for Windows 95

Works provides a well-rounded selection of applications at a budget price

manufacturing process.

For more mainstream users Visio has been made a little easier to use — there are now tool tips on the control points of shapes and the right-button menu is not only supported but configurable. With features being added at such a rapid rate it won't be long before Visio sires a sibling for its technical offspring.

Works for Windows 95

Works has always had an air of being a junior version of Office. It's the software you get with the computer so that you can do something — a bit like the trial pack of soap powder you get when you buy a new washing machine. The idea is that once you are hooked on Works, you'll want to upgrade to Office. For many people this won't apply, but as part of the bundling stratagem it was essential that Microsoft had a version of Works to run under Windows 95. The old version *would* work, but the new one offers 32-bit protection, long filenames, right mouse-button support and all the other good

things Windows 95 brings.

Works is an integrated collection of applications: word processor, spreadsheet, database, drawing program and communications software. The old Microsoft policy of being data-centric — you open files and work on them regardless of whether they are word processor, spreadsheet, whatever — is well at home here. The software starts with a task launcher and over 30 wizards for automating common tasks.

Work in the Microsoft usability labs, where local people are asked to try out new versions of the software while they are monitored through one-way glass, have led Microsoft to place an emphasis on "discoverability", where the software guides you to the new features. For Works this has been supplemented with a new manual which is designed to be browsed through rather than read from cover to cover, and short tutorials which Microsoft calls "show me" movies. The software tracks you, and when you first use a new feature, such as embedding objects, it offers to run a tutorial.

Works has a slighty different feel to other Microsoft applications, in that it guides you through tasks rather than confronting you with a blank screen. The buttons are bigger, but it manages to avoid being condescending.

A comprehensive menu of options is shown while you type, which helps with

the discoverability but cuts down the amount of space available for actually typing. The toolbar is customisable but there is no macro language — although of course, OLE 2.0 is supported so information from Office can be linked or embedded. The option for custom toolbars is very much more restricted than that offered by Word, although interestingly it includes a link to Microsoft Network. The table options are run as a separate program, linking in with the spreadsheet, and it is here that (if you'll pardon the pun) Works excels.

The software is very well integrated within itself, but a lot of the research work done by the Office teams has not filtered in, or has been omitted to provide some product differentiation between a suite which will typically cost £100 or be bundled free, and one which sells for £300. There are no Intellitype features, none of the nice scrolling when you insert text or guessing at what you are going to type.

The spreadsheet has most of the functions a typical user will want. Again, there are none of the advanced features such as Visual Basic or the mapping charts of Excel, and none of the new usability features, but for most people the facilities will be more than adequate. It watches what you are doing and provides help boxes and tutorial tours when you attempt something for the first time.

The biggest difference between the type of applications in Works and those in Office is the inclusion of the database with Works and Access being an option for Office. The database is more comprehensive than Cardfile but lacks any language or automated query support, although you can apply filters to searches in quite a sophisticated way. With a small database loaded it seemed quite fast, but ultimately this is not a program which will be used for high-power applications. Microsoft claims that it is designed for address books, lists and reports. It integrates well with the word processor, making it easy to produce mailing lists, and has good help when you're unsure how to proceed. Setting up a database is complicated but Works does its best to guide you through.

The last, and certainly the least significant part of the package is communications. This seems a little pointless when Windows already has Hyperterminal, a reasonably good comms program. The communications section of Works adds Kermit, Xmodem and Ymodem to Hyperterminal's Zmodem, there is keystroke recording and a button which

Works provides a basic spreadsheet with an emphasis on guiding the naive user through using the software

This is the crudest view offered. Detail can be added by using the slider

automatically logs you into the Works forum on the Microsoft Network, but beyond that there isn't much more that you can do with a comms program without getting unnecessarily esoteric.

Generally the software is a little slow: even on a machine with 24Mb RAM and a DX4 running at 100MHz there were noticeable delays, although as this was a late beta things may improve. Works 4.0 is a full 32-bit application, but the switch to 32-bit-ness alone does not automatically speed a program up.

Works is a fine first taste of Windows 95 software, and if you haven't used the advanced features of more expensive programs you'll be happy with it.

Xara Studio

In the November 1994 issue of *PCW* we previewed Camelot, the 32-bit drawing program from Computer Concepts. At the time, Windows 95 was called Chicago and was going to be out in time for Christmas of that year. The delay in the operating system has been a mixed blessing for Computer Concepts, which has set up a new company, Xara, with which to take on CorelDraw. It's not the first time a software house has targeted CorelDraw with a new program. SPC launched Harvard Draw specifically at the same market and failed.

The expertise which led to Xara was the Acorn program ArtWorks, but Studio is not a port. Xara realises that its major advantage over Corel is the lack of a legacy; the program can be optimised for today's computers, leading to a faster program with a greater level of accuracy. The only advantage of the ArtWorks legacy is a huge library of clip-art selected from drawing competitions.

The performance edge is the result of 150Kb of hand-coded assembler — the old-fashioned way of doing things is still the best. The program is so fast that the major bottleneck is the speed at which the CPU can read from and write to RAM. Being 32-bit helps in other respects. All co-ordinates are held to 32 bits of accuracy, giving a resolution of 72,000dpi and 4000 levels of zoom — four times the
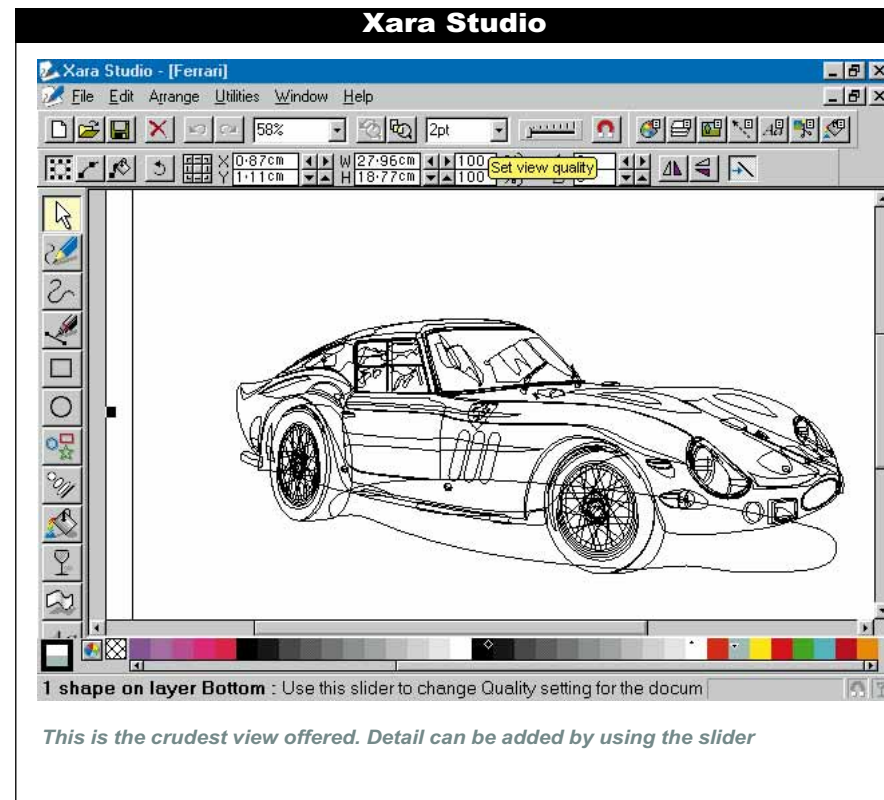
depth of CorelDraw.

But Studio is not designed to take on the might of Corel head-to-head. One of the fundamental differences is that it has a dimensioning system. As with a CAD program, shapes can be scaled in metric, imperial or a scaling of your choosing.

More impressive is the bitmap handling. The fill bitmap mode works astonishingly quickly, allowing the bitmap within a random shape to be stretched and skewed in real-time.

Perhaps the most impressive tool is the transparent graduated tint. An arrow tool allows the artist to specify the beginning, end, direction and rate of graduation. The transparency allows great effects — stained glass windows can be created with overlapping glass, for instance. There are two types of glass, reflective and transmissive, and both are supported. The tint is held as start and end co-ordinates within the native file format, which makes some complex-looking artwork surprisingly compact. Xara can blend between one shape and another, which is ideal for creating complex highlights.

The software is not multi-threaded so will not take advantage of a multi-processor system. According to one programmer there was little advantage in this, since little of the software was processor-bound. The bulk of the code is written in Visual C++; ports to other systems — the Mac in particular — will

depend on the availability of the compiler.

There is an infinite undo and redo buffer, and two types of handle on shapes to make Corel users feel at home. Camelot's own method of manipulating shapes is there, too.

Conclusion

There is an impressive diversity in the Windows 95 programs already available, and not just from Microsoft. If you are unsure as to whether to upgrade you should look hard at the applications rather than the operating system: they all offer significant benefits. There will come a time when you won't have an option — all software will be made this way.

PCW Details

Visio 4.0
Price £169
Contact Visio Corporation
01372 227900

Works for Windows 95
Price £99, but look out for special price of £80 inc VAT until the end of the year. Current users of Works 3.0 will be able to upgrade FOC until the end of the year.
Contact Microsoft 01345 002000

Xara Studio
Price £199. Upgrade from CorelDraw £99
Contact Xara 01442 350000.
Fax 01442 350010

Expand
and
deliver

PCW PCMCIA Photography by David Whyte

PCMCIA cards have become an essential accessory for any self-respecting notebook. Terence Green looks at 20 leading devices and picks out some of the best.

All new notebook PCs and an increasing number of desktops now have a PCMCIA slot and there's a PCMCIA card to suit almost every application, from hard disks to Ethernet adaptors, SCSI adaptors and fax-modems. Here we review 20 PCMCIA devices from the leading manufacturers (we have omitted fax-modems as these were covered in detail in our May '95 issue).

PCMCIA is the original plug-and-play hardware, a small credit card-sized device which you can plug in and remove at will — at least that's the theory. In fact, PCMCIA is a lot less hassle-free than the words plug-and-play suggest. When problems occur it isn't always obvious who might be responsible. Sometimes the PCMCIA card manufacturer may have cut corners, leaving the card slightly off-spec and therefore impossible to configure correctly. Or the problem may be with the card and socket services software that supposedly enables automatic PCMCIA configuration, or plug-and-play. Sometimes a PCMCIA card which doesn't work with one vendor's software will work perfectly with that of another.

The problem might even be the PC notebook. We had to upgrade one vendor's card and socket services package as it fell over the first time it encountered a fast PC, a 75MHz DX4. Timing problems often occur on the woefully

PCMCIA Cards Contents

ill-defined IBM PC standard.

Fortunately most of these problems can be overcome by not always choosing the cheapest option, and by always asking suppliers to state in writing that the PCMCIA product they're selling you will work in your chosen configuration. Don't waste your time attempting to get it all going in the belief that you're working with entirely compatible components because they're PC-standard. It's just a fact of life that the PC is a flaky piece of design and some combinations of

hardware and software are never going to work together no matter how hard you pray.

More intractable problems occur with the operating systems. PCMCIA drivers take up too much memory and if you also want to run network drivers, SCSI drivers, and CD-ROM drivers as well, you will have trouble using DOS/Windows. Card and socket services suppliers such as SystemSoft, Award, and Phoenix are doing much to reduce the memory footprint, and although they're not there yet, Award's upcoming DPMS-enabled software looks promising.

You can also escape the memory crunch by moving to OS/2 Warp, Windows NT, or Windows 95. The trouble is, OS/2 Warp's PCMCIA support is a little unwieldy and it won't be easy to use with a wide variety of PCMCIA cards until an update ships in October. Windows NT 3.51 is just out and is the first version of Windows NT to support PCMCIA devices. So it may be wise to wait a while before placing your faith in either OS/2 Warp or Windows NT to resolve the PCMCIA dilemma.

Windows 95, of course, is going to solve everyone's problems and no doubt reduce world aggression too. But it has only just come out and as OS/2 Warp and Windows NT demonstrate so well, it takes time for an OS to become a finely-honed object of desire.

Callunacard 130Mb

Callunacard makes Type III PCMCIA hard disks of 130Mb and 170Mb, and a 260Mb device is due out soon. Like all the Type III hard disks, the Callunacard works provided you have card and socket services software configured for ATA drives. This often isn't the case with PCMCIA-enabled hardware and the ATA driver will make further inroads into your conventional DOS memory when it loads.

Otherwise, the Callunacard works just fine. Included with the PCMCIA hard disk are a few useful additional utilities: PASSWORD.EXE and POWER.EXE. These allow the user to set the card's default power-saving options independently of the system's utility and to enforce password security — well worth having on a PCMCIA hard disk.

PCW Details
Callunacard 130Mb
Price £269
Contact Portable Add-ons 01483 440777

SunDisk ATA FlashDisk 10Mb

Type II solid state ATA FlashDisks have a hardware controller and don't need special flash memory file system software. Smaller, and more expensive per megabyte than conventional hard disks, FlashDisks are faster and more rugged. They have no moving parts and can survive much greater shocks than PCMCIA hard disks. FlashDisks are sparing of power compared with hard disks except when they're being written to. They are as fast as SRAM, yet don't require a continual power supply to retain data.

SunDisk ATA FlashDisks appear to the operating system as hard disks: the range runs from 1.8Mb up to 20Mb and is supplied with Stacker compression software. This can double the amount of data each SunDisk can store. The cost of a FlashDisk may be justified by its robustness and by the value of the data you plan to store on the disks.

PCW Details
SunDisk ATA FlashDisk 10Mb
Price £460
Contact Portable Add-ons 01483 440777

GameCard II

This is a Type II PCMCIA joystick interface for games players. Supporting dual joysticks it has an adaptor cable ending in a standard 15-pin D-type connector. To connect two joysticks for multi-player games you'll need a two-way (Y) adaptor which you must buy separately.

The dual-channel card supports multi-function joysticks as well. Designed by JC Designs of Essex and manufactured in the UK, the GameCard II comes with installation software but requires third-party card and socket services software which isn't supplied. The GameCard II needs a 2byte I/O port which must start at 200h.

If there's a conflict with existing hardware you will need to modify the PCMCIA services software before the GameCard II's driver will enable the games port.

PCW Details
GameCard II
Price £43
Contact JC Designs 01371 874478

SMC EliteCard PCMCIA Ethernet Combo

The SMC Type II PCMCIA Ethernet adaptor can be connected to either BNC (10Base-2) or a UTP (10Base-T) network cabling. A module on the flexible cable houses RJ-45 and BNC connectors; a third connector is for an external power supply plus power and transmission LEDs.

While there could usefully be a few more LEDs on the cable module, the rest of the SMC package is neatly done with both SystemSoft card and socket services software, and a decent manual for the hardware and software. The warranty is for five years. The software supplied includes an SNMP agent to which you can append a small amount of asset data about the local PC and video card. The SMC adaptor requires a 16Kb RAM address for a dual-ported memory buffer which delivers better throughput than an I/O mapped card.

PCW Details
SMC EliteCard PCMCIA Ethernet Combo
Price £175
Contact SMC 01344 418800

Kingston DataPak 260

This Type III PCMCIA hard disk is compatible with the PCMCIA-ATA interface specification. Our review item was one of the newest 262Mb devices, made in Singapore. A 170Mb drive is also available.

The card comes with CardSoft PCMCIA card and socket services software. ATA PCMCIA drives need an extra DOS driver which allocates disk letters. Like all PCMCIA hard disks, which are delicate pieces of equipment, it is provided with a protective slip-case.

Type III drives require a PCMCIA slot 10.5mm thick which usually means that they fully occupy standard twin-socket PCMCIA hardware. A few notebooks separate Type III and Type II sockets, allowing you to use two PCMCIA devices simultaneously.

PCW Details
Kingston DataPak 260
Price £399
Contact Datrontech 01252 303500

PAO Ethernet+

The Ethernet+ network adaptor PCMCIA Type II card from supports ODI and NDIS (Novell, Microsoft, LANtastic, Banyan, NFS) networks. It works well with Windows for Workgroups and NetWare but, as yet, lacks specific OS/2 driver support.

The installation routine is fairly easy to work through but sometimes needs manual tuning. The card comes with an enabler which must be used in conjunction with card and socket services. SystemSoft CardSoft software is supplied. The enabler also allows the system to be booted without the card. This takes you into the area of plug-and-play, which requires perfect harmony between all the various components, not just the Ethernet+.

10BaseT and 10Base2 Ethernet connections are supported via separate cables. Properly set up, the card is fast and can be successfully hot-plugged.

PCW Details
PAO Ethernet+
Price £135 (10BaseT), £155 (10Base2)
Contact Portable Add-ons 01483 440777

SCM SwapBox Floppy Combo

IBM/DIP IR Wireless Card

Infra-red LAN adaptors manufactured by IBM and sold by DIP are PCMCIA Type II cards which can be used to establish wireless LANs. They employ diffused infra-red signals generated by a small infra-red transceiver attached to the end of a short cable.

With diffused infra-red there's no need to have the networked devices in line of sight but the system works better when it can bounce the signal off the ceiling. Low ceilings are best if you want to communicate over a reasonable distance, say 30 feet, so you might have to cosy up if you work in a high-ceilinged Victorian building.

The card is supplied with software supporting most ODI or NDIS networks for both server and client and it can be set up to bridge an infra-red system to a wired NetWare LAN. ISA and MCA infra-red adaptors are also available. Setting up a small two-station Windows for Work-groups LAN proved to be easy.

PCW *Details*

IBM IR Wireless Card
Price £299
Contact DIP Systems 01483 202070

Grey Cell Ethernet II Gold — Combo

Grey Cell's PCMCIA Type II Ethernet adaptor supports twisted pair (10BAse-T) and BNC (10Base-2) cabling through a single Combo connector attached to the PCMCIA card itself. Grey Cell has taken up the fixed connector as it is less fragile than the usual "rat's tail" cable adaptor for PCMCIA network cards, which often breaks at the point of attachment to the card.

However, if placed in the lower PCMCIA slot of a pair the adaptor blocks access to the upper socket. And it is not immune to accidental breakage: a little pressure on the adaptor exerts an enor-mous force on the point of connection to the PCMCIA card.

The Grey Cell card is supplied with a good range of drivers for DOS, Windows, OS/2, and Unix.

Grey Cell Ethernet II Gold — Combo

New Media Multimedia Combo

PCW *Details*

Ethernet II Gold — Combo
Price £169
Contact Grey Cell 0181 902 8998

SCM SwapBox Floppy Combo

You probably need a SwapBox if you don't have any spare storage bays in your PC and you must have a PCMCIA socket. The SwapBox is a single unit the size of a standard 3.5in floppy drive but it houses a Type III PCMCIA card slot plus an ultra-slim 3.5in floppy diskette drive.

There are several SwapBox models, with up to four PCMCIA sockets per installation, in units which support two rear-mounted sockets in the adaptor backplates. However, the Floppy Combo version restricts you to one PCMCIA socket.

The adaptor is a 16-bit ISA card which requires minimal configuration. A pair of cables connects the adaptor to the SwapBox unit mounted in its bay. A speaker is included for fax/modems. SCM supplies Award CardWare 2.0 software for PCMCIA card and socket services.

PCW *Details*

SCM SwapBox Floppy Combo
Price £175
Contact International MicroTech 01793 784480

New Media Multimedia Combo

A Type II PCMCIA card, the New Media Corporation's Multimedia Combo combines a 16-bit stereo sound adaptor and a SCSI-2 interface.

For notebooks without sound and SCSI it is an excellent mix. The only fly in the ointment is the rather cumbersome cable which carries the SCSI wiring and the audio connector module with head-phone, microphone, line in, and CD-Audio jacks; it's a hefty load for the truly mobile notebook user to tote around.

The package comes with plenty of software including SystemSoft card and socket services, Microsoft Sound System and Corel SCSI. Configuration is easy: the card's enabler driver simply interfaces with card and socket services as a client driver. Both sides of the combo will work side by side and the sound system is compatible with Adlib FM audio as well as supporting the Windows Sound System.

PCW *Details*

New Media Multimedia Combo
Price £479
Contact Portable Add-ons 01483 440777

IBM WaveRunner ISDN Digital/Analogue Modem

WaveRunner is a PCMCIA Type II card with multiple communications modes. It is an ISDN interface, an ISDN terminal adaptor, and even an old-fashioned 28.8K analogue modem with V42 compression. IBM was still getting all the software together when we started using it and it could only be used from Windows and DOS, but the OS/2 software should be ready by now. Two separate line connectors are supplied for ISDN and analogue modem access and the software won't initialise unless you are connected to the WaveRunner. You have to start a driver for each mode but you can do this in Windows without having to restart. SDN support is very flexible, offering unrestricted basic rate (64Kb/sec) over one (64Kb/sec) or two (128Kb/sec) B-channels as well as V.120 rate adaption with or without V.42 com-pression over one or both B-channels.

PCW *Details*

IBM WaveRunner
Price £541
Contact IBM 0181 818 4454

SecureData/PCMCIA

Nanoteq's Type II card uses the Cares encryption system to encrypt and protect data, on a notebook hard disk, from unauthorised access. The PCMCIA card is part of a family of similar security adaptor products.

The card tested had early revision software which has some limitations in respect of the flexibility of its security options. The earlier version of the software will only encrypt at the partition level but there is new software on the way, including a Windows utility, which will allow partitions, directories and files to be protected.

The software also allows floppy disks and serial and parallel ports to be secured against unauthorised access. A single card can be used by several users each securing their own files, directories or partitions on the same machine or on separate systems. It's dead easy to set up, easy to use, and very effective against access.

PCW *Details*

SecureData/PCMCIA
Price £199
Contact SecureTeq 01376 500614.
Fax 01621 893599

NogaVision Digital Video Model NV-256

NogaTech's digital video card is a PCMCIA Type II card supporting video capture, frame grabbing, and full-motion video at up to 25fps. Live video, including stereo sound, can be displayed on screen and captured to file in Video for Windows AVI format.

The system supports PAL and NTSC standards and composite and S-Video inputs. You can connect VCRs, camcorders, TV or even laserdisk players to the card. However, to get the best dis-plays you need a notebook with a colour TFT active matrix LCD and good, reliable 256-colour drivers as a minimum.

When tried on a second-tier notebook with a passive matrix dual-scan colour LCD the video worked but the picture was indistinct and the colours muddy. Make sure your notebook model is sup-ported; if it is, the kit installs without fuss and works well.

IBM WaveRunner ISDN Digital/Analogue Modem

PCW *Details*

NogaVision Digital Video Model NV-256
Price £385
Contact Portable Add-ons 01483 440777

Chase CARDport ISA

A PCMCIA card drive for desktop PCs, the Chase CARDport comprises a half-length 16-bit ISA adaptor, with a Type III PCMCIA socket in the adaptor backplate, and a front-mounting reader with another Type III slot which needs to go into a 3.5in drive bay.

It's less flexible than the Cardwell card reader from Datrontech because you would have to add two Cardports to a system to get four PCMCIA sockets. On the other hand, the CARDport expansion adaptor is much smaller than the Cardwell and therefore more useful on a cramped desktop.

Like the other card readers the CARDport needs one I/O port address. Otherwise, apart from the remote possibility of an I/O conflict, installation is a simple case of fitting the hardware and running the software install utility.

SecureData/PCMCIA

PCW *Details*

Chase CARDport ISA
Price £165
Contact Portable Add-ons 01483 440777

Chase CARDport ISA

Chase CARDport ISA

Mitsubishi Melcard SRAM 1Mb

Maxtor MobileMax 131Mb

Cardwell CardBay-AT Card Drive

Cardwell PCMCIA SCSI-2 Card

The Cardwell SCSI adaptor is a Type II PCMCIA card with a SCSI-2 interface. The cable adaptor is available with a choice of Centronics or high-density SCSI connectors.

DOS and Windows support software including a Windows configuration utility is included in the package . Support for Windows 95 and OS/2 Warp is promised. The supplied software also includes an ASPI enabler which interfaces with the PCMCIA client driver and ASPI drivers for SCSI CD-ROM, hard disk, optical, and removable drives.

The card was very easy to set up and put to work. The ASPI enabler only needs 5Kb of memory but as there isn't a direct enabler it has to be loaded on top of card and socket services, which needs a lot more memory. The CardWell's CardMaster utility installs the SystemSoft card and socket services software and basic ASPI services. Corel SCSI software, which is more fully-featured, is offered as an optional extra.

PCW Details

Cardwell PCMCIA SCSI-2
Price £149
Contact Datrontech 01252 303500

Maxtor MobileMax 131Mb

MobileMax hard disks are PCMCIA Type III devices. Maxtor hasn't yet released its 262Mb drive and has put Type III developments on hold. We looked at a 131Mb drive. It's a standard ATA interface requiring the card and socket services and the PCMCIA ATA driver. With compression software (not supplied) you can increase the usable disk space; it's usually OK to compress these drives provided you have a good backup system.

Maxtor is holding back on Type III drives because it believes that Type II with single platters is the way forward. Maxtor now has Type II PCMCIA single-platter hard drives at 85Mb and 121Mb capacities which can run on 3.3V power supplies. Future notebook design is unlikely to favour increasing use of the relatively large Type III cards. Also, one cannot insert another PCMCIA card into the second socket of a dual-socket while a Type III hard drive is inserted.

PCW Details

MobileMax 131Mb
Price £160
Contact Maxtor 01483 747356

Mitsubishi Melcard SRAM 1Mb

The Mitsubishi Melcard PCMCIA Type II SRAM card is mainly for handhelds and notebooks with no floppy disk drive. Like FlashDisks, SRAM cards are solid-state with no moving parts. They're faster and far more robust than PCMCIA hard disks. Like floppy diskettes, the Mitsubishi card has a write-protect switch.

RAM is particularly aimed at systems where low power consumption is vital; it has a much lower power requirement than a Type III rotating hard disk and, until 3.3V devices and notebooks turn up, a much lower power drain than Flash EEPROM disks which run 5V and consume 12V while being written to. Mitsubishi has 20Mb FlashDisks but its 4Mb SRAM card is the largest SRAM available.

SRAM cards require a battery to maintain the memory. It's recommended that the battery be changed annually. You'll need the miniature screwdriver supplied and a battery from the jeweller's, costing a few pounds.

PCW Details

Melcard SRAM 1Mb
Price £139
Contact Mitsubishi 01707 278899

Cardwell CardBay-AT Card Drive

The Cardwell CardBay-AT is a PCMCIA card drive containing two PCMCIA sockets in a 3.5in form factor housing. A 3.5in fitting kit is supplied; but for 5.25in bays you'll need a manufacturer's mounting kit. The drive is easily mounted in a storage bay with front access and cabled to a Cardwell expansion card which requires one free 16-bit expansion slot.

Some Cardwell adaptors, but not the one in the review kit, host a single PCMCIA socket which is accessed via the backplate on the rear of the PC. Up to four PCMCIA slots can be added to a desktop if a Cardwell daughterboard containing one PCMCIA socket is added in an expansion slot adjacent to the primary Cardwell adaptor.

The Cardwell PCMCIA drive also has a speaker for fax/modem card support. The software is installed via Cardwell's CardMaster installer but appears to be CardSoft software from SystemSoft.

PCW Details

Cardwell CardBay-AT
Price £99
Contact Datrontech 01252 303500

Elonex PC-500R/I

Desktop PCs with PCMCIA sockets, though not commonplace, are available from HP, IBM, Apricot, Escom and Elonex.

The Elonex PC-500R/I is a compact desktop with two PCMCIA sockets, room for a CD-ROM drive, three internal PCI expansion slots, an NCR SCSI-2 interface and a 100MHz Pentium CPU.

Along with a Toshiba T2400CT, the Elonex was a test-bed for the PCMCIA cards. The card readers were installed in a Compaq Deskpro. The Elonex runs Microsoft Windows NT Workstation 3.51, IBM OS/2 Warp, and Microsoft Windows 95 (June Test Release), all of which support the PCMCIA 2.0 specification.

The CD-ROM and PCMCIA sockets are housed on the right-hand side of the system box with the CD-ROM at the front. This arrangement is awkward unless you have at least a foot of free space on that side. Apart from that this is a conveniently small desktop with expansion catered for via PCMCIA.

PCW Details

Elonex PC-500R/I
Price £1,935 (100MHz Pentium, 16Mb RAM, SCSI CD-ROM, PCMCIA, 15in SVGA)
Contact Elonex 0181 452 4444

SystemSoft CardWizard Pro

CardWizard Pro is the latest wheeze from a card and socket services provider. Basically a Windows front end for the configuration of the DOS-based PCMCIA software, CardWizard will probably end up bundled with most PCMCIA-enabled notebooks because SystemSoft has a big following among PCMCIA OEMs in the US.

Rival PCMCIA suppliers, such as Award and Phoenix, have also recently upgraded their card and socket services software in an effort to make configuration of multiple cards easier by providing a Windows interface. Award's CardWare is very easy to use but SystemSoft's CardWizard goes further in the amount of information it provides and how it makes that information available to savvy users who want to fine-tune the detail. While easier configuration is a priority for PCMCIA devices, the amount of memory the card and socket services drivers require under DOS/Windows is as important. Let's hope that gets fixed next.

PCW Details

SystemSoft CardWizard Pro
Price £69
Contact Portable Add-ons 01483 440777

Elonex PC-500R/I

ESystemSoft CardWizard Pro

TABLE OF FEATURES PCMCIA CARDS

Product	Description	Manufacturer	Type	Price	Supplied by	Phone	Fax
Callunacard 130Mb	Hard disk	Calluna	III	£269	Portable Add-ons	01483 440777	01483 452304
GameCard II	Joystick adaptor	JC Designs	II	£43	JC Designs	01371 874478	01371 874300
Flashdisk 10Mb	ATA FlashDisk	SunDisk	II	£460	Portable Add-ons	01483 440777	01483 452304
EliteCard PCMCIA Combo	Ethernet adaptor	SMC	II	£175	SMC	01344 418800	01344 418814
DataPak 260	Hard disk	Kingston	III	£399	Datrontech	01252 303500	01252 303444
Ethernet +	Ethernet adaptor	New Media	I	£135	Portable Add-ons	01483 440777	01483 452304
IR Wireless card	Infra-red LAN adaptor	IBM	II	£299	DIP Systems	01483 202070	01483 202023
Ethernet II Gold — Combo	Ethernet adaptor	Grey Cell	II	£169	Grey Cell	0181 902 8998	0181 903 4318
SwapBox Floppy Combo	Floppy Disk/PCMCIA drive	SCM	I, II, III	£175	International MicroTech	01793 784480	01793 784470
Multimedia Combo	Sound/ SCSI-2 card	New Media	II	£479	Portable Add-ons	01483 440777	01483 452304
SecureData/PCMCIA	Security card	NanoTeq	II	£199	SecureTeq	01376 500614	01621 893599
WaveRunner	ISDN Digital/Analogue modem	IBM	II	£541	IBM	0181 818 4454	0181 818 5494
Nogavision NV-256	Digital video	Nogatech	II	£385	Portable Add-ons	01483 440777	01483 452304
CARDport ISA	PCMCIA card drive	Chase	I, II, III	£165	Portable Add-ons	01483 440777	01483 452304
MobileMax 131Mb	Hard disk	Maxtor	III	£160	Maxtor	01483 747356	01483 751208
CardBay-AT	PCMCIA card drive	CardWell	I, II, III	£99	Datrontech	01252 303500	01252 303444
PCMCIA SCSI	SCSI-2 adaptor	CardWell	II	£149	Datrontech	01252 303500	01252 303444
PC-5100R/I	PCMCIA-enabled desktop	Elonex	I, II, III	£1,935	Elonex	0181 452 4444	0181 452 6422
Melcard SRAM 1Mb	Battery-backed SRAM card	Mitsubishi	I	£139	Mitsubishi	01707 278899	01707 278837
CardWizard Pro	Card and socket services	SystemSoft	N/A	£69	Portable Add-ons	01483 440777	01483 452304

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Conclusion

Picking an outright winner from such a disparate range of items is impossible but the group does include a number of interesting products.

First in line are the hard disks from Maxtor, Datapak and Calluna. These just work and although expensive compared to desktop megabytes they do exactly what they set out to. It is possible that PCMCIA removable media drives (just about to appear from SyQuest and others) will offer a better price-per-megabyte for infinite amounts of storage, but in the meantime, provided you treat them carefully, PCMCIA hard drives are a great way to revive an under-resourced notebook.

Of the network cards, we liked the SMC card best because it is so widely supported and easy to use. And among the card readers, the SMC Floppy SwapBox stood out because, like PCMCIA hard disks, it provides expansion for compact desktops, avoiding the necessity to buy a new PC. Not well known in the UK, SMC is big in Germany and has been involved in PCMCIA since the start.

The NogaVision Digital Video card is another good piece of equipment. Unlike a number of oddball PCMCIA cards we tried, this one installs and works quickly and

easily. We were also impressed by the SecureTeq security card; as notebook storage is so vulnerable to thieves it's almost a necessity.

Lastly, we picked out two excellent items manufactured by IBM: first the IBM WaveRunner digital/analogue modem, and second, DIP's Wireless LAN adaptor. The WaveRunner bridges the existing analogue dial-up world and digital ISDN, while the infra-red wireless LAN adaptor cuts out the problem of dealing with cables when you need to roam around.

PCMCIA standards

The road to PCMCIA started in 1985 when the Japanese Electronic Industry Development Association (JEIDA) set its first standard for 68-pin memory cards in 1985.

The Personal Computer Memory Card International Association (PCMCIA) was formed in 1989 and in September 1990 had arrived at the PCMCIA 1.0 standard. PCMCIA 1.0 imposed some order on memory cards, but PCMCIA members started coming up with non-memory applications for cards. In 1991, PCMCIA standard 2.0 laid down specifications for the large variety of PCMCIA cards we have today.

One set of PCMCIA standards defines three sizes: Type I at 3.3mm, Type II at 5mm, and Type III at 10.5mm.

PCMCIA 2.0 is a fairly loose standard as anyone will attest to who has used more than one card or has had to configure them manually. A point update in July 1993 to the PCMCIA specification brought it up to PCMCIA 2.1 with the addition of more clearly defined interfaces between the user application and the PCMCIA hardware via socket services and card services.

Finally, PCMCIA cards had a standard definition for physical, electrical, and software requirements, but the rest of the PC world had moved on. PCMCIA cards are 16-bit and the bus width is moving to 32-bit via PCI (peripheral component interconnect). PCs are also moving to 3.3V operation while most PCMCIA cards run at 5V and occasionally 12V. And PCMCIA card manufacturers still manage to come up with fairly loose adherences to the card information structure (CIS); a data set embedded in the card to inform the card and socket services software of the card's capabilities.

The most recent PCMCIA standard as finally set in March 1995 (PC Card 3.0) is supposed to deal with many of the remaining problem areas. At the same time the PCMCIA took the opportunity to change the name to PC Card because most People Can't Memorize Computer Industry Acronyms (such as PCMCIA).

PC Card Standard 3.0 introduces a high-performance 32-bit bus which can operate at either 5V or 3.3V. Called CardBus, it adds to the 16-bit bus rather than replacing it. Card-Bus will support busmaster PCMCIA cards

which can control the I/O bus independent of the CPU. This will enable high performance PCMCIA cards to use DMA (direct memory access) transfers to speed throughput on I/O-sensitive tasks such as networking, sound and video.

PC Card 3.0 also specifies a standard method for multi-function cards sharing a socket and tightens up the software interfaces so that the problem of plug-and-play cards which won't configure properly should disappear in time.

Most of the benefits of PC Card 3.0 won't appear for some time yet, however. The PCI-PCMCIA interconnect status will probably require adjustments to the PCI/PCMCIA bridge chips. The software to support card and socket services for PC Card 3.0 has yet to be written. Operating systems need to be provisioned with the revised PCMCIA standard. And there are as yet few PC systems capable of supplying 3.3V to PCMCIA sockets and few cards that will run on 3.3V now.

The transition to PC Card 3.0 will take some time and it's likely that the current muddled situation will get worse before it gets better; probably in mid- to late-1996.

It's all worked out beautifully

A motor racing team is just that; a team. No one person makes it but a poor link in the chain can break it. Everything must represent the best possible solution to a problem, from the aerodynamics to the engine, suspension, braking, electrics and, of course, the electronics. The Williams racing team has expertise in all these areas but in others it looks to outside suppliers, a case in point being Adams Technology, the Manchester-based PC supplier.

…for Adams Technology, helping the Williams Renault team to maintain the revs in its motor-racing success. **Simon Rockman** outlines the benefits of computerised data, and the link between the team and its PC supplier.

Despite being based hundreds of miles from Williams' Didcot HQ, Adams manages to work closely with Williams.

Williams recently branched out to run the Renault Laguna team in the British Touring Car Championship (the BTCC). No team can expect to win straight away, and Williams has always said that it would be mid-season before its drivers Alan Menu and Will Hoy could expect to be regular visitors to the podium. Computer systems play a vital role here and while other teams use off-the-shelf solutions, Williams uses hardware and software developed in-house by the Formula One (F1) team.

In most respects the F1 and BTCC teams are run separately but Frank Williams and technical director, Patrick Head, both take an active interest and will soon see some of the work that Adams has done for Williams, filter into the F1 team. They both attend the BTCC races whenever possible but if there is a Grand Prix taking place over the same weekend it's Damon (Hill) and David (Coulthard) who get the attention rather than Alan and Will.

The engineers fill the car with sensors and monitor such things as damping, wheel travel, acceleration and g-forces. The engineers look at how the car behaves over different parts of the track and then tweak the performance. The rules prohibit the teams from using a radio link for the data, so all the information is collected by a Williams-designed and built device called the VCM (Vehicle Control Module) which saves the data to a flash memory card. In the pits, this is whipped out of the car and slotted into one of the Adams Technology 486 machines in the pit garage. These have been installed in a unit called the Whirlitzer — a cabinet which springs up, with the monitors and both machines in one unit. There is a special slot on the front for the flash card. The design currently uses a 64Kb card in a Fujitsu proprietary slot. There are plans to change this to PCMCIA, although given the small amount of data means that this is not a pressing need and the current system has proved reliable. But moving to PCM-CIA will also allow a switch to notebook PCs.

The same VCM is used in other forms of motorsport. Williams uses it in Formula One where wireless telemetry is allowed and this is what produces the statistics you see on TV on a Sunday evening. Keke Rosburg's Opel team has bought the Williams computer equipment for use

Above *It is a challenge for Adams to build systems for a specialist customer*
Left *Computer data helps racing team mates to modify their driving*

The Datamill Windows software written by the Formula One team gives a detailed breakdown of the information gathered by the system. There are 160 pins on the bus which can be attached to any kind of sensor but the software is set up to monitor speed and distance, brake pressure and bias

in the German DTM: a no-holds barred equivalent of the BTCC where the cars are substantially changed from the road-going versions. In this application the VCM controls the active suspension — a technology which has been banned from BTCC and F1 partly on the basis of cost. Whatever the data gathering mechanism, the important information is fed into the computers in the pits in the shortest possible time.

(the setup of the suspension), and battery voltage. Depression of the four dampers, acceleration, roll, gear and a number of other criteria are also monitored from lap to lap. Statistics can be given for any point on any lap — a map of the circuit shows at which points the stats change. If one driver is faster than the other through a particular complex, they can compare what is going on and modify their driving to copy the quicker route.

By monitoring the performance of all these parts of the car, the engineers can look for those extra improvements which could make the fractions of a second

difference in lap time — ultimately perhaps, the difference at the end of the race between getting to soak other people in champagne or being soaked yourself.

Adams Technology has found it an interesting challenge to build systems for

The BTTC car

Formula One racing cars are built from the ground-up. BTCC (British Touring Car Championship) cars are ostensibly the same as those available in your local car sales showroom, except that they're tuned up a bit before being let out on the track.

The Renault Laguna production line in France where a special run of bodyshells is made for the Williams team. These are then stored at Didcot (and hopefully not needed) — the team takes three cars to the track and only builds up extras if the rough and tumble of BTCC takes its toll. If a new body is needed it is sent back to France to be seam welded and a roll cage built in (massive steel pipes which buttress the insides of the car). The cages are far more substantial than most racing car roll cages, and given the frequency with which BTCC cars collide with each other it's a sensible precaution. At the end of the season the surviving cars are scrapped, although one or two might be used as mules for developing the following season's cars.

Inside, the car bears very little resemblance to a standard Laguna. Apart from the "climbing frame" decor there is nothing which isn't needed. All the seats, padding and panels have gone, the carpets, seat runners and anything which smacks of creature comforts hasn't just been removed; it was never there in the first place. The single bucket seat is fixed, a couple of feet back from the standard position to give better weight distribution. Since no driver has arms two feet longer than usual, the dashboard has a pod which extends the vital controls and the steering

wheel. But regulations stipulate that the car be fully functioning, so even the indicators work — although indicating your intentions in BTCC is about as likely as Van Halen doing an unplugged album. The extended dashboard is made of carbon fibre. A row of lights along the top of the dash provide other indications (including a speed of 80mph which is the limit when driving in the pits). The inside of the Laguna is blue painted metal and what distinguishes it from lesser racing cars is how neat everything is: all the internal cables are neatly routed and there is a television camera on the roll cage. BTCC races are not shown live but are taped using an 8mm video recorder in every car and the footage amalgamated before broadcast. The major change in BTCC since last year is the introduction of aerodynamic aids. Touring cars now have a very low spoiler on the front and a wing at the back, helping to make them faster through the bends. But because this makes them look less like road cars the move has proved unpopular with some fans who consider that the cars should look right, even if they are quite unlike the real thing in actual construction. The wings are all made of carbon fibre. They are expensive, and built to be light which makes them fragile and the front spoilers rarely last long. Limits to the overall dimensions and the advantages of adding a wing have meant that the Volvo team has had to switch from the estate version, which proved reasonably competent, to the saloon cars of this year.

The whole lot is designed to be pulled apart quickly, not just for race-repair but because the racing cars are mobile test-beds, too.

Being able to monitor the performance of important parts of the car affects the split-second difference between a winner and a runner-up

such a specialist customer and sees it, additionally, as a way to hone its own organisational skills: Williams works with scrupulous efficiency, so meeting the demands of such an exacting customer has been good for everyone within Adams.

There is also the opportunity to explore new technologies. Motor racing is often a game of numbers and getting the telemetry information distributed around the pits helps everyone to learn what's going on. At present data is carried from the pits to Frank Williams in the motor home, using "sneakernet" (a runner in specially-branded Williams training shoes) on floppy but Marcus Adams is keen to experiment with WaveLan to provide a 2Mbit link between the network in the pits and the PC in the motorhome. All these developments won't directly make for a race win, but then motor races are won and lost by fractions of one percent and only by having the very best equipment can you be sure that nothing will go wrong.

A more immediate benefit for Adams Technology is that the latest advertisements from Renault show the race-winning Laguna with the Adams fig leaf to the fore. As the season has progressed, so the Lagunas have moved up the rankings. Will Hoy started off badly but is now finding his form, and Alan Menu is climbing up the points table. Next year will see the first car designed by Williams from the stage of initial development work, through to the track — Adams is planned to be a more active part of that project and the result should be heavier computerisation of the pits lane. **PCW**

The global shopping trip

World Wide Web offers the potential to turn our so-called nation of shopkeepers into international mail order traders. Fact or fantasy? Wendy M Grossman takes a look at British and US online businesses already up and running.

The Internet seems to hold many platinum promises: not least of these is the vision that small companies will be able to find a worldwide market via this relatively new and inexpensive medium.

Just as desktop publishing turned, potentially, every laser printer owner into a small press the World Wide Web (in theory) could turn every back room business into an international mail-order outfit at low cost — but not yet. It's a compelling fantasy for both vendors and consumers. Particularly to an expatriate, like myself, the notion of being able to sit at a desk in London and have instant access to the familiar goods of home is a powerful one.

Moreover, anyone who's fed up with having 26 places in which to buy copies of Pulp Fiction and Home Alone, yet nowhere to find the much-loved and delicate seventies cult film King of Hearts, or who lives in a small rural town with no good bookshop and a tiny grocery store that's never heard of Gouda cheese, will welcome the idea of being able to use the Internet to gain access to a world of wider choices. But again; not yet. But like they always say, it's coming Real Soon Now.

People who are interested in becoming net.vendors have, essentially, two choices: to go it alone, or join one of the electronic shopping malls that are beginning to pop up across the net. CompuServe's internal US Electronic Mall is probably the oldest online shopping service: it's been going for more than ten years. The UK Shopping Mall, however, only started up in May 1995.

Both services are due to change fairly

soon as CompuServe is moving to open them up on the Web, giving those merchants broader net accessibility than they have now. It's already facing Web-based competition from Barclaycard's "BarclaySquare" as well as the somewhat differently orientated "Britnet".

No one will release sales figures and CompuServe's Keith Arnold, who runs the US Electronic Mall, is no exception. His assessment of the market is candidly mixed: "For all the hype that it gets, it's not exactly a medium that has many huge success stories. I'm not saying people aren't making money, but this is the wild, wild west. Although we've been doing it longer than anyone else, it's still in its infancy." So: "A lot of companies make a nice profit on their online sales,

but a lot of companies are just at the break-even point."

Like many involved in net commerce, Arnold compares the costs and returns with the many forms of advertising rather than to sales outlets: "We don't have companies saying we'll pull money out of, and back way off, traditional advertising and plough into online because the return is equal or greater. But we do see a lot of companies saying that consumers are changing — they're not passive like they used to be. They want more control over their money and their destiny." So many companies answer these perceived changes by "driving into every possible channel."

Both CompuServe and Barclaycard's BarclaySquare, launched at the end of last May, aim at bigger companies with nationally known names. So CompuServe's UK shopping mall houses: WH Smith, Virgin, and Tesco (wine). BarclaySquare invites you into: Argos, Blackwell's, Toys 'R' Us, Sainsburys and Innovations.

"We do strongly communicate that the Internet is not secure," says Sebastian LaPorta, the commercial manager for Barclaycard's Emerging Markets Unit, adding that besides the Netscape secure server technology Barclaycard has its own back-office security that authenticates transactions and validates

BarclaySquare has gone for big names like Sainsbury's and Argos

customer addresses and post codes. This is something that many telephone ordering outfits don't do, points out LaPorta.

CompuServe can claim a similar level of security: it uses its own proprietary network, so as long as you access CompuServe by direct dial-up, your transaction should be completely secure. Web users visiting the CompuServe site from outside, though, face the same problems as any Web users.

Selling via both CompuServe and BarclaySquare is priced to exclude small businesses. Barclaycard, which believes its name will give online customers a feeling of security about the businesses with which they're dealing, didn't charge the first raft of vendors rent, since the value and demand were unknown. In mid-July, it was still finalising its price structure for its full roll-out in 1996: roughly, says LaPorta, companies will have to pay to develop the site and there will also be varying rental levels, depending on position and prominence on the service. BarclaySquare doesn't expect to impose transaction charges.

By contrast, CompuServe quotes US rates of $50,000 plus two percent of online sales for joining its roster of merchants. This includes developing the site for a couple of hundred products, online promotions, features in CompuServe's in-house magazine and so on. This may seem disappointing, but Arnold and his UK counterpart, Paul Stanfield, both say that the US experience shows that the smaller merchants simply don't have the available resources to devote to building up the online presence, in the way that's needed, for the venture to be a success.

Being a big name helps, he says, pointing to the almost immediate success of the US (and now UK) clothing direct seller Land's End. But it's not enough by itself: "Slapping static Web pages up on a server is not going to make you a true interactive marketer. You have to understand the medium and know how to create a site that's engaging and all those things, and put the resources behind it and have people who really know it. There are so many projects where the vice-president and president of marketing are really excited, and then within 12 months you have a college intern running the whole interactive show between making coffee and photocopies." There has to be one person who really "lives the business", rather than someone who has a

Electronic publishing ventures like d-Comm avoid delivery problems

note taped to his computer reminding him to "download this file every day and take it to Jane."

Britnet, a new service backed by the five-year-old Online Entertainment, aimed specially at small British businesses, quotes much lower costs: as little as £5,000 to develop the site and do some marketing for it, plus a percentage that varies from five to 15 percent. The vendors on its site so far provide travel insurance (you can fill out a form, get a quote and even a cover note online), London theatre tickets and information on mortgages. "We're slowly trying to bring some structure to British Internet trading," says Graham Higginson, Britnet's managing director. The company expects to have 25 to 30 participants at its site by autumn this year, having installed a secure server last July.

Concurrently, it's undertaking a market research programme run by CMT, the company that carries out the national shopper survey, to find out who really does visit the site so that it can provide its participants with detailed information. Like his counterparts at Barclaycard and CompuServe, Higginson likens online marketing to a new form of advertising and

Computer Manuals takes orders by Internet but confirms by phone

believes the opportunities are best for companies with an existing mail-order infrastructure, although he admits it wouldn't be that difficult to set up fulfilment arrangements for small businesses.

The one exception to this delivery problem is, of course, publishing. *The Economist* magazine's new specialist electronic IT publication, *d-Comm*, says it has a very low break-even point because electronic publication has done away with the expenses of production and distribution. Higginson says he's getting 15 to 20 calls a day from companies who want to join the site. "Some of these people will be disappointed," he says, "certainly the smaller ones," with all the hype, "it's almost panic." But for a small company, "It's painful if they set up and get no response for six months."

Nonetheless, at least a few people are beginning to take advantage of the reach of the Internet to start small online businesses. One example is Giftnet, a sort of brokerage service that rents space on Demon's web server and offers an unusual collection of gifts, including helium balloons with your choice of greeting, coffee, fruit cake, tequila, and cacti. The site's owner, Denise Spreag, says she's set it up as an experiment to see what the hype was about and whether it would work. She spent several months going to gift and trade fairs and sampling merchandise. "Waddling home" afterwards, she approached a few small traders with what she believed were interesting items and proposed the venture. Orders are taken by email or fax with no credit card information. She then calls back to confirm and arrange payment. The traders then send the goods and pass on a small commission.

Spreag has managed to keep this to a low-cost venture. Space on Demon is inexpensive. The Web pages, which have been deliberately kept simple and text-only, were written by a friend, Simon Sherlock, who works in computing and saw the experience as an opportunity to learn HTML. It's low-cost for the retailers, too, because it's so experimental and Spreag isn't charging them rent. She has skipped some frills: for instance, the page has no graphics (for speed reasons) and

the product line is small enough that everything fits onto a single page.

Somewhat more expensively, but still low-cost, is the approach taken by Birmingham-based Computer Manuals, one of the major retail and wholesale suppliers of computer books. Like Giftnet, Computer Manuals' Web server takes orders but confirms later by telephone and then takes details of payment. When you've ordered once, you're assigned a customer number which you can quote on email or form-based Web orders. The company also accepts PGP-encrypted orders, but says these are rare.

Nick Challoner, who handles online sales for Computer Manuals, advises those interested in setting up their own online sales presence to shop around for space, checking not only prices but the speed of the provider's own connection to the Internet. Smaller providers, who resell larger companies' services, often have relatively small bandwidth available which has to be shared with all of the company's users — at popular times of the day, this can slow your service to a crawl. Net users react like London drivers who have just spotted an opening in traffic: they click, and then zoom elsewhere. Even BarclaySquare experienced this as it went online with what LaPorta admits was too small a pipe to its site (managed by Jersey-based Interactive Telephony), so last July the company upgraded to a two-megabit pipe to improve the speed of service.

Every business is different, but based on his experience Challoner estimates 100 hours for developing a medium sized site from scratch. Most Web consultants charge approximately £500 a day, but as he says, HTML is not difficult to learn and at those rates there's a lot of money to be saved by doing the basics in-house. Computer Manuals' site incorporates a search engine — a piece of freeware sourced from the University of Edinburgh. Installing that, and making it work, is more complex than simple HTML formatting: the sort of thing for which you could hire someone for a couple of days, to carry out if you didn't have the necessary programming experience in-house.

Challoner disagrees with the idea that only large companies, or those with an existing mail-order infrastructure, can succeed on the net. When you're starting up, he says, "The volume is low enough, compared with normal mail order, that if a shop decided to sell products on the Web it wouldn't be inundated with orders it would be unable to fulfil." Instead, he

Netscape 1.1

One of the reasons that we're seeing a spurt in the growth of commercial services on the net is the release of the latest version of Netscape's World-Wide Web browser and server software, which incorporates security in the form of a Secure Sockets Layer (SSL). Netscape claims that this provides data encryption, server authentication, message integrity, and optional client authentication between applications like FTP, Telnet, and Web software. The specification, developed by Netscape, is available on the company's Web server (http://home.mcom.com/home.html) along with relevant technical and reference material.

For the online shopper, it's easy to tell if you're interacting with a secure site or not: if you are, the bars at the top and bottom of your screen turn to blue (or whatever colour you set in your configuration options). As Netscape's information warns, this doesn't mean you can believe what's in the document, just that it was transmitted to you using encryption. A key icon at the bottom left corner of the document also shows whether the current document is secure: if the key is broken, it's not. More importantly, Netscape will tell you if you're about to submit a form, possibly bearing credit card and other personal information, insecurely.

You can get more information about the encryption used, and the remote server, from the dialogue box that comes up if you choose Document information from the File menu. From the vendor end, the HTTP server negotiates the connection with the browser, and thereafter all information in both directions is encrypted in transmission — not just credit card details submitted via forms, but access authorisation information (user IDs and passwords), and even URL requests and the data transmitted in response. The encryption used is RC4 using a 40-bit key — as usual, due to the International Traffic in Arms Regulations and the international character of the Internet, there are limits on the strength of encryption that can be used. A US-only version of both the server and browser using 128-bit keys is planned.

Secure servers — which Netscape refers to as HTTPS (for HTTP plus SSL) — use a different protocol from insecure servers, and typically use different ports, too (443 instead of 80, for the technically minded). The upshot is that a single server system can support both types of access. This is useful if, for instance, you want to allow any passing browser to examine the shop window and take a look at your product offerings, switching to the secure server for ordering and payment purposes. At the same time, the difference in the protocols means that people using insecure browsers won't be able to transmit their public information over the network: the connection will be refused from the outset.

Security on the net is still in development. There are other proposed protocols, and these are being studied by the W3C working group on security. More information on all these topics is available via Netscape's home page.

Both vendors and customers should be aware however, that security of data in transmission is only one part of a security system: protecting your Web server won't be enough if, at the same time, your accounting system automatically spits out a statement to go with each consignment that lists all the credit card and personal information and then sends it to the delivery address instead of the billing address. No less a company than W.H. Smith, in its first days on CompuServe's UK Shopping Mall, sent out credit card slips wrapped with books that had been ordered — as gifts to third parties.

thinks it would start slowly enough so that a business could keep pace as the numbers grew. But smaller companies are still at a disadvantage. The $2,000 to $3,000 cost of Netscape's secure server software is a big investment for a small company — particularly for a medium which is still unproven. The smallest companies, like Spreag's Giftnet, have to hope that service providers renting space will choose to install secure servers, and sell secure services, as part of their Web site. Medium-sized companies have to look at setting up their own Web sites, which is what Computer Manuals is planning. But even then, the company will wait to install a secure server until the technology settles down and is proven to offer the security that's been promised. That's the key that will turn the Internet from a new kind of advertising medium into a genuine marketplace.

Resources

- **BarclaySquare**
http://www.it.net/barclaysquare >Britnet:
http://www.britnet.co.uk

- **CompuServe**
http://www.compuserve.com

- **Computer Manuals**
http://www.easynet.co.uk/compman.html
>d-Comm: http://www.d-comm.com

- **Giftnet**
http://www.demon.co.uk/giftnet >

Active service

Which is the best way onto the Internet with the plethora of service providers offering access? **Wendy M Grossman** is your pathfinder, reviewing the established providers, scouting out the best newcomers and summarising the hardware and software considerations.

It's astounding just how much the Internet services provider market has changed since our first round-up a year ago. Then, there were just seven services to review, but this year it's not even possible just to list them all. For this guide we've picked the established national providers, plus a selection of interesting newcomers. We have left out BBSs and the smaller, regional services, most of which are resellers for larger providers already reviewed here.

Forget the hype about the information superhighway — what you're buying when you sign up for Internet service is a communications tool. In most cases the Internet you gain access to is the same, just as you buy access to the same telephone network whether your service comes from Mercury or BT. But a few services, notably Research Machines, the BBC Networking Club, and UK Online, specifically aim to block material parents might find objectionable for their children.

And like the telephone network, the Internet is the conduit for a variety of services. Just as the phone network offers the chance to talk to people, use fax machines and modems, and call up chat lines, the Internet offers email, FTP, Telnet, IRC, and the Web. Each service requires a different piece of software, known as a "client".

There are two main types of Internet access: direct or "IP" (Internet Protocol), and gateway. With a gateway service, the various types of client software run on the service provider's computer, and all you need on your computer is a general communications package — even Windows Terminal will do. With IP services you run the client software on your own computer.

Until recently, gateway services were the simplest method for an inexperienced user, as IP connections for direct IP services were generally harder to configure. This is less true now that most providers supply installation routines to do the tricky stuff for you.

Once you've installed the "stack" that loads the Internet protocols onto your computer, adding client software is extremely easy: just unpack them into the directory of your choice and start them up. This has definitely shifted the ease-of-use balance, since the Windows-based clients now available require you to learn far fewer complex commands than the text-based Unix interface you'll find on most gateway services. On top of that, direct IP services allow you to run concurrent multiple sessions, so that you can browse the Web or Telnet to a remote computer while a file transfer is in progress.

However, gateway services still have a lot to offer. Unlike direct providers, gateway providers typically offer a coherent interface, online help, and local services such as access to the main commercial news wires (Delphi and CompuServe) or local conferencing (Delphi, BBC Networking Club, CompuServe, CIX, and Almac). CompuServe also sells access to a wide range of information services at varying prices.

Because gateway services are all different, the trend now is for them to sell software tailored to their systems that will make navigation easier. Some such software, like Ameol for CIX or Apollo for Delphi, automates logons so that you spend the minimum amount of time online and do the time-consuming work of reading and writing messages offline, where there are no phone bills adding up. The one disadvantage to this approach is that if you subscribe to more than one service you wind up with a different piece of software for each one.

There are a couple of hardware considerations, too: gateway services tend to be less demanding. For a direct IP connection, get the fastest modem you can afford, definitely no less than 14,400bps. To run under Windows you also need a serial port with a buffer chip called a 16550 UART in it. Most new PCs from reputable manufacturers will already have one on the motherboard. Otherwise a serial board containing one is a fairly cheap upgrade.

The various software clients don't need the fastest PC in the world, but it helps to have a reasonable processor and amount of memory, so that Windows (or OS/2, Mac System 7, or whatever you're using) itself runs smoothly. We tested most of the ISPs' supplied software packages for this review on an IBM Value Point Pentium P60 machine, but we routinely access even the most demanding part of the net, the Web, with all types of software on a 486SX/25 with 8Mb RAM.

By far the most common use for the Internet is exchanging email. If that's all you want to do, any provider will do the job at a reasonable cost; your primary consideration should be making sure you'll have access to your email when and where you need it.

A year ago, the second most common use was electronic conferencing, either locally or worldwide on Usenet. Either way, conferencing is a way to interact with people who share your interests and to find technical or miscellaneous help. If this interests you, make sure you can get an offline reader (OLR), as this is the area where phone bills and usage hours really add up.

By now, though, the second most common interest is probably the fast-growing World Wide Web. The Web is pretty hopeless via a gateway, as typically the client software will be text-only; with a direct IP provider you can use far more attractive Windows software that can handle graphics, audio, and even video. However, you need a high-speed connection to enjoy any of this. Even at top modem speeds the Web can be maddeningly slow.

For most of the remaining commonly used services — FTP, Telnet, and IRC — there's little difference between gateway and direct providers, and the same is true of Gopher servers. The exception, FTP, is usually easier and more efficient via a direct service provider and a Windows package; on some gateway systems (CIX) you have first to retrieve the file to the provider's computer, and then send it to your own. If you dream of an all-in-one package, it's not there yet, although Web browsers like Netscape support both FTP and Gopher.

Within these broad categories there are fine differences between ISPs. Some services offer free trials — a good way to get your feet wet before making a final decision. Bear in mind, though, that no provider will do more than get you started: you will have to do some active learning to get the best out of the net.

BBC Network-ing Club

The BBC Networking Club is part of the BBC's education unit, and its use is restricted to home users and schools. It has the slowest procedure for opening an account of any of the services reviewed here: you fill out an application and post or fax it back, and then have to wait for a set of disks to arrive by mail. Most regular users we've come across, however, say they're happy with the service and that it's reliable.

Once you've filled out the application and sent it back you're sent an A4 guide to getting online, two disks full of software, and two IDs and passwords — two, because one is for the IP service and the other is for the BBC's own BBS, Auntie. Like the Direct Connection and some others, the BBCNC is really two services: a login service for local conferencing, mail, and news, and an IP service. We were disappointed to see that the software supplied is another collection of unregistered shareware; the guide says that the BBC had expected to deliver new software to its users in February this year, at a cost of £5 to £6, along with a £35 offline reader for Auntie which was still in beta as we went to press.

We were very impressed, however, with the manual, which is a very good guide to the software. You may have

● *The BBC Networking Club is limited to home and education, but its users seem happy with it*
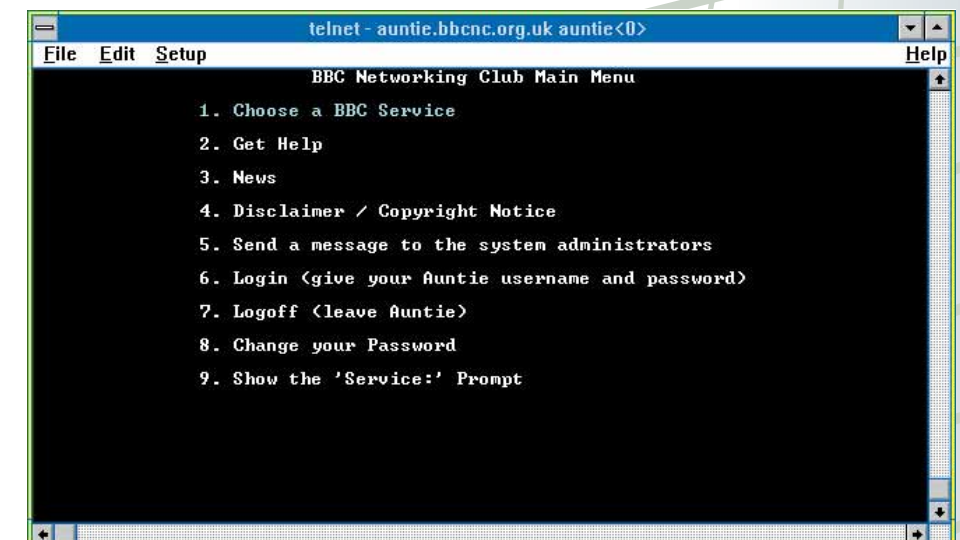
noticed there's no newsreader in the package; a sample FTP session in the manual sends you to download WinVN — the best way to learn, by doing something useful.

The setup procedure you follow asks your user IDs, but not your password. Trumpet Winsock demanded this information after a false start at logging on. Once we'd entered it, things went smoothly. Most of the software is straightforward, and the manual covers the configuration routines needed to troubleshoot your connection. Anyone who's been around the net much will probably want to replace at least a couple of the supplied components, particularly WinWeb, which although it's a nice browser is somewhat behind in development. Unfortunately, the service has discontinued the Web-based shareware registration scheme it directs you to in the manual. You are expected to register direct with the developers, whose addresses are in the manual rather than linked from the Web page.

All the packages are configured to log directly onto the BBC's site, especially the Telnet client, which takes you to Auntie's opening screen. This part of the service is menu-driven; follow the numbers and letters to get to Auntie's local conferencing.

BBC Networking Club
Price Sign-up £25; £12/month
Contact BBC Networking Club 0181 576 7799

Good Points BBC content, on Pipex vPoP network, inexpensive, good manual.
Bad Points Delays in delivering OLR, administration seems slow, not for business use, shareware fees payable.
Conclusion Users seem happy with this service, but it's limited to home and education; parents may like its attempt to block some newsgroups.

CityScape

Cambridge-based CityScape, which like most services started up last year, has had a confusing relationship with Pipex, for which it used to supply the consumer service. These days, CityScape's IP Gold service competes directly with Pipex Dial; nonetheless, Pipex supplies CityScape's Internet feed and network of PoPs. But CityScape has changed its software from Unipalm's Dial package to a more standard group of software.

The £25 sign-up fee you pay includes a fully registered suite of software, as one of the company's directors believes more people should realise when they compare its sign-up fees unfavourably with those of some other providers. With services like IBM and CompuServe supplying free, registered IP software, even this price is beginning to seem high, especially if you later decide you prefer other packages. On the other hand, CityScape is a flat-rate provider and one of the trade-offs tends to be that free sign-up and software often presages higher, or per-hour, connection fees. Overall, CityScape is very good value and seems to have

escaped the problems that have plagued some other, larger, services.

CityScape's package comes with a streamlined installation routine that completely flummoxed us because we couldn't figure out how to load our details. It turned out that this window routinely opened with the OK button disappeared off the bottom of the screen. Once you've found that, it's very simple, since all you have to input is your user ID and password, plus details of your modem and communications setup. Your IP number is allocated dynamically.

Like several other services, CityScape has required users to call in to change their passwords. Recently, however, it's been working with the British Computer Society (BCS) on building BCSNet, and it's changed its procedure in answer to BCS specifications that users had to be able to change passwords at will. This is good news in one way, since you can change your password in a hurry if you need to. But this puts the onus on you not to choose stupid passwords like your login, real, or company names, or a part of your address.

Like a number of services, CityScape gives users a free half-megabyte of Web space in which to express themselves, and also hosts some outside folks like London's ICA. It also has an interest in Britain's first cyber pub, which you can get a look at via its Web server.

Long-standing users seem generally happy with the service: but in our experience the office tends to be very busy, and getting help can be difficult.

CityScape
Price Sign-up £25; £180/year or £15/month
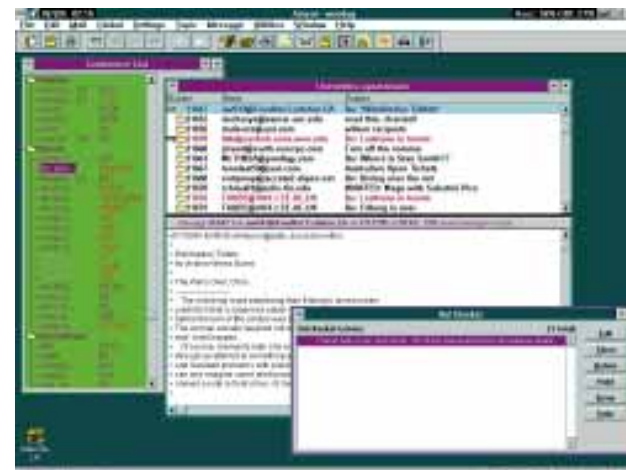**Contact** CityScape 01223 566950

Good points Sign-up fee includes registered software, reliable service
Bad points Staff tend to be busy
Conclusion A strong choice for UK-only access

CIX

Surbiton-based CIX, for Compulink Information Exchange, is probably Europe's oldest conferencing system: it has literally thousands of its own discussion groups (conferences), as well as gateways to Usenet and the Internet. The Internet gateway gives you access to FTP, Gopher, Telnet, IRC, the various Internet utilities, and the text-based Web browser, Lynx. Most of this is nicely designed, so you simply type "gopher" or "www" and you're instantly in the system.

Cityscape is good value and seems to have escaped the problems suffered by other, larger services

CIX is probably Europe's oldest service. It's nicely designed and busy, with a strong community feel

Online help is available.

Most users access CIX with one of its many offline readers — there is at least one for almost every type of computer imaginable. CIX's own official OLR is Ameol, which supports most Internet activities through scripts and also works via Telnet. The Ameol/CIX combination is probably the fastest way to handle Usenet downloads as CIX simply bundles up all your waiting messages into a single file for Ameol to swallow whole and digest into threaded topics. If you log on using an ordinary comms package you'll find that CIX's interface is confusing at first, but quick, consistent, and flexible once you get used to it.

CIX's IP service was originally planned for early 1995. It is still in beta as of this writing, but due for launch in mid-August with a £30 licensed software package. Pricing has been set at £15 per month for 30 hours off-peak, or 20 hours anytime. The £6.25/month minimum will be waived for IP users. There are plans to introduce new PoPs.

The system has had reliability problems in 1995 — the worst was on a recent Friday afternoon, when the system went down without warning at 2pm and didn't come back up for nearly 15 hours. When it did, some conference messages were missing. Some staff have blamed the glitches on the efforts to get the IP service ready.

CIX's strong points are the many offline readers,

the facility that lets users set up their own (even private) conferences, and the speed of its Usenet feed. But the batch files it creates to download Usenet have a 2Mb size limit, so if you subscribe to many groups you may have to reconnect to get all the material down. CIX's best feature, the community feeling fostered by having a large group of British users who log on daily, is probably so far unmatched in the UK. It's mostly a techie crowd so if you want to mix with a wider variety, try Delphi or CompuServe's UK forums.

CIX
Price £25 sign-up; £3.60/hr peak, £2.40/hour off-peak; £6.25/month minimum
Contact Cix 0181 296 9666

Good points Wide range of OLRs, community feel, fast interface especially for Usenet
Bad points Unreliability problems in spring and summer 1995
Conclusion Good, local service; business users should have a back-up system for email

CompuServe

Overnight, CompuServe became the largest ISP in the UK when it launched its IP service in May, 1995. It started in 1979 as a time-sharing company and is based in Columbus, Ohio. It is the oldest commercial online information

service in the world.

CompuServe's information service can be accessed using either a standard comms package, or one of CompuServe's own navigation packages (CIM), or one of several OLRs. The service provides you with mail, many discussion and technical support forums, and a shoal of information services including British and American encyclopedias, magazine and other periodical databases, and the commercial news wires as well as access to FTP, Telnet, and Usenet.

In addition, CompuServe gives away a NetLauncher package which includes a dialler that takes the settings from your existing CompuServe setup, a Winsock, and Spry Mosaic. CompuServe's version (the company bought Spry earlier this year) includes customisable hotlists organised by subject. Once you've got all this set up, there's nothing to prevent you adding FTP, Telnet, and other clients as you wish. You are allocated an IP number dynamically each time you log on.

Many of CompuServe's nodes still run at 14,400bps; however, its entire network is due to be upgraded to v.34 by May next year. CompuServe lists a mass of access numbers; some of which are supplied by networks like Tymnet or Sprintnet which cost extra in communications surcharges. In general, you'll probably find it cheaper to pay the long distance phone bill to the nearest of CompuServe's own network nodes.

CompuServe's strengths are its consistent reliability, global access points, the breadth of the information services, and the relatively easy to use software. But you wouldn't want to use its online newsreader to access Usenet on a daily basis — it's just too expensive and clunky.

Just as we went to press,

CompuServe is the oldest commercial on-line information service in the world
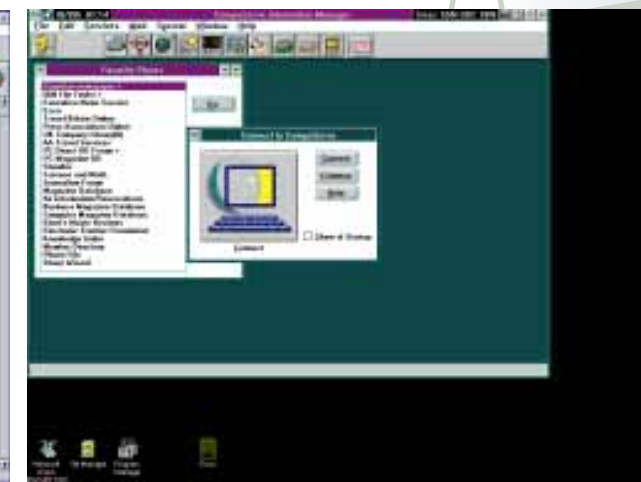
CompuServe announced it was completely revamping its pricing structure as of 10th September. From then on, $9.95 a month buys you five hours' use of almost anything on the service, with extra hours charged at $2.95. A second pricing plan costs $24.95 for 20 hours, plus $1.95 per additional hour. There have been lots of complaints about this plan because many users rely heavily on the unlimited access to basic services, that it wipes away.

CompuServe has also announced plans for a new interface which will integrate the information service with the Web so you can switch seamlessly between them. Finally, the company plans to launch a consumer-orientated online service aimed at less experienced users, sometime in early 1996.

CompuServe
Price Membership kit £29.95; monthly rates start at $9.95/month (including five free hours — no VAT added)
Contact CompuServe 01734 725 555

Good points Reliable, global access, broadest range of information services available
Bad points Can become expensive
Conclusion If we could have only one service, it would be CompuServe

Delphi

Delphi was the first nationwide US service to offer Internet access when it set up its gateway in November, 1992. The UK service was launched in early 1994 following the system's purchase by Rupert Murdoch's News Corporation (in 1993). The UK head-quarters are in London's Camden Lock and the US headquarters has just moved from Boston to New York. As we went to press, News Corporation had just announced the merger of Delphi and its inter-active games company, Kesmai, with the US phone company MCI's Inter-net operations.

Delphi's naked interface is intended to be easy to use: it's all text-based menus from which you access your choice by typing the first couple of letters. This is easy for newcomers but you get very tired of it, very quickly. Worse, the struc-ture is so unpredictable that the one shortcut feature of the service — type-ahead — is virtually unusable. The one good thing about Delphi's interface is that the Internet services aren't segregated; you can access them from anywhere on the system. So if you ask for Sports, you get a listing of services that include the AP news wire, local sports conferences, the Usenet newsreader, and a selection of other Internet resources all listed together.

There are several packages available to put a better face on Delphi including a couple of navigator packages and an offline reader, Apollo, from Ashmount Research. You can order these on Delphi itself, to be sent electronically or on disk. Apollo's functionality is also included in Ashmount's multi-service PowWow Professional package.

Delphi's gateway includes the full range of Internet services: Telnet, FTP, Ping, Finger and the Web, via a text-based browser. Besides this, like CIX, Delphi has a range of local conferences, some of them hosted by the same people. Having initially been a US service, it has a large range of US con-ferences as well. And there are a few information services, such as the AP newswire, headlines from the Times, and an airline reservation service, that also appear on CompuServe. Unlike the latter, Delphi segregates the US and the UK to some extent: to encourage its develop-ment as a British service in the early days, the UK service didn't appear on the US menus.

Delphi has stagnated somewhat in the last year, but it's clearly planning better things: it has announced a new interface (developed jointly with Netscape) and is due to be rolled out in the UK later this year. From the sounds of it, it may be somewhat like UK Online's Web-based service.

Delphi
Price No sign-up fee; £10/ four hours or £20/30 hours plus £3/ additional hour
Contact Delphi 0171 715 7080

Good points Reliable, own conferences can be set up, mail can be stored online permanently
Bad points Old interface, UK forums still under-populated
Conclusion Delphi's new interface could make or break the future of the service

Demon Internet

Demon was the company that created the domestic Internet access market in Britain and it set the price target that all other ISPs try to reach. It hasn't raised its prices since it started in late 1992, charg-ing a tenner a month. Traditionally the trade-off for this low cost was surviving the experience of configuring its DOS software; a cobbled-together group of programs including a dialler (originally designed to let people send data over packet radio), and an offline reader which downloaded rather slowly. More recently there have been evenings full of busy sig-nals: a victim of its own popularity. Its worst troubles arrived this Spring when it had problems with its news and mail servers. These have since been fixed, and the system seems to be back to its reliable self.

Evening access has also improved since the company signed a deal with Energis and acquired a lot of new phone lines. Better than that, it's come up with a new Windows package which includes a full set of Internet utilities, installs smoothly, and brings Demon's usability more into line with the other suppliers'. At the same time, Demon hasn't

compromised: unlike almost all the others, the Windows-based newsreader is an offline reader and the package is one of the most complete currently available, even including implementations of Ping, and Finger.

This means that Demon's software remains more complicated than some others, but this doesn't reflect badly on the company since it's offering a complete service. For instance, the Telnet client, which has been written by Demon staff, has scripting facilities — rare, and very useful. And Demon is one of the few services that gives all its users their own permanently allocated IP numbers. This means users can set their machine up so that other people can access it, or retrieve files from it, from across the Internet.

Signing up for Demon involves phoning or faxing the company to choose a node name and password, and to get your IP number. You can then either log on to the company's server and download the software you need, or ask for it to be sent on disk. You can have as many mailboxes per account as you wish, but there are restrictions on how you use the Demon service on a network. Demon rents Web space; it hosts The Electronic Telegraph.

Demon's strong points are low prices and a full service; it helps to be technically literate, but its Windows package makes this less important.

Demon Internet
Price Sign-up £12.50; £10/month.
Contact 0181 371 1234

Good points Cheap, full-featured, UK-wide access
Bad points Has had some news and mail problems during 1995
Conclusion Good value, but periodically suffers from growing pains

The Direct Connection

This seven year-old company operates two types of services: gateway (they call it "login") and IP. But the IP service is the more popular of the two and it's the one the company is promoting. In some ways this is a pity as there's a lot to be said for local conferencing, but as the company itself points out; people are now more used to graphical interfaces, while the login service is text-based. TDC (The Direct Connection) is a Pipex reseller. It's a particularly good deal for Videotron customers, who can call it for free during some off-peak times.

Joining TDC used to be a matter of setting up your account and then logging on to the gateway service as a guest, to download the software. However, the service will send you a couple of disks containing a complete package — all unregistered shareware. It's up to users to pay the fees for a legal license or switch to other packages after the shareware evaluation period is over.

Direct Connection has some of the most helpful technical support people around — they even wrote us a little routine to let a single Winsock share multiple configurations so our existing ones wouldn't get overwritten. But that's assuming you can get through to a human: Direct Connection has one of the worst voice mail systems ever devised and its help lines are often too busy to let you through to a person. However, the company's business manager, Trevor Diamond, has sworn to throw away the voice mail and adds that TDC fully intends to push itself into the ranks of the bigger providers.

The service as a whole demands

Left *Direct Connection is inexpensive and has good technical support, but overall it needs some attention*

Right *EasyNet supplies Internet access for Cyberia. It's a reliable service, with a classy set of software installation instructions*

a certain amount of self-reliance and technical intelligence. Although the software package is almost the same as Easynet's (only the newsreader and Telnet client are different) there is no unifying menu. The installation routine simply unpacks the whole thing into a window full of icons and then it's up to you to do the configuring.

Direct Connection seems to have stagnated a little since last year. While it's a perfectly good service — in the early part of this year, when Demon was busy, you could almost always get through to connect in the evenings — performance seems a little slow, and the service doesn't seem to be growing as fast as some others. Unlike some of the larger providers, Direct Connection doesn't seem to be making moves towards creating or buying in its own package.

The Direct Connection
Price Sign-up £7.50; £10/month and upwards
Contact Direct Connection 0181 297 2200

Good points Inexpensive, especially for Videotron customers
Bad points Extra fees payable for shareware, technical knowledge needed, voice mail system
Conclusion Inexpensive, undifferentiated service that needs better software and setup in order to grow

Easynet

This is the company that supplies Internet access for Cyberia, London's cyber cafe, and is also a majority shareholder. Its

commercial Web customers include the Birth Control Trust, Computer Manuals' online bookstore, and Channel One.

Easynet's software is supplied on two disks with the best set of installation instructions we've seen, including a personalised screen showing how to fill in your user ID, IP number and modem information — you know it's just fancy mail-merge, but it is very classy.

However, seeing the password written on a piece of paper raised an interesting question: are you prompted to change it when you log on for the first time? The answer is no — to change your password on Easynet, you must call them and request that they do it. For security reasons, this is a bad policy: it's safest if no one knows your password, and a standard protection is to change passwords regularly — and immediately, if you think it could have been cracked. Immediacy is difficult in the middle of the night, since Easynet's technical support hours are Monday to Friday 10am to 9pm, and Saturday and Sunday 10am to 6pm.

Once we had installed the software though, and tried running our first connection, we discovered we couldn't do anything. It turned out that we hadn't compared the setup screen with the instruction sheet quite closely enough. A mistake in the IP number meant that although we were able to log on, we didn't register as a legitimate user. Technical support had no trouble figuring this out quickly, and we had no problems thereafter, either with getting onto Easynet whenever we tried, or with connections (once we were on).

Our only criticisms of the package are two small usability points. Firstly, while you can easily send mail from Eudora at any time it isn't obvious how to get mail, and it doesn't just arrive. It turns out you have to request it by picking a menu choice; when you do, Eudora asks you to type in your password before it will connect. Secondly, it isn't obvious how to disconnect without exiting the menu system. Since Trumpet Winsock can be fussy if you exit without hanging up properly, the package would be far less trouble if this were rectified so the "Connect to Easynet" button changed to a "Disconnect from Easynet" button after logon.

Overall (except for the password problem) Easynet seems to be a good, reliable, if undifferentiated service. Its biggest limitation is that at present it only has PoPs in London and Edinburgh.

Easynet
Price Sign-up £25; £11.90/month or £118.80/year
Contact Easynet 0171 209 0990

Good points Single-menu interface, great setup procedure
Bad points Change password by calling office; few PoPs
Conclusion Has to stay up and running or the whole world will know, because of Cyberia

eWorld

Apple's Mac users-only service is due to be opened up to the world of PC users some time towards the end of the year. Meanwhile, Mac users can tour around a service that includes shopping, local forums, and Internet access using the latest version of the client software 1.1. It doesn't take much of a Mac to do all this: we did our visiting on an old SE/30 with 4Mb of RAM and a 40Mb hard disk attached by special cable to the same external Hayes Optima we used for the other reviews. (You need System 6.0.8 or later to run version 1.1).

eWorld remains a staunchly US product. The menu system that guided us through eWorld technical support (a freephone number) routed us to an inept MCI operator who thought that York and Aberdeen were in London. She was also unaware that the 081 area code had been changed to 0181. Back at the very busy eWorld help desk (also handled in the US), they found 9,600 and 14,400bps numbers — we then had trouble with flaky connections.

But once you get on, the interface is beautiful and what every online service should be emulating. The opening screen is a little village: you click on the "building" you'd like to enter; financial services, computer centre, news-stand, and so on. Each choice you make puts up a selection of services: you click on the ones you want — from Reuters news, to downloading the eWorld Web browser as a prelude to moving into the wider net.

But at $9.95, with only one hour of use included per month and additional hours also priced at $9.95, the service is expensive. Except for the service's own Info Booth and software download area, nothing is free — not even the shopping. Mac users should therefore bear in mind that eWorld is not their only choice. Many of today's graphical Internet packages — everything from Web servers to the Internet videoconferencing package, CU-

SeeMe — were originally developed on all those Macs that Apple sold cheaply to US educational users. Demon, IBMNet, and CompuServe all have Mac packages readily available, so Mac users should remember that the choices do exist. However, Apple says its high costs are almost entirely due to communications surcharges, necessary to route UK users via Spring, MCI, and BT to the service's home in the US. If you already have IP service and you access eWorld via Telnet, the price drops to $29.95 an hour.

eWorld
Price No sign-up fee; $9.95/hour ($2.95 via Telnet), free trial available (two hours)
Contact eWorld 0800 896206

Good points Beautifully designed Mac interface, online news, shopping and events
Bad points Expensive, US-based with little UK content
Conclusion Mac users should consider their many other options: if you need eWorld, sign up with an IP provider and go in via Telnet

Frontier

As if the Internet market weren't confusing enough already, there are two "Frontiers": Frontier Internet Services specialises in Web design and sells Internet connections on the side; Frontier Communications International sells videoconferencing capacity and UNIX connections. In the few months since the latter launched its PC-based Internet service it has installed PoPs all over Britain, to the point where the company says its ratio is as high as 15:1 in Truro — that is modems to users, rather than the more usual other way around. Its Gloucester node is even worse. But Frontier believes the market is there and in the meantime on a busy night in Edinburgh, it can route the excess traffic to Gloucester where the ratio is 30:1 and sometimes there's only one person online.

Frontier's US parent is currently beta-testing a software package for the service which when it's finished, probably some time in late September, will be given free to old and new subscribers. In the meantime, new users have the choice of sourcing their own software or buying a full suite of registered programs for £99. Frontier's cybersalesman, Justin Roger, believes that distributing shareware unregistered for use on a commercial service contravenes the established conditions of shareware distribution.

What Frontier provides for your £25

sign-up fee is a live human on the other end of the phone line who guides you through installing and configuring your software via a first, successful login. You pay £4 extra per month if you want a permanent IP address; otherwise you get one dynamically assigned to you when you log on. Thereafter, Frontier provides 24-hour technical support. We told our human we were a Demon user trying to change our software configuration to use it with Frontier, but we weren't sure we would sound convincingly inexperienced. In the end, we dealt with several humans. The first sent us a full set of instructions, by email, specifically geared to our stated needs including a script we could simply paste into Winsock. A second called some hours later to check we were getting on OK. A third, we called, to let the company check we were logging on properly. All were pleasant and helpful, and seemed to be fully informed: Frontier's tracking system obviously works. That's more than we can say for Winsock, which took several calls to trouble-shoot (not Frontier's fault).

Frontier
Price Sign-up £25; £8.50 or £12.50/month (dynamic or static IP address)
Contact Frontier 0500 468376

**Good points** Lots of PoPs, 24-hour 7-day top-quality technical support
Bad points Relatively unknown
Conclusion Cheap, well-supported, with good coverage; all it needs is decent software and a UK track record

IBMNet

People first heard of IBMNet when OS/2 Warp was released with a bonus pack including all the software needed to log on to the Internet. IBM also gives away Windows packages and has a deal with Mac software publisher, Ventana, for a Mac package. Under OS/2, we found the system somewhat frustrating as it seemed as if every time we dialled in, the software needed to be updated. Nevertheless, regular users do not report such problems and say the service is excellent and reliable.

Until recently, IBM was handing out a shareware package that was pretty much
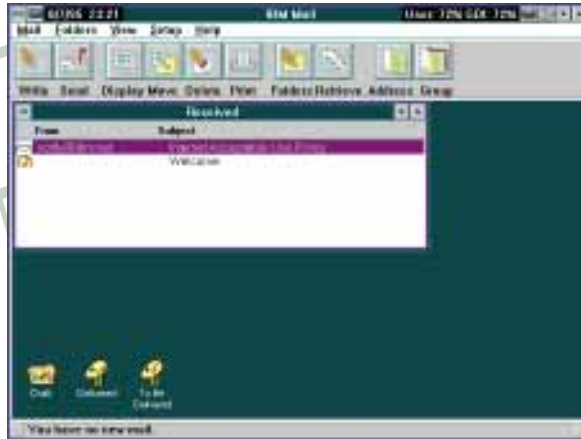
IBMNet offers reliable, global access and has the perfect software for anyone using more than one system

the same as several other services reviewed here: Eudora, WinVN, and so on. But now it's got a licensed package that's much better, and it's free.

What the company gives you is almost the perfect software for anyone using more than one system. The control panel includes options for adding connections to a wide variety of services including the UK's Demon and Direct Connection, and you can add any extras you like. It's all well-designed and attractive with big, fat, colourful, clearly labelled buttons. There's no manual, but you don't even miss it.

The snake in this paradise is that you can't configure the software, so it doesn't automatically close all your Internet applications when you disconnect. Have these people never heard of downloading a large Web page and disconnecting to read it offline? If you could do that, and then click on a link to reconnect, the software would be our choice for some kind of prize. Parts of it, particularly the mail package, were bought from Netmanage, maker of Chameleon and other Internet software — the rest is IBM's own.

IBM is continuing to build its own network, much as CompuServe has, rather than sign a deal with outside companies to provide nodes. The intention is that by owning the network IBM can better control speed and reliability. Instead of following the typical Internet pattern of routing packets of data all over the place, IBM aims to route them directly to the nearest point to your actual target destination before handing them over to the Internet proper. If this actually works, the trade-off for the much smaller number of UK nodes (nine, as opposed to the 90 percent coverage promised by some other systems) may be worth it. And you get global access, with 110 nodes already in place

in Europe. Additionally, as we went to press IBM had announced a new product to support Lotus Notes over the network.

IBM Global Network
Price No sign-up fee; £10/3 hours or £20/ 30 hours plus £3/additional hour
Contact IBM 0800 973000

Good points Reliable, global access, great software
Bad points Hours above 20/month could add up
Conclusion A strong choice, especially if you want IP-only worldwide access

Pipex Dial

Wherever you look in the UK Internet service market, Pipex is there. It's part of the software distributor Unipalm (now renamed Unipalm Pipex) which has recently signed a deal to distribute Netscape in the UK. It supplies the Internet feed for about 30 resellers nationwide, including several reviewed here: CityScape, the PC User Group, the BBC Networking Club and The Direct Connection. On top of that it made a deal with Mercury earlier this year, to create a virtual PoP network to which it also sells access. Users get local call access via the many numbers nationwide and Pipex gets cheaper maintenance, since the calls are re-routed to one of only two banks of modems.

Pipex Dial (launched late last year as Pipex Solo) is Pipex's consumer service. You get a package of Unipalm software including a control panel-cum-configuration routine, Mail-It, and a couple of other utilities, but no FTP client or newsreader. While it's nice to see a different software package once in a while, we weren't too impressed with this one. Mail-It is fussy — it won't send messages if it's loaded before you connect. Pipex's technical support says that this is to enable your writing messages offline, which is always welcome, but it's hard to see why you shouldn't be able to log on and send your output when you've finished. The Telnet client has no facility for remembering sessions.

All the software feels rather "corporate"; as if it were designed for use by the technically literate. This impression is reinforced by there being no documentation — bad news for a consumer-oriented service. You could replace it with something you like better of course, but you'll have paid £50 for it first. As we went to press, a new version

Real-life cyber spaces

Mike H. peers at a screenful of actresses' names that he's found, all by himself, on a server somewhere in America's Bible belt. He hesitates among Nicole Kidman, Audrey Hepburn ("she's old enough to be grateful, but she's dead") and Liz Hurley. He goes for Kidman, even though by now his companion has ruined her for him by mentioning that she's married to Tom Cruise. The pictures that come up aren't of great quality, but never mind, she still looks terrific.

Mike, a long-term Mac user, seems unimpressed when he's told that the pictures are coming from a continent away: "It looks like HyperCard." Afterwards, he washes his hands with some distaste: "When do you suppose that keyboard and mouse were last cleaned?" Mike, 51, has discovered "Cyberia", London's cybercafe.

Huddled in Whitfield Street, behind London's Goodge Street tube station, Cyberia is cool, even if it didn't appeal to Mike whose relative disinterest is partly due to the fact that he was selling email and time-sharing systems 15 years ago. But his visit hasn't been wasted as it's only cost him £2.50 (and a half hour) to find out that he doesn't want to be on the Internet, which his brief acquaintance with the Web leads him to describe as "about as user-friendly as a cornered rattlesnake." Most people have to spend a lot more time and money to reach the same conclusion, so he's doing well. If you get hooked, Cyberia will sell you a training course for about £30.

At an adjacent terminal, a couple of Dutch guys (who look like university students) seem to be enjoying their time on the system a lot more. They have seen Cyberia on TV, they say. They haven't got access themselves at home, so they have come to see the place.

It's pretty well full at 7p.m. on a Monday. What's interesting if you think of computing as a solitary business, is that everyone perched precariously on the stools fronting the terminals has friends peering over their shoulders and arguing about which site to visit next. The tables are full of people with laptops, computer magazines, and £1 cups of coffee awaiting their turn.

If all this sounds to you like an appealing way to try out the net without the expense of buying hardware and fighting with Winsocks, Cyberia might be a low-cost way to try things out. The London cafe is not the only one: there are others in Edinburgh, and Kingston upon Thames, Surrey. During this year's Edinburgh Festival, the Edinburgh cybercafe is running a Web service that includes Festival listings, reviews from the Guardian newspaper, and tourist information. The latter helps the disorganised find places to stay in a city where the last bed was booked for the month sometime back in April.

The latest addition to the roster of real-life cyber spaces is Cambridge's cyber pub, Cybeeria as someone on CIX recently joked. Mike H. would have preferred this approach — at least he could have had a pint.

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of Pipex Dial, 2.6, had just been released (not quite in time for our review) with built-in filtering of email, improvements to Telnet, and an FTP client added. One nice feature about Dial is that you can check an option to have the software notify you when there are upgrades, and you download these directly from the service.

Ironically enough considering its position in the industry, Pipex was one of only two services (eWorld was the other) which gave us trouble with dropped lines. Once safely connected, however, performance seemed to be the best of the group reviewed here.

Pipex Dial
Price £50 sign-up, £15/month
Contact Pipex Dial 0500 474739

Good points Performance, source company for other ISPs
Bad points Software, lack of documentation
Conclusion Corporate focus persists, but it's a strong service

Research Machines

Abingdon-based Research Machines is known for supplying many machines to British schools. This year it's moved into offering Internet services to the same clientele, as well as to parents and others who want the service. The company says it has about 900 users so far, 700 of which are schools.

Because of this educational focus, RM (Research Machines) is continually conscious that no school principal wants to be the one whose school gets written up in *News of the World* because its pupils have been caught trading the URLs of pornographic Web sites. Accordingly, RM is making more efforts than most to block such material: besides cutting its Usenet feed to eliminate groups like the alt.sex and alt.binaries.pictures.erotica hierarchy, RM blocks some Web sites via its router. As RM's product manager Tim Clark points out, the disadvantage to this is that you can't block just part of a Web site; you have to block the whole thing. So in the days when the University of Delft had a pornography archive (it closed down due to the burden it placed on network traffic), blocking access to that meant blocking off its fine art archive, too.

But the system is secure, according to Clark: "It can't be gotten around — yet." Long-term, though, he says the company doesn't see itself acting as a censor; it looks towards products like the SurfWatch (currently Mac only) which will block Web sites, and a virus checker (updated regularly), to do this sort of work. The one drawback to this approach is that it's difficult to block everything that could possibly offend anyone, so parents who care about this sort of thing will still need to exercise some supervision.

The software package is supplied with a streamlined installation routine that gave no trouble — another day, another copy of Trumpet Winsock. There's no FTP or Telnet client, although you can source these yourself through the Web or via FTPmail. You have to register the software yourself: RM says educational users shouldn't have to pay more than £17 in total. Both the Gopher and Web clients are set up to display some of the Internet's many educational resources and RM itself is compiling lists of such things: take a look at its Web site http://www.rmplc.co.uk for examples.

RM's biggest selling point is probably its generosity with Web space: ordinary users can have up to 5Mb, and schools can have "almost as much free space as they want". A number of schools have already started putting up Web sites jointly constructed by pupils and staff.

Research Machines
Price £25 setup, £120/year payable in advance
Contact Research Machines 01235 826868

Good points Strong educational focus
Bad points After initial troubleshooting technical support is by email only, pay a year in advance, shareware fees
Conclusion Best suited to educational users and parents who care about blocking access to parts of Usenet and the Web

A guide to the software

The packages that direct ISPs give or sell you generally contain one of a number of commonly available programs. Some are legally licensed copies; others are shareware which you are expected to register for an additional fee. So when you compare setup costs between providers, you should add in any such extra fees. Before you pay, however, try the software: once you're on the net you can get substitutes for software you don't like; the list below should give you some idea of alternatives. A comprehensive selection of Winsock-compatible software is available from the Web site http://cwsapps.texas.net/.

Chameleon: A fully-featured commercial mail package from Netmanage. A cut-down version called Sampler turns up on lots of cover and book disks.

Eudora: A freeware mail package produced by Qualcomm. The commercial version has many more features. Named after American writer Eudora Welty.

Ewan: Telnet shareware. Nice, although it tends to crash; can memorise session settings but no scripting facility.

Free Agent: A commercial offline newsreader; free for personal, educational, or non-profit use.

Mosaic: A Web browser. Supplied under licence by some ISPs including CompuServe, which in 1994 bought one of its publishers, Spry.

Netscape: Currently the most common Web browser. Version 1.1 added security features which you'll need for sites which have implemented secure transaction procedures. Netscape's printing facilities are flaky, but it can run multiple sessions, so you can read one set of Web pages while downloading another.

News Xpress: An online newsreader.

Winsock: WINSOCK.DLL is a dynamic link library file. It does two things: it loads the Internet protocols, TCP/IP, on your system, and it runs a script to log you onto your service. There are a number of widely available Winsocks, of which the most common is shareware from Trumpet. In general, you should stick to the one supplied by your provider, as configuring one of these things isn't fun (although a number of services now cover up the ugliness with an easy-to-configure face). Once Winsock is installed on your system, you can run any compatible applications you like with little trouble.

WinVN: An online newsreader.

WSFTP: Windows-based FTP client that gives you a File Manager-style display of the file directories on a remote computer.

WSGopher: Now that most Web browsers can display Gopher menus, you probably don't need this client. But you may find it faster and more convenient in some cases.

Glossary

Archie: Archive server. An Archie search gives you a list of files and locations. The main one for the UK is at archie.doc.ic.ac.uk.

Finger: Utility for finding out who is a particular user on a given system, either from either ID or a portion of their real name.

FTP: File Transfer Protocol. You use FTP to send or retrieve files from distant computers. To log on to services that maintain public archives, type "ftp" or "anonymous" where it asks for your ID, and your email address as your password.

Gopher: Menu-based, indexed information server, easy to use and search.

IP: Internet protocol.

MOO: Multi-User Object-Oriented environment. Essentially, a themed MUD; for example, Zen or post-modernist.

MUD: Multi-User Dungeon. Co-operative, text-based role-playing games you access via Telnet.

NNTP: Network news transfer protocol. Used on Usenet servers.

OLR: Offline reader. Automates logging on so you can read and write offline where it's cheaper.

Password: A good password is easy to remember but hard to guess. CompuServe and eWorld let you pick two words linked with a special character: most systems limit you to between five and eight characters. One good method is to pick a memorable word, capitalise a letter somewhere in the middle, and add a special character such as "%" or "?".

Ping: Tests whether a site is alive and connected.

PoP: Point of Presence. In other words, a local phone number you can dial to reach a particular system.

POP3: Post Office Protocol 3; an alternative to SMTP. Less flexible, but the available software is easier to configure and use.

PPP: Point-to-Point Protocol. The most common type of direct IP account.

SLIP: Serial line Internet Protocol. Older type of IP access replaced in most cases by PPP.

SMTP: Simple Mail Transfer Protocol. Alternative to POP3; more flexible but more difficult to configure.

TCP/IP: Transmission Control Protocol / Internet Protocol, the networking protocols in common use on the Internet. To connect, you need to load these protocols on to your computer.

Telnet: Lets you log on to remote computers and operate them. Use Telnet to access certain types of games servers (MUDs and MOOs), library catalogue services, freenets, and the Netherlands' Digital City.

Usenet: Worldwide bulletin board; individual conferences are called newsgroups. Some of these, particularly the alt.sex hierarchy, contain material parents may find objectionable but services targeting families tend to filter these out.

UUCP: UNIX-to-UNIX Copy Program. A dial-up computer-to-computer method of transferring mail and news that doesn't involve the Internet.

UUencode: The routine for converting program, or "binary" files into gibberish-like text so that they can be transmitted across the Internet. To run the programs, you must first UUdecode the file.

Veronica: Search facility for Gopher servers.

vPoP: Virtual Point of Presence. That is, a PoP you can call but whose physical modems are located elsewhere on the network. Demon claims to have invented the term.

World-wide Web: A system of hypertext links that let you jump from computer to computer with no more difficulty than following the links in a Windows Help file. You access the Web using a browser such as Mosaic, Netscape, Cello, or WebExplorer.

UK Online

This is a new service, in beta at present but looking very promising. Announced in mid-1994, the service should be launched by the time you read this.

UK Online isn't like any of the other services on the market. Everything on the service is managed through a Web browser interface: mail, local conferences, and Usenet access. The supplied software is a very simple package consisting only of a dialler and a Web browser called "Tiber"; both come from California-based Distinct Software (another unfamiliar name). You install the software, double-click on the UK Online icon, and Tiber loads up and logs on for you, starting you off at UK Online's home page on the Web. To enter the UK Online service itself, you click on the icon to take you to your home page; the software prompts you for your user ID and password.

From there, everything continues to look like the Web: mail, local conferences, Usenet and so on. Sending mail or posting a Usenet message is done through forms which come up when you click on the appropriate button. Conferences are displayed in threaded format on a Web page. It's less clunky than it sounds, even for very busy newsgroups like alt.religion.scientology, particularly in early August, when the service was still only being used by about 700 beta testers. It's hard to predict how it will perform under a heavy load.

Once you've got UK Online up and running, it works like any other IP connection. You are free to load up Telnet, FTP, or other clients as you like, although you need to source the software yourself. So far, the service doesn't supply hot lists of sites to visit. You do get access to the Press Association newswire.

WinNET has very clear instructions and the system is set up to minimise the amount of time you spend online

The service's main interest, though, is the UK family market. To this end, every account includes four mailboxes and parents can block Internet access for their kids or limit the amount of time spent online. The service itself cuts newsgroups it thinks may be objectionable, or about which there are complaints. It's also focusing on building up a series of special-interest clubhouses intended to promote a feeling of community.

UK Online
Price £9.99/month 10 hours; £14.99/month unlimited inc VAT
Contact UK Online 01749 333333

Good points Easy interface, inexpensive, local conferencing, free trial
Bad points Untested under load
Conclusion A very good prospect

WinNET UK (PC User Group)

The package you get when you sign up for mail and news is WinNET, which is used by a number of other service providers around the world. It's easy to install and use and it has folder facilities for filing messages.

Joining the service involves completing an on-screen form with details of your name, hardware settings, and billing information, and then waiting while the software logs on to the service and transmits it all. A few minutes later, it logs back on to receive confirmation and downloads introductory messages to get you started. The service keeps you up-to-date on new facilities by sending you an electronic newsletter.

UK Online isn't like any of the other services on the market. Everything is managed through a Web browser interface
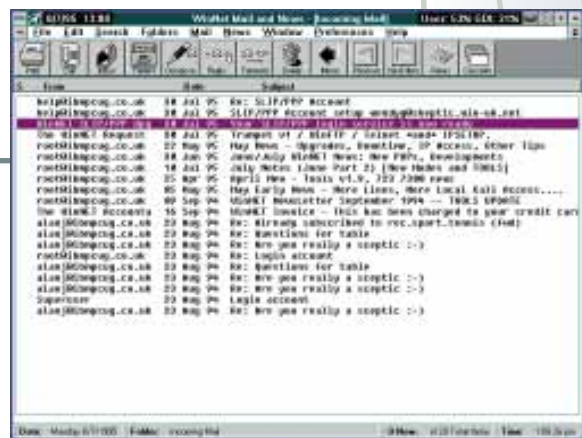
Joining the IP service is similar: you send a mail message to a specific address (included in one of the instructional messages), and you get back an attached file with Trumpet Winsock, an installation routine, and WSFTP, for which you need to pay your own registration fees. A selection on one of WinNET's menus ("Detach file") turns these files back into a zip file. You unpack this software and run a setup routine that helps you configure Winsock. The same method gets you a copy of Netscape and updates to the WinNET software as well.

Another message to the help desk, which you can either send separately or via the configuration routine, gets you a separate ID and password for the IP service. We were impressed: a request sent late one Sunday afternoon, was processed within half an hour, with the account being active at one o'clock the following morning. A welcome message for the IP service gives you installation instructions.

This all requires a certain amount of self-reliance — it's not as easy as getting a whole package on a set of disks. Nonetheless, we were impressed with the clarity of the instructions and with the way the system is set up to minimise the amount of time you spend online.

The PC User Group has made a deal with WinNET in the US, to enable British travellers in America to access mail in the UK via a 1-800 number.

WinNET UK (PC User Group)
Price No sign-up fee; £6.75/month for mail and news plus £8.25/month for IP
Contact WinNET 0181 863 1191

Good points Easy mail package, well designed service to maximise offline time, good instructions, access deals with US WinNET services.
Bad points Shareware fees payable, two-service structure.
Conclusion An obvious choice if you're already using the WinNET service.

Editor's Choice

ISPs divide into roughly three groups: direct IP, gateways with local conferencing, and services intended to help parents control what their children see. In the latter category go for UK Online, BBC Networking Club, and Research Machines. The Internet is not as much of a sewer as they say but if the prospect worries you, look at one of these.

In the gateway category go CIX (until its IP service is launched) and Delphi. Take a look at these if you have old, slow hardware and are interested in local chat.

The one service with a foot in all categories is CompuServe: it's a gateway service; it limits access to some adult areas of its own system; it has information services and conferencing; and it also has an IP service, albeit without mail handling. If money were no object Compuserve would probably be our choice for a single service because of its global access, long track record and con-sistent reliability. The costs adds up rapidly, even with the new pricing, so heavy users should look at the cheaper flat-rate providers, particularly Demon (assuming it can keep its capacity expanding in line with its growth rate), or CityScape. Frontier is a very promising newcomer with excellent freephone technical support and by the time you read this, a licensed, free software package. For worldwide access, also look at IBM.

Miscellaneous services

There are many other providers worth consideration. Firstly, there are regional service providers — often resellers for the national ones like Sussex's Pavilion Internet, a reseller for Pipex. There are already a surprising number of these in areas as widely separated as Notting-ham and Lerwick, Shetland. The Man-chester service, Poptel, is widely used by the Labour party. For more information about services in your area (if you are already on the Web or know someone who is), try http://www.limitless.co.uk/inetuk/provide rs.html4. In the Irish Republic your best bet is Ireland Online, which has added a number of PoPs to its original access points in Dublin and Galway.

There is also a variety of special-interest services, of which GreenNet is the most notable. This is a BBS, focused on the environment, peace and human rights which links to similar ser-vices around the world. GreenNet, which is owned by a charity and keeps its prices low, offers its 2,000 users email and fax services and 800 local conferences, as well as PPP/SLIP access to the Internet and Usenet.

On a global scale, Microsoft Network is due to launch with Windows 95 on 24th August. Although US customers are expected to have Internet access at that point, it is not due to be offered in the UK until Christmas, and even then it will be accessible only by Windows 95 users.

Also of interest is Tel-Me, particularly for small businesses who need directory information, stock prices, CCN company profiles, Infocheck, and Thomson Direc-tories. Tel-Me combines a custom soft-ware package with a specially set-up modem to give you fast access to just those things, plus Internet mail. When it was first launched in 1994, the service was rather expensively priced; the launch of version 2.0 cut prices to affordable levels. Sign-up costs £49.95 for the Tel-Me software, or £99.95 if you want a modem included. The FastConnect modem that Tel-Me supplies, can be used to access other services. But when used in conjunction with Tel-Me, connec-tion is almost instant because it is pre-configured for the service's modems and the handshaking sequence is eliminated. Payment is per transaction for directory inquiries, Press Association headlines over two hours old, and so on. Internet e-mail is free. Tel-Me is a much more impressive service than you'd think. With directory enquiries, for instance, Tel-Me accesses BT's PhoneBase using parallel techniques so that it can retrieve many records, per query of yours, using fuzzy matching techniques. The software takes up a lot of disk space, though.

Also worth trying, if only as a way of seeing what the Internet is like, is Spud's Xanadu which is a completely free service based in Canvey Island, Essex. You get no technical support or other help: what you do is dial the BBS using a standard comms package, login as "new", and answer the questions. The modem number is 01268 515441.

Expect to see many more announce-ments in the coming months. America Online is said to have made a deal with the German publishing conglomerate, Bertelsmann, for a European information service, and Demon has announced a partnership with Europe On Line to create a Europe-wide service.

What's

up, dock?

A notebook equipped with a docking station can give you the best of both worlds — computing on the move and power on the desktop. **Steven Helstrip** rounds up the *PCW* reviewers to put 15 dual-action systems through their paces.

In the corporate UK, notebooks now account for 35% of the number of PCs sold. Nearly half of those are shipped with either a docking station or a port replicator, making them good for both portable and desktop use.

Just as notebooks come in all shapes and sizes, so do docking stations, although there are two distinct types and all essentially perform the same job. There's the full-scale docking station that provides everything you'd expect from a desktop — ISA slots and drive bays for extra devices such as a CD-ROM drive and a hard disk, for example. Extra I/O ports for video, comms and built-in sound are also not uncommon.

A port replicator, on the other hand, does only what it says: it has exactly the same facilities and connectors as the portable itself, including serial, parallel and external keyboard/mouse connectors. For the mobile worker calling into the office it has the advantage of saving time and effort expended on plugging and unplugging external units, plus it reduces wear and tear on connectors. Port replicators are much smaller than docking stations and rarely add expansion capabilities.

For this round-up we asked over 20 manufacturers to provide a highly-specified notebook system with either a docking station or a port replicator. Of those, 15 did, although the machine from Gateway came without a docking station but with IRDA capability and desktop receiver. Each system varies significantly in terms of build quality, usability, features, size and looks. However, all are capable of comfortably running several Windows applications simultaneously so processing power should not be your only concern. More important, it now seems, is the quality of keyboard, screen and overall design.

Notebooks Contents

ACi 7600 Pentium

Rounded edges and a charcoal grey finish make this one of the more stylish notebooks on test. The docking station provides four ISA slots and two drive bays, one of which is accessible from the front panel. At the rear there are ports for parallel, serial and SCSI.

The keyboard is light to the touch and benefits from a deep wrist-rest. The trackball has buttons positioned either side and slanted inwards, making it easy to use and steady to the touch. At 9.5in the TFT screen is modestly sized, but images do appear sharp and high in contrast, particularly when displayed true colour. The Ni-MH battery sits under the wrist wrest and is removed by releasing two catches, although this can be quite fiddly. Equally tricky to remove is the hard disk, which requires you to use two hands to undo the catches. Power management features a suspend-to-disk option, letting you power down completely and power up in exactly the same place.

The ACi is not supplied with software as standard, although McAfee VirusScan and several audio applets were bundled with the review machine. DOS 6.22 and Windows 3.11 will cost you £75 for the disks and the manuals, or you can pay £99 and get Top Level Complete Works.

This was a pleasant machine to use and despite the rather poor performance, for a P90 it represents excellent value for money. • AJP offers what looks like the same machine. It has a larger hard disk, however, at 520Mb against the 320Mb in the ACi, and the RAM has been doubled to 16Mb. The price is £2,987.

Adele Dyer

7600 Pentium
Price P90 8Mb/320Mb TFT £2,768
Contact ACi 0181 830 1958

Good Points Pleasant to use, good expandability in the docking station.
Bad Points Smallish hard disk, no bundled software.
Conclusion User friendly and good value.

Adams Accura 5000

The first thing you notice about this notebook is how noisy it is when you power up. It sounds like a jet engine with a stone in the turbine, but since it is a fairly powerful machine, maybe that is appropriate.

The display is a 10.3in quad-scan, although there are no dedicated controls for brightness and contrast; settings are altered using a special key combination. The wrist-rest is just as deep as the keyboard. Within this area are built-in speakers, microphone and trackball, arranged in such a way that makes you think they have been thrown down without much thought.

In use the Adams is hard work. Both the trackball and the keyboard are sticky in feel, especially the trackball whose buttons are stiff. With its industrial grey and purely functional design, it feels as if you are using a piece of industrial machinery rather than a notebook.

The on-off switch is stiff too, and it takes a good job to finally turn the machine off when you go to power down. All very non user friendly, you might think, but there are redeeming features such as the IRDA port fitted as standard.

Considering the functionality of the notebook design, the docking station was one of the more attractive ones on test. The fixing device, however, looked a bit tacky and didn't look as though it would stand up to too much misuse. Unusually, the Adams had a floppy drive and one free front-facing slot. Inside, there are two expansion slots and room for a hard disk.

Adele Dyer

Accura 5000
Price P90 8Mb/720Mb Quad Scan £3,068
Contact Adams 0181 877 8822

Good Points Large screen, large hard disk.
Bad Points Plain design, unpleasant keyboard.
Conclusion At the cheaper end of the market, styling has been sacrificed to performance.

Compaq Contura 430CX

Compaq launched the Contura 420 and 430 range of notebooks in June this year. The 430CX sits at the top of the range with a 720Mb hard disk and 8Mb of RAM as standard. Our review model was supplied with 16Mb.

The eye-catching curvy design of this notebook makes it stand out in the crowd. The trackball in the centre front of the base is indented into the plastic, with right and left mouse buttons above and below. The keyboard takes up about three quarters of the base, leaving little room for a wrist rest. The general appearance is stylish, but the lack of a wrist-rest ultimately makes for some discomfort. And as the indented mouse buttons are stiff, it's difficult to work smoothly in Windows.

A status panel in between the keyboard and the screen provides indicators for various system features as well as a battery gauge. The battery itself is an industry standard Duracell which allows up to five hours' use when fully charged.

The docking station comes in two parts — a base providing hardware connectors, and a cover which fits on top to support an external monitor, allowing you to use the docking station whether you've got a spare external monitor or not. The docking base provides an Ethernet connection as well as a battery charging facility and extra security features which allow you to lock the whole unit to the desk.

Eleanor Turton-Hill

Contura 430CX
Price DX4/100 16/720Mb TFT £3,560
Contact Compaq 0181 332 3888.
Fax 0181 332 3409

Good Points Stylish design, nice big screen.
Bad Points Stiff trackball buttons and lack of wrist-rest make the keyboard uncomfortable to use.
Conclusion Overpriced for a DX4/100, even when you consider that the standard model with just 8Mb of RAM and no docking station costs £2,995.

CTX Ezbook

The Ezbook DX4 /100 has a standard system design, with the keyboard condensed towards the far end of the base leaving plenty of wrist room, and a trackball placed centrally near the front. The right and left mouse buttons are placed above and below the trackball, which is awkward at first but does become quite comfortable.

In between the screen and the keyboard is a small indicator panel displaying the status of various system features in the form of small icons. A dripping tap denotes power consumption for example, and two battery shapes display the status of the main battery and the hot-swap battery.

Inside there's a 524Mb detachable hard disk, 16Mb of main memory and a local bus VGA card fitted with 1Mb of video RAM. When using an external monitor it is possible to display resolutions up to 1024 x 768 at 60Hz. The built-in TFT display will manage 64,000 colours at 640 x 480 and colours are clear and sharp. Brightness and contrast can be altered using four keyboard function keys.

A huge docking station provided allows you to transform the Ezbook into a complete desktop system. The entire notebook is inserted inside the docking station with its screen down, forming a desktop unit for an external monitor. A built-in amplifier enhances the audio signals from the notebook's Sound Blaster card, and built-in multi I/O supports basic serial and parallel ports as well as an IDE hard disk drive, CD-ROM and network card.

Eleanor Turton-Hill

Ezbook
Price DX4100 16/524Mb TFT £3,048
Contact CTX 01923 818461. Fax 01923 818643

Good Points Designed for practicality rather than style. Comfortable to use.
Bad Points Small screen (9.4 inches). Poor performance results.
Conclusion Not as stylish or as well specified as some of the notebooks in this round-up, and slightly overpriced for what you get.

Dell Latitude Xpi

In typical Dell style, this notebook comes with lots of "Getting Started" help including a large chart explaining how to unpack and assemble the various parts. Another "Getting Started" facility appears on bootup, offering the option to make backup system diskettes, and in Windows you'll find an on-line user's guide containing tips on travelling with your notebook and conserving battery power.

Other utilities have been pre-installed in Windows under the group heading "The Dell Control Centre", which allow you to configure the display, speaker volume, power conservation and password security as well as remap port settings.

Inside there's a P90 processor, 16Mb of memory (upgradable to 40Mb) and a 810Mb hard disk. Despite an extra 256Kb of SRAM cache, performance results were not stunning but did rank above average among the P90s. The XPi uses lithium ion batteries which take an hour and a half to charge and last a maximum of four hours on the road. You can change the batteries without having to power down as an internal battery has enough power to keep the system going while you swap them over. The XPi's keyboard takes up only half of the base of the machine leaving a comfortable amount of room for a wrist-rest towards the front. A port replicator fits neatly to the back, providing Ethernet or Token Ring connections as well as a SCSI interface.

Eleanor Turton-Hill

Latitude Xpi
Price P90 16/810Mb TFT £3,918
Contact Dell 01344 720200

Good Points Well designed and easy to use with lots of guidance for novice users and 12 months warranty.
Bad Points Heavy and expensive.
Conclusion This machine comes from a reliable source, produced reasonable test results and is well designed, but its high price compares badly with similarly specified machines in this round-up.

Evesham Vale Voyager

One of the most irritating aspects of the Voyager is its on/off switch — or should I say, the lack of one. Two key combinations (which cannot be changed) turn it on and off. It's virtually impossible to switch off accidentally, though.

There's nothing striking about the Voyager's looks but its usability is among the best. The keyboard is a good size and laid out well, with key combinations to adjust contrast/brightness and audio output level. Both the keyboard and the trackball have a good feel, and the TFT display resolves text and graphics clearly although a touch small for my liking. The build quality of the case is poor and unlikely to stand up to any misuse.

The Voyager was the only system in this round-up to be supplied with its maximum 20Mb RAM. In Windows 3.1 there didn't appear to be a noticeable difference in speed when compared to those fitted with 16Mb, although there would be some performance difference running Windows 95. Power management features are plenty but can only be accessed through the BIOS setup program. A nice feature is the ability to automatically suspend to disk when the battery level gets dangerously low. Since 20Mb is installed, this takes around 10 seconds to complete.

The docking station is much larger than it needs to be. Inside there's lots of empty space even with devices installed. There's room for three full-length 16-bit ISA cards, one 3.5in and two 5.25in drives. All are accessible from the front panel. The rear of the docking station has ports for video, comms, mouse and keyboard.

Steven Helstrip

Voyager
Price DX4/100 20/528Mb TFT £2,957
Contact Evesham 01386 765500

Good Points Great keyboard and trackball.
Bad Points Ordinary looks, poor build quality.
Conclusion A great notebook for the serious typist, but not for the enthusiast.

Gateway 2000 Liberty

Although it's the smallest notebook in this round-up, the Liberty has one of the largest and sturdiest screens. It is dual-scan with controls for brightness and contrast to the right. It is possible to display resolutions up to 1024 x 768 by creating a virtual desktop, although you can only view 640 x 480 pixels on screen at any one time.

The keyboard is slightly smaller than full-size but is comfortable to use. The only irritating thing is having to use the Fn, or function, key to get to the number keypad. The pointing device is along the lines of IBM's ThinkPad nipple only it's above the "enter" key and a little trickier to use, and almost useless if you're left-handed.

There is no docking station option; instead, the unit comes with an IRDA port and infra-red receiver that connects to the serial port of a desktop PC. The IRDA port can send print jobs to compatible printers, and copy or move files to a desktop PC.

With only the standard 8Mb installed, the Liberty is capable of running just about any application you throw at it. Switching between Word and Excel was surprisingly fast, as was the overall speed. The most remarkable aspect of this system though, other than its size, is its suspend-to-disk facility. It takes just about one second to dump the entire contents of memory to disk, leaving you to carry on from where you left off when you return to work. Returning from a suspend, again, takes only a few seconds.

Steven Helstrip

Liberty
Price DX4/100 8Mb/720Mb Dual Scan £2,499
Contact Gateway 2000, 0800 602000

Good Points Compact, powerful and light, with IRDA and good suspend mode.
Bad Points Pointing device may not suit everyone.
Conclusion The compact nature of the Liberty belies its performance and feature set.

IBM 755 CX

This is IBM's latest gem based on a 75MHz Pentium processor. The sound card is DSP-based and is SoundBlaster compatible. It can also double up as a fax-modem, although you will first need to add the telephony kit which costs an extra £115. This can be fitted easily, or so we're told.

The lid opens by sliding two catches either side of the notebook. Again, IBM has used the trackpoint, or nipple, pointing device. The buttons can be locked to prevent accidental operation by pulling them forward. This will be useful in Windows 95 since it makes extensive use of the right button. The full-size Lexmark keyboard is excellent.

The 10.4in TFT display is superb and capable of resolutions up to 800 x 600 in 256 colours. DOS boxes, however, run at 640 x 480. The review machine was supplied with a 540Mb hard drive with two partitions for OS/2 Warp and Windows 3.11. You can select which operating system to use at boot. If, like most people, you only need the one OS, any partition can be deleted using the built-in utility.

The 755CX was supplied with the Dock I docking station. This adds a further two type II PCMCIA slots (or one type III), SCSI, one 16-bit ISA slot and double-speed CD-ROM drive. Stereo speakers are built into the base of the unit and are more powerful than those in the notebook. IBM also offers the Port 1 for £80 that provides basic port replicator features; Port II adds further PCMCIA slots and costs £220.

The 755CX is a solid performer and has a wealth of upgrade options. If only it was cheaper. **Steven Helstrip**

755CX
Price P75 8/540Mb TFT £5,580
Contact IBM 0345 727272

Good Points Just about everything. Most notably, the screen and keyboard.
Bad Points A bit on the expensive side.
Conclusion The typist's and power user's dream.

NEC Versa P75/S

The NEC's power switch is a pull lever, which pulls the same way for on and off, and the trackball is on the front of the machine, at 90 degrees to the usual position. It is surprisingly comfortable when typing as you can let your thumb hang down and use the trackball without having to move your whole hand.

The keyboard was too clicky for my liking, but the keys themselves are large and well spaced. There is no wrist-rest.

The 9.5in display can display resolutions up to 800 x 600. Graphics and text are clearly defined and contrast is high. The hard and floppy disks are removable, allowing you to plug in extra PCMCIA cards, a hard disk or second battery.

The MediaDock has been designed to expand the adaptability of the Versa and is obviously meant to be portable, having a handle on the front. As a mulitmedia machine it comes with a double-speed CD-ROM and four speakers, but there are a couple of niggles. The MediaDock considerably raises the level of the notebook, so each time you plug in the notebook, you also need to connect a mouse and keyboard. There are no keyboard and mouse ports on the MediaDock, so you have to plug them into the notebook.

The docking station itself is of more standard fare. There are two free ISA slots and three free front-facing bays, two of which are half-height. If you put in an extra hard disk, it will have to go in one of these slots.

Adele Dyer

Versa P75/S
Price P75 8Mb/810 Mb TFT £4,680 (with MediaDock)
Contact NEC 0181 993 8111

Good Points Adaptable due to the removable floppy drive. Good screen.
Bad Points No wrist-rest, mediocre docking station.
Conclusion The adaptability is useful, especially with the MediaDock.

Olivetti Echos 48

The Olivetti stands out here not only for being the most radical in terms of design, but for its build quality. The casing is solid, the hinge for the display is firm and the trackball has an air of quality about it.

The power switch is positioned beneath the 10.4in TFT display and cannot be accidentally switched on while the lid is closed. To the right of this are five LEDs to show drive activity, power and battery status. The keyboard is a good size but the keys have a short travel. The palm-rest is reasonably sized and has a rubbery surface keeping your hands from slipping

around. The trackball is suitable for both left- and right-handed users.

Round the back there are ports for video, parallel and serial along with two PCMCIA slots capable of doubling up as one type III. The battery sits beneath the palm-rest and is easily removed. While working with Windows, I managed to get a good three hours' use from this machine. Power-management facilities are good allowing you to power individual components including hard disk, screen and processor after a set period. A suspend-to-disk facility allows you to save the entire contents of RAM to disk.

The port replicator supplied with the Echos simply duplicates ports for comms, video, mouse and keyboard and has no expansion facilities. The Echos attaches easily to it by means of a connector beneath the machine.

The Echos may seem a touch overpriced at £3,307, but when you consider its stylish looks, build quality and usability, you'll agree it's worth every penny.
Steven Helstrip

Echos 48
Price DX4/100 16/540Mb TFT £3,307
Contact Olivetti 0181 785 6666

Good Points Solid build, solid performance.
Bad Points No docking station or infra-red port.
Conclusion Excellent.

Rock Estima Sonata

Despite the oversized look of the Estima, it has one of the smallest displays featured in this round-up. But thanks to the TFT screen, resolution is clear and easy on the eye. Drivers supplied are capable of displaying up to 800 x 600 on a virtual desktop and 1024 x 768 on an external monitor.

The docking station is large and inside it's tidy with plenty of room for expansion; there's room for three full-length cards together with a CD-ROM or hard disk. The stand for the external monitor is secure and removable. If the notebook's keyboard is

used when the Estima is in the docking station, the machine tends to wobble, but there is no danger of it coming loose since it gets locked-in with a key.

The keyboard feels springy and the Home, End and Page keys are a touch too small. Unless the keys are hit precisely they tend to tilt, so you hit more than one key at a time. This is especially noticeable with the "a" and Caps Lock keys. The trackball, on the other hand, is comfortable and the buttons are well positioned for right- and left-handed users alike.

Underneath the machine are feet for raising the rear, thereby creating a tilt for typists

working on a flat surface. The power-saving features are good, with the option of suspending to hard disk or RAM. There is also the ability to change power-saving settings "on the fly" without having to reboot.
Melvyn Mildiner

Estima Sonata
Price DX4/100 16Mb/510Mb TFT £2,946
Contact Rock Computers 01753 567889

Good Points Lightweight; trackball and power-saving features; the price.
Bad Points The keyboard.
Conclusion One of the best pointing devices, but the keyboard is awkward and uncomfortable. The specification is good and the price is reasonable.

Texas Instruments 4000M

Unlike every other notebook in this test, the docking station for the TI4000M has the option of being battery powered as well as from the mains. The advantage is CD-ROM and sound portability, though the combined weight of notebook and docking station means that you won't be using the two together on your lap on the train.

The screen on this machine is good. It's a TFT with just one control to adjust brightness. The maximum resolution is 800 x 600 in 256 colours on a virtual screen, but on an external monitor the TI4000M delivers up to 1280 x 1024, albeit in 16 colours. Inserting

a disk into the floppy drive is a little awkward because it's also necessary to insert about 1cm of finger.

The keyboard was good on the whole, although the cursor and function keys were too small for my liking. The IBM-style "nipple" was responsive, marred only by the keys which were a little too close together and, again, a tad too small.

The docking station is what really sets the TI apart from the rest. It has a built-in double-speed CD-ROM drive, 16-bit sound card, stereo speakers (with an option for a wide or narrow stereo field), microphone,

headphones, and SCSI II port. It also came with its own mouse.
• *Before going to press, TI announced an updated model which incorporates a new 10.4in TFT screen. There will be no change in price.*
Melvyn Mildiner

4000M
Price DX4/100 16/500 9.5in TFT £3,897
Contact Texas Instruments 01932 761599

Good Points Docking station, display, world-wide guarantee, SCSI II.
Bad Points Some keys are too small; limited power-saving features.
Conclusion Great docking station. A very capable machine at a reasonable price.

Toshiba Satellite Pro 400CDT

The Toshiba Satellite Pro 400CDT is no ordinary notebook. It is the only current notebook to boast a Pentium processor and a CD-ROM drive as standard, thus it is designed for the most demanding of road warriors.

The CD-ROM drive is a quad-speed, the battery is a top-of-the-range lithium ion, and the built-in sound system is fully compatible with the SoundBlaster Pro. The RAM comes in the form of EDO for better performance, although the cache is asynchronous, rather than synchronous which is faster.

The TFT screen is 10.4in, and Toshiba's supplier will soon be turning out 11.3in screens in production quantities; because of the way TFT screens and CRTs are measured, 11.3in TFT screens will have almost the same viewing size as a 14in CRT monitor. This TFT can display true colour, or on an external monitor the Chips & Technologies graphics chip can cope with up to 1024 x 768 x 256, thanks to its 1Mb RAM.

The IRDA-compatible infra-red capability provides a convenient way of getting files between machines, or you could use a PCMCIA network card thanks to the two Type II slots (configurable as one Type III). The port replicator (with an RRP of £250) is set a little apart from other port replicators by its additional two Type II slots.

Toshiba already has a vast share of the UK notebook market — somewhere around the 40% mark — and this model looks set to capture the market among those who need all the extras. It's not cheap, but then, the closest notebooks offered by IBM are a good deal more expensive.

Nick Lawrence

Satellite Pro 400CDT
Price P90 16/700Mb TFT £4,440
Contact Toshiba 01932 841600

Good Points All the extras.
Bad Points No ISA or PCI slots in the docking station.
Conclusion Excellent.

Twinhead Slimnote 5100T

The Slimnote 5100T's pointing device is made by Alps, is completely flat and operated by moving your finger along its surface. The keys are not too small, with sufficient travel, and there is a suspend-to-disk option. The Phoenix BIOS allows you to save the contents of RAM to disk and pull them out again when you turn the computer on, to carry on working where you left off.

The built-in sound is fully SoundBlaster compatible and the speakers and microphone are built-in as well, though for presentations the sound quality would naturally be better with external speakers.

The screen is a TFT model, and the Cirrus Logic graphics chip has 1Mb RAM, sufficient to display 1024 x 768 x 256 on an external monitor. If the NiMH battery does not supply enough juice, you can swap the floppy disk drive for a second battery. Further expansion comes in the form of two Type II PC card slots, which can be configured as a single Type III instead. The docking station allows you to put in three ISA cards, though the design is rather poor and there is a lot of wasted space.

Raw horsepower is taken care of by the DX4/100 processor. 8Mb RAM comes as standard, and, though the memory chips are of proprietary design, the upgrade to 16Mb (as this machine has) should cost you only £320. The hard disk comes in three sizes, 340Mb, 500Mb and 810Mb. Since the machine reviewed has the largest, its cost works out at a total of £3,554.

Nick Lawrence

Slimnote 5100T
Price DX4/100 16Mb/810Mb TFT £3,949
Contact Twinhead 01256 811366

Good Points All the extras; the trackball (for most people).
Bad Points The docking station is not too well designed; the trackball (for some).
Conclusion Well worth a look.

Viglen Dossier P5 AS

Viglen, now owned by Amstrad, likes to play it safe with notebook design. This particular model has been designed and manufactured in Taiwan, and is similar to the notebooks offered by Adams Technology and Opti.

The spec is good: a P90 processor complemented by 16Mb RAM and a 530Mb hard disk. The standard 8Mb memory is upgradable to 40Mb through proprietary memory in the form of two piggyback memory modules, of which an 8Mb upgrade will cost you £309. The built-in sound is fully SoundBlaster compatible and capable of playing both digital audio and MIDI files. The docking station has stereo speakers built-in but you can play sounds on the move, although the built-in speakers aren't sufficiently powerful for group presentations. The infra-red port is fully IRDA compatible and capable of 100Kb/sec throughput.

The TFT screen is 10.4in and capable of displaying 640 x 480 in 256 colours, while viewing on an external monitor can be enjoyed up to 1024 x 768 x 256. The docking station can take two ISA cards and contains a second 3.5in floppy disk drive. Further expansion comes with the two Type II PCMCIA devices, also configurable as a single Type III.

The pointing device is a trackball, which, despite a slightly dated look, does the job well. The keys have sufficient travel to be comfortable. The NiMH battery has power to last a couple of hours, and is safer but not as long-lasting as the newer lithium ion.

Supplied software includes Lotus Organizer and Cardsoft utilities to manage PCMCIA slots. This rounds off a safe but uninspiring package. Nick Lawrence

Dossier P5 AS
Price P90 16/530Mb TFT £3,716
Contact Viglen 0181 758 7000

Good Points Windows performance.
Bad Points On the expensive side.
Conclusion Unexciting.

The secret of longer life

If there's one fundamental rule of portable computing, it's that the batteries will always start to run out at the vital moment. Fortunately, you should be warned by the PC when time is running out and you should save what you are doing and quit. As portables adopt faster processors, bigger hard disks and better screens, battery life becomes more of an issue. Thankfully the situation is improving as more efficient batteries and power management software begins to appear, but the battery that combines high capacity, fast recharge, low weight cells and low cost to both wallet and environment is still a long way off.

Nickel Cadmium (NiCad) batteries have a number of factors in their favour. Voltage levels remain relatively stable throughout the discharge cycle; repeated discharging and recharging does little damage; recharge cycles are short, and prices are falling. The main drawback for users is energy density. Size for size, they hold less charge than other types, which may mean carrying extra units around. The constituent materials are also bad for the environment when disposed of improperly.

Nickel-Metal Hydride (NiMH) batteries, on the other hand, may hold up to 80 percent more charge than NiCADs, but they charge more slowly and cost much more.

One drawback of both NiCADs and NiMHs is that they should be fully discharged before reuse. Failure to do this reduces the charge capacity of the battery and its effective life and is known as 'voltage depression'.

Other technologies such as Lead Sulphuric Acid have been tried but none have succeeded. Now, Lithium-ion (Li-ion) batteries are being promoted by prominent portable makers such as the industry leader Toshiba.

Lithium itself is highly dangerous but this Li-Ion form is very stable. Li-ion batteries are lighter, and cells can supply up to three times more power, display little voltage depression effect, and discharge less when stored. They are greener than nickel-based batteries when disposed of, and a longer life makes this less frequent.

All portables come with some form of power-management facility, whether it's built into the BIOS or controlled by software. These have various 'sleep' settings to suspend processor, screen and disk activity when the keyboard, mouse and serial port are not being used, which significantly extends battery life. In addition to this, processors are now using less power than before. *** Although hard disks are increasing in capacity, phsically they are becoming smaller. The result is smaller platters that need less power to drive.

If you intend to spend most of your time running a notebook from batteries, it's useful to know if the batteries can be recharged without being connected to the PC. Where portables are pooled, this allows separate charging of spare batteries and quicker re-issue times. If you're going to use the PC mainly off the mains, then batteries aren't so important. For use on the move, though, close attention to weight, recharge times, life and other factors is essential.
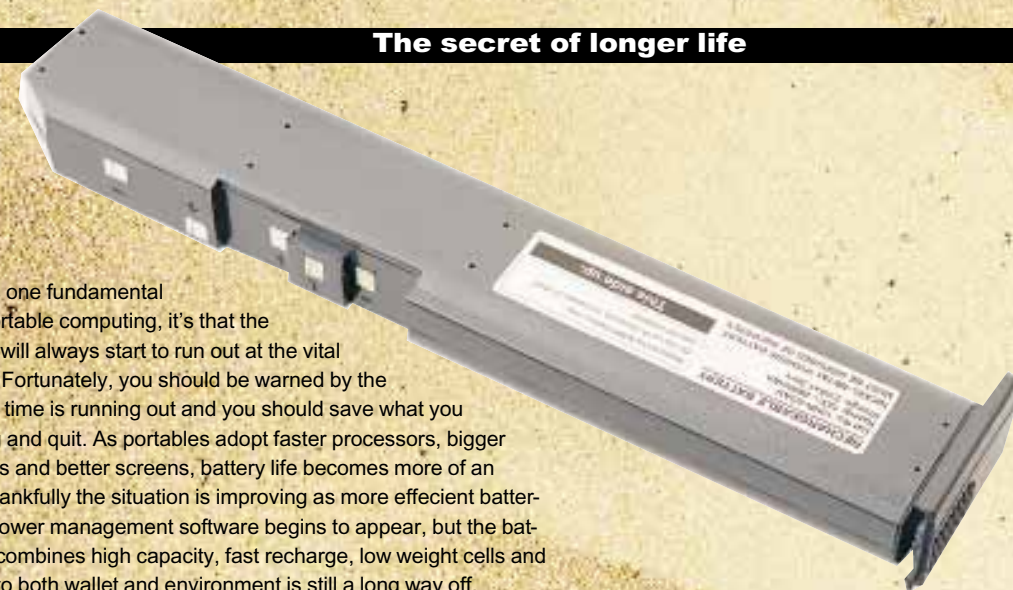
What to look for in a portable

In general, one desktop PC is often just the same as the next. When it comes to portables, though, the range of models is far more diverse. For light use, almost any decently constructed portable will do. When the notebook becomes your primary PC, though, the keyboard layout, pointing device and screen quality become more important.

Don't let anyone kid you that screen size and quality aren't important. The display is what you spend most of your time looking at, not the notebook itself, and therefore text, icons and graphics need to be clear. If you work with spreadsheet applications regularly, it's well worth considering one of the portables capable of displaying 800x600 as this will allow you to view more of your work on-screen. The majority of systems in this round-up will only display 640x480, but drivers that provide a virtual desktop are becoming more popular. The range of possible viewing angles differs between screens and for group use this is crucial. TFT screens, although often twice the price as dual scan, are better all-round and are worth the investment if your wallet can stretch that far.

Portables come with a large variety of pointing devices in place of the standard mouse, such as trackballs, mini-mice and the IBM-style "nipple". Of course, it's largely a matter of personal choice, so you should try out a few types before you buy. Also, check that the portable has two serial ports; one for a modem and one for an external mouse. As long as you have a flat surface to work on a standard mouse can make working with Windows much easier.

If there is one item that can make or break a portable (and its user) it is the quality and layout of the keyboard. There is an automatic trade-off between size and keyboard usability, so it is important to determine the type of use beforehand. For writing reports on the move, a larger keyboard makes more sense despite the increased shoulder-ache. Subnotebooks are easier to carry but aren't ideal for intensive typing.

Another problem of keyboard use is that the base unit of the portable is often quite deep and this can soon cause wrist-ache. Only one or two machines have thin bases but this usually means sacrificing the floppy drive or some other component.

Mobile communication

A mobile phone provides an invaluable link for the travelling businessman, so it seems logical that it should be the solution for the portable computer user.

But it's not quite that simple. Mobile phone links will never be as good as bits of buried copper. Sending information — be it voice or data — over a wireless link is always subject to interference. The problem is also complicated by a lack of standards. There is no way to connect any mobile phone to any computer; it's always necessary to choose the right phone for the right computer.

Analogue, cellular and PCMCIA solutions work, but not that well. In practice, you'll see an unreliable 2400bps — unlikely to attract a flashing blue light as you steam down the digital super highway. More attractive are the digital networks. Current systems are operated by Orange, Cellnet and Vodafone. Until recently, using digital mobile phones for data was great in theory, but duff in practice.

Vodafone launched a special service in October last year, Cellnet a more comprehensive package in November with Orange following in June of this year. The Vodafone system has limited use, only allowing you to log into a remote computer. Cellnet, on the other hand, offers more advanced services, including the ability to send and receive faxes via your mobile phone. The Orange system is as comprehensive as Cellnet's, only much cheaper.

A standard known as SMS (Short Message Service) works like a pager. Even if you are on the phone a 160-character text message can be transmitted to the display on the handset. The Vodafone system will receive these messages, but since linking digital phones to computers is quite new it's considered pointless to be able to allow phones to originate messages as that would necessitate typing messages, using combinations of keys on the numeric keypad.

Links to computers mean that sending and receiving SMS messages is a good, cheap, alternative to real data. You can establish a pretty reliable 9600bps link and use software compression. Not an amazing speed but tolerable for most applications, such as updating sales information or running an SQL enquiry. With the right hardware, speeds of 57,600bps are theoretically possible.
Simon Rockman

Dual-scan and TFT compared

The earliest portables used traditional (but small) cathode ray tubes (CRTs), which had to be treated delicately. New technologies were clearly needed if portables were ever to catch on. A number of other technologies were introduced but fell by the wayside.

Scaled up from calculators, LCDs were soon seen as the way forward, but even they had drawbacks. The contrast was low, making outdoor use difficult, and viewing angles were restricted, which stopped groups from seeing anything on the screen.

Passive Matrix screens use a fine layer of crystalline liquid sandwiched between super-thin layers of glass. A grid or matrix of electrodes allows a current to be passed through lines on the screen. Pixels are formed where two intersect. A couple of polarising filters control how light passes through the screen. When the current is switched on, the crystals in that area change orientation and the filters block out the light, making the pixels appear dark.

To add colour, extra pixels and filters are needed. If you stare closely at your domestic TV screen you will see that each dot of colour is made up of three pixels corresponding to red, green and blue (RGB). Combining these three colours produces the spectrum.

Unfortunately, the imprecise nature of the LCD matrix means that it is impossible to turn a pixel on without affecting adjacent ones. "Crosstalk" reduces sharpness and clarity. Contrast is much reduced and the viewing angle greatly restricted. Colours are muted and less discernible.

More recently, additional layers of liquid crystal have been added to create dual and triple-scan displays. These correct the original distortion to improve contrast, the number of greyscales and the viewing angle. The other side of the coin is that extra layers mean greater thickness and weight.

Many companies have adopted Thin Film Transistor (TFT) technology to improve colour portable screens. Microscopic resistors directly (or actively) control how each transistor works with the result that each pixel is independent of the adjacent ones, making contrast and clarity much better and the colours rich and vibrant. TFT screens can be made much thinner than LCDs and refresh rates now approach CRT speeds, making simultaneous connection to an external monitor possible.

When choosing a screen type, it's also important to look at the size of the palette. Even if a screen can only display 256 colours simultaneously, being able to choose from many more makes the effective screen quality much higher. Palettes of 64K and 256K colours enhance clarity enormously.

TFT screens are hard to manufacture, and can cost up to £500 more than their LCD equivalent. VGA screens need 921,600 transistors (640 x 480 x 3) and each has to be perfect. Early production techniques yielded only a 20% success rate. Today this is around 80% — better, but far from perfect.

Performance Results

Overall

ACi 3.72 | Adams 4.32 | Compaq 2.71 | CTX 2.37 | Dell 3.88 | Evesham 2.81 | Gateway 3.12 | IBM 3.37 | NEC 5.63 | Olivetti 2.72 | Rock 2.55 | TI 2.68 | Toshiba 3.49 | Twinhead 2.65 | Viglen 4.08
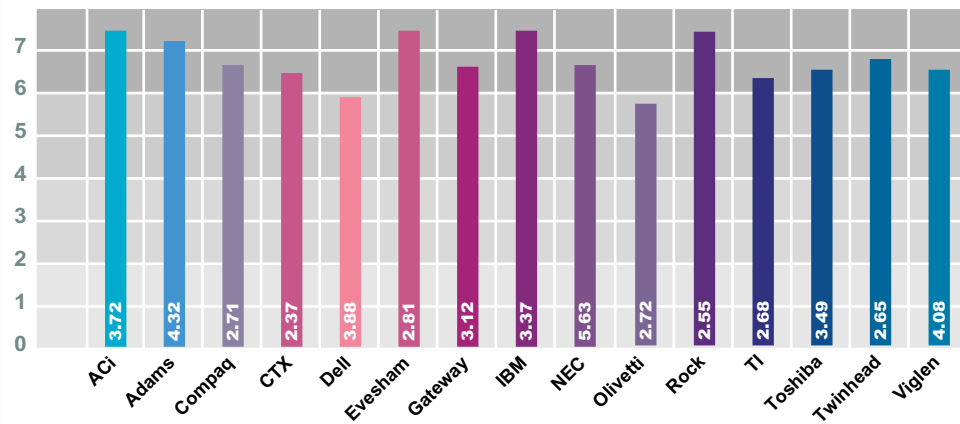
The calculate the overall score, the results from Windows and DOS tests are weighted according to their influence on overall system performance. All results are pitched against a score of 1 for an Apricot XEN-PC 486DX/25 with 8Mb RAM.

Windows

ACi 3.82 | Adams 4.52 | Compaq 2.89 | CTX 2.55 | Dell 4.00 | Evesham 3.00 | Gateway 3.22 | IBM 3.35 | NEC 3.73 | Olivetti 2.93 | Rock 2.77 | TI 2.77 | Toshiba 3.65 | Twinhead 2.90 | Viglen 4.52

The Windows tests take results from macros run in Word 6.0a, Excel 5.0, WordPerfect 6.0a and FoxPro 2.6, forming a result from their geometric mean.

DOS

ACi 4.95 | Adams 5.49 | Compaq 2.90 | CTX 2.55 | Dell 5.19 | Evesham 3.04 | Gateway 3.72 | IBM 4.69 | NEC 4.70 | Olivetti 2.87 | Rock 2.84 | TI 3.39 | Toshiba 4.37 | Twinhead 2.80 | Viglen 4.33

The DOS test are based on WordPerfect 6.0b, Lotus 1-2-3 Release 3.4 and FoxPro 2.5, with individual results combined through a geometric mean.

Editor's Choice

Each time we put a notebook group test together, the range of products increases substantially. This time around we looked only at those with docking-station options, but even so, we were presented with 15 vastly different systems. Not just in the way they look, but the whole thing: different displays, pointing devices, upgrade options... The list goes on.

It seems the most important consideration when choosing a notebook PC is no longer how fast the system performs: any 486 system is capable of running a word processor, spreadsheet and database. More important is how comfortable you are when using it, so it is well worth trying a few out before parting with your cash. Primarily you should pay close attention to the keyboard, display and trackball. It may

be that you have specific requirements — a network card, for example. These should also be weighed up before you make your purchase.

When we were considering products for Editor's Choice, the five areas we paid most attention to were usability, build quality, performance, features and cost. As there isn't a system that combines excellent features in all these areas, there has to be a trade-off.

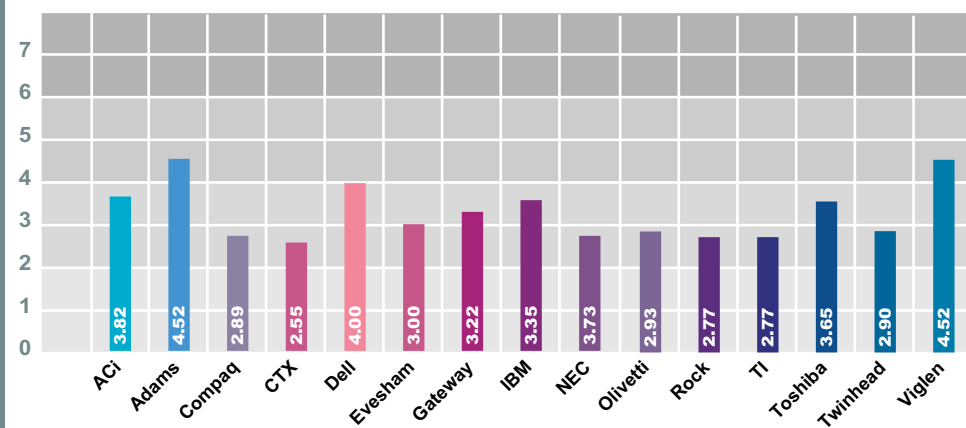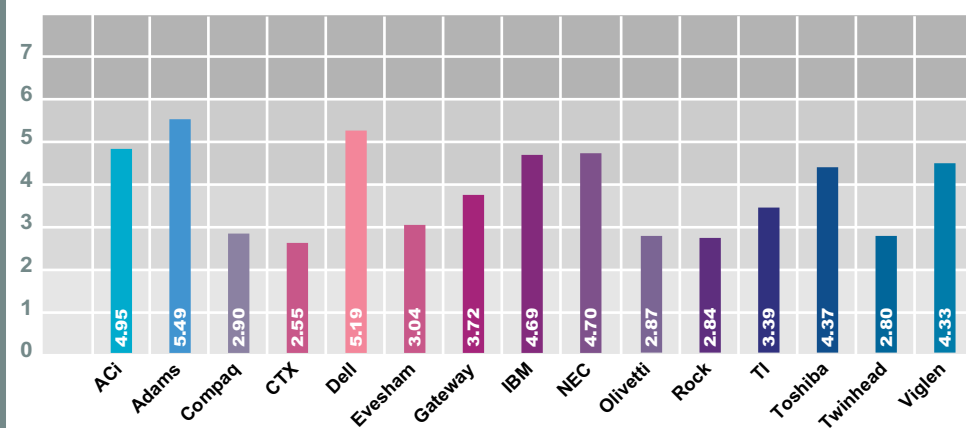The system that impressed us all (price excepted) was the Toshiba CDT400, which is our Editor's Choice. It has one of the best 10.4in TFT screens in this test (soon to be 11.3in), that produces high-contrasting colours and is viewable from wide angles. In true Toshiba fashion the keyboard is great, and features a surprisingly usable "nipple"-style pointing device. As for features, the Tosh just about has it all: quad-speed CD-ROM drive; masses of expansion capabilities, thanks to four PCMCIA slots when linked to the port replicator; IRDA-compatible infra-red port; and Sound Blaster-com-

patible audio. Although the CDT400 is one of the more expensive portables in this round-up, it comes from the largest and most popular notebook manufacturer. Excellent.

The IBM 755CX cannot go without a mention. Overall this system is superb and ideally suited to the power user. The keyboard, as per usual, is the typist's dream; the display is stunning and capable of resolutions up to 80 x 600, and the overall look and feel is polished. The 755CX is Highly Commended, although its £5,580 price tag could offend.

Another machine that impressed just about everyone who laid eyes upon it was the Gateway Liberty. Despite being subnotebook in size, the keyboard and display were surprisingly large and high quality. The pointing device proved to be a little awkward for some, but its size, price, excellent power management and overall charm just about outweighed this. The Gateway also walks away with the much coveted Highly Commended award.

The IRDA specification

Linking computers together makes them more powerful. It also ties them to one place. Infra-red communications has the benefit of communication without the ties of a docking station or PCMCIA network card. In theory you can plonk your computer on your desk and instantly have access to your network, printer and modem. No wires, no fuss. All this is done by having the computer communicate by means of what is effectively Morse code. The computer flashes lights at the network which reads them and flashes a response. The light is invisible and the flashes incredibly fast but that is the principle. It's still only theoretically possible, but we're getting there.

Of course, for this to work you need a standard. There is a standard for infra-red TV remote controls to make sure that changing channels doesn't stop the video or open the curtains. For computer communications the devices need a better level of compatibility than just ignoring messages meant for another device. To this end Hewlett-Packard, which pioneered the Serial Infra-Red standard, organised the Infra-Red Data Association (Irda) which now has over 100 members, including chip makers, computer manufacturers, and printer manufacturers. This initial specification was launched in March 1994 and is just beginning to spread in popularity. It works at short range, and being light-based, is of course line of sight – with a speed of 115 bps. Since infra-red LEDs are very cheap and the switching is simple, the cost of adding Irda to a device is tiny, and the power consumption very low. It's a standard which is bound to take off, and IBM, Apple, HP, Digital Equipment, Texas Instruments and Gateway 2000 have at least one machine with an Irda port in the range. So expect Compaq and Toshiba to follow. There are also adapters which allow a standard serial port to transmit Irda. Adaptec, Lexmark and specialist company Extended Systems have such add-ons. Tulip even has a desktop machine with an Irda port.

Just as the new standards start to become popular, a new standard which allows faster rates of transmission – 1.5Mbps and beyond – is being written for the Irda specification. This is not quite as damning as it seems since the new specification allows backwards compatibility to run at the old speed. The first device to support the 1.15Mbps speed is the IBM ThinkPad. This can communicate with Irda devices at 115k and with devices like the Apple Newton and Sharp IQ using older standards at 9600bps. A disadvan-

tage of the standard is that there is no security. Irda relies upon the limited distance and line of sight transmission to stop unwanted snoopers from reading your beam. If you are concerned you can add software encryption.

The invisible network is still a little way off, but infra-red printing is a reality thanks to the Hewlett Packard LaserJet 5. This has an Irda port on the front in addition to the standard printer ports on the back and is supplied with the necessary driver software. There is a 30° field of view, so lining the notebook up is not critical. Though it has an effective range of three metres, keeping closer is more reliable, and the specification for Irda says that you should be within a metre. The LaserJet 5 is a PCL or PostScript printer, neither of which are particularly compact file formats, but in tests the slow transmission rate did not hamper the performance, even on a page with a lot of graphics. The software error-corrects so there is no degradation in image quality.

A peculiarity which seemed to hamper some devices was over-brightness. Getting too close could cause the transmission to break down.

While print speed might not be affected by the slow serial transfer rate the other uses for Irda will benefit tremendously from them. Chief among these is file transfer. A number of manufacturers provide machine-to-machine links by using the Tranxit, Laplink-like, software. This allows files to be transferred from one machine to another as easily as if they were on the hard disk of a single machine by dragging and dropping, but it does not have some of the more advanced features of systems like LapLink.

Psion is working on a future version of the Gold Card modem which will have Irda in addition to the traditional cable link Adding an LED to a device which already has many of the components necessary for a serial port peripheral makes sense, but the major problem is one of the viewing angle – most PCMCIA sockets are not in the best position for pointing at the printer.

We are bound to see (or not see) more infra-red devices. It's an inexpensive, flexible way of linking devices, which requires little power or board space. It's ideal for pocket computers and works well in an environment where a number of users want to share a printer without installing a network. It's not a universal solution – it doesn't replace the network just yet – but for many people it will be a better bet than a docking station.

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Top ten tips for buying and using portables

1. That old maxim "try before you buy" couldn't be more true when it comes to choosing a notebook PC. The variety of portables, in terms of design and performance, is astounding.

2. One of the best ways to test out a portable's suitability for Windows use is also one of the simplest. Fire up the included Solitaire and have a go. If you find it hard to move and position the cards in Solitaire, then it is likely to be difficult to move blocks of text and graphics around in more general use.

3. Don't be seduced by that faster processor or that better screen unless you really need them. If your needs simply involve word processing, look for the notebook with the best keyboard and pointing device. If you are likely to be dealing with graphics, only then does the screen become a big issue.

4. Make sure you choose a system with sufficient RAM. Although Word and Excel will run nicely with 8Mb under Windows 3.11, native applications running on Windows 95 and OS/2 require 12 or 16Mb to run at their best.

5. Build quality is important. Notebooks assigned to particular individuals for long periods will generally be treated better than those which pass through many hands regularly. In the latter case, it is important to buy portables that will take real hammering. This may be more important in the long term than a better screen or bigger disk.

6. Removable floppy disks allow longer times between recharges by giving space to a second battery, and the absence of the floppy can help avoid viruses and games which clog the disk and reconfiguration of the setup. File transfer can be done by the system's administration staff centrally.

7. With portables being so modular, it is tempting to buy a base model and then upgrade later as funds allow. The drawback is overall cost. Nearly all the major components of a portable are proprietary and considerably more expensive than their desktop counterparts. Look at the RAM prices, for example. You can be expected to pay upwards of £100 per megabyte, compared with around £30/Mb for standard SIMMs. Generally speaking, it works out cheaper to buy the spec you will need long term from the outset than upgrade later on.

8. Most of the models on test allowed the user to make the upgrade — sometimes this was easy, other times hard. Many manufacturers insist on processor upgrades through recognised engineers or their own staff. Naturally, this will work out more expensive than doing it yourself. It is also an important issue for anyone needing to upgrade a whole batch of machines because of shipping costs and the loss of equipment for several days.

9. The display becomes very important if the notebook is to be used by large groups of people. The viewing angle is very much more restricted with a dualscan screen than with TFT screens, which allow more people to see the screen at once.

10. In the early days, many batteries could be recharged externally with a separate charger — a spare could be charged up while the main battery was in use and the two later swapped over. The trend today seems to be against this as none of the manufacturers supplied external chargers. For anyone managing a large group of portables, the logistics of keeping everyone supplied with power can easily become a nightmare, so talk to your supplier about this before you buy.

TABLE OF FEATURES

Manufacturer	ACI	Adams	Compaq
Model Name	7600 Pentium	Accura 5000	Contura 430CX
Phone No.	0181 830 1958	0161 877 8822	0181 332 3888
Fax No.	0181 830 1959	0161 877 8684	0181 332 3409
Price of Machine Reviewed	£2,768	£3,068	£3,560
SPECIFICATION			
Processor Type and Speed	Pentium 90	Pentium 90	DX4/100
RAM Supplied (MB)	16	16	16
RAM Maximum (MB)	40	40	32
Hard Disk Supplied (MB)	540	710	720
Floppy Disk (Int/Ext)	Internal	Internal	Internal
PCMCIA Slots	Two	Two	Two
Pointer Type	Trackerball	Trackball	Trackball
CONNECTORS			
Serial Port (Std/Enh)	Enhanced	Enhanced	Standard
Parallel Port (Std/Enh)	Enhanced	Enhanced	Enhanced
IRDA Option?	No	Yes	No
DISPLAY			
Display Type	TFT	Quad Scan	TFT
Screen Size (inches)	9.5	10.3	10.4
On-screen Colours @ 640x480	256	256	256
External Colours @ 1024x768	256	256	256
POWER SUPPLY			
Battery Technology	NiMh	NiMh	NiMh
Claimed Battery Life (Hours)	2.5 hours	2.5 - 3 hours	3-5.5 hours
Claimed Recharge Time in use)	2 hours	3 hours	Not Supplied
PHYSICAL SIZE			
Dimensions (WxDxH) cm	28.3 x 23.2 x 5.3	27.9 x 21.8 x 5.15	22.6 x 30.4 x 5.4
Weight with Battery (Kg)	2.9	3.09	2.84
DOCKING STATION			
CD-ROM option	Yes	Yes	No
Hard Drive option	Yes	Yes	No
PCMCIA Slots	Yes	No	No
Network card, type	No	Optional	Ethernet compatible
Game port	No	No	No
Sound	Yes	Yes	No
Physical size (WxDxH) cm	37 x 36.7 x 12.6	38.2 x 37 x 11.9	22.83 x 3.49 x 30.29
SOFTWARE			
Operating System version	Not included	Windows 3.11	Win 3.1
Business Applications	None	None	None
Multimedia Titles	None	None	None
Other	Utilities	Utilities	Tabworks, Learning centre
SALES AND SUPPORT			
Basic Warranty Length	1 year	1 year	3 years parts and labour
On-site Service available (cost)	No	No	See dealers
Extended Warranty Available	Yes	Yes	Yes
Sold through Dealers or Direct	Direct	Direct	Dealer

TABLE CONTINUES ON NEXT PAGE ▶

TABLE OF FEATURES

Manufacturer	CTX	Dell	Evesham Micros	Gateway 2000	IBM	NEC	Olivetti	Rock Computers	Texas Instruments	Toshiba	Twinhead UK	Viglen	Manufacturer
Model Name	EzBook	Latitude XPi	Vale Voyager	Liberty	Thinkpad 755 CX	Versa P75S	Echos 48CP	Estima Sonata	TravelMate 4000M	400CDT	Slimnote 5	Dossier P5 Advanced Sound	Model Name
Phone No.	01923 818461	01344 720000	01386 765500	0800 60 2000	0345 727272	0181 993 8111	0181 785 6666	01753 567899	01784 212739	01932 828828	01256 811366	0181 758 7000	Phone No.
Fax No.	01923 818643	01344 860187	01386 765354	010 353 1 848 2022	0345 727272	0181 235 4945	0181 780 8191	01753 567007	01784 212662	01932 852167	01256 811142	0181 758 7080	Fax No.
Price of Machine Reviewed	£3,048	£3,918	£2,957	£2,499	£5,580	£4,680 (With MediaDock)	£3307	£2,946	£3,897	£4,440	£3,949	£3,716	Price of Machine Reviewed
SPECIFICATION													**SPECIFICATION**
Processor Type and Speed	486DX4/100	Pentium 90	i486DX4/100	i486DX4/100	Pentium 75	Pentium 75	i486DX4/100	i486DX4/100	i486DX4/100	Pentium 75	i486DX4/100	Pentium 90	Processor Type and Speed
RAM Supplied (MB)	16	16	20	8	8	8	16	16	20	16	16	16	RAM Supplied (MB)
RAM Maximum (MB)	32	40	20	24	40	40	24	32	20	40	32	40	RAM Maximum (MB)
Hard Disk Supplied (MB)	524	810	528	720	540	810	540	510	524	770	810	540	Hard Disk Supplied (MB)
Floppy Disk (Int/Ext)	Internal	Internal	Internal	External	Internal	Internal (&removable)	Internal	Internal	Internal	External	Internal	Internal	Floppy Disk (Int/Ext)
PCMCIA Slots	Two	Two	Two	Two	Two	Two	Two	Two	Two	Two	Two	Optional	PCMCIA Slots
Pointer Type	Trackball	Trackball	Trackball	Nipple	Trackpoint III	Trackball	Trackball	Trackball	Nipple	Nipple	Touchpad	Trackerball	Pointer Type
CONNECTORS													**CONNECTORS**
Serial Port (Std/Enh)	Standard	16550 UART	Enhanced	Standard	Standard	Enhanced	Standard	Enhanced	Standard	Standard	Enhanced	Enhanced	Serial Port (Std/Enh)
Parallel Port (Std/Enh)	Enhanced	Enhanced	Enhanced	Standard	Standard	Enhanced	Enhanced	Enhanced	Enhanced	Enhanced	Enhanced	EPP/ECP support	Parallel Port (Std/Enh)
IRDA Option?	No	No	No	Yes	Yes	No	No	No	No	No	No	Yes	IRDA Option?
DISPLAY													**DISPLAY**
Display Type	TFT	TFT	TFT	Duel Scan	TFT	TFT	TFT	TFT	TFT	TFT	TFT	TFT	Display Type
Screen Size (inches)	9.4	10.4	11	10.4	10.4	9.5	10.4	9.5	9.5	10.4	9.4	10.4	Screen Size (inches)
On-screen Colours @ 640x480	64,000	16,000,000	512	256	256	256	256	256	256	256	256	262,000	On-screen Colours @ 640x480
External Colours @ 1024x768	256	256	256	256	256	256	256	256	256	256	256	256	External Colours @ 1024x768
POWER SUPPLY													**POWER SUPPLY**
Battery Technology	NiMh	Lithium Ion	NiMh	NiMh	Lithium Ion	NiMh	NiMh	NiMh	NiMh	Lithium Ion	NiMh	NiMh	Battery Technology
Claimed Battery Life (Hours)	3-6 hours	4 hours	2 hours	4 hours	3 hours	5 hours	4-6 hours	2 hours	3-5 hours	4.5 hours	3 hours	1.5-2 hours	Claimed Battery Life (Hours)
Claimed Recharge Time in use)	2 hours	2 hours	1.5 hours	System off: 2 hours	2-3 hours	2.7 hours	1.5 hours	2 hours	12-16 hours	2-3 hours	3 hours (not "in use")	8 hours	Claimed Recharge Time in use)
PHYSICAL SIZE													**PHYSICAL SIZE**
Dimensions (WxDxH) cm	28.4 x 21.8 x 4.1	27.9 x 22 x 5.1	26.8 x 22.4 x 5.7	25.4 x 20.3 x 4.1	29.7 x 21 x 5	29.2 x 23.3 x 5.5	28.6 x 21.6 x 4.4	28 x 23 x 5	21.6 x 27.9 x 4.9	29.9 x 23 x 5.5	30 x 39 x 10	27.8 x 22 x 4.9	Dimensions (WxDxH) cm
Weight with Battery (Kg)	2.68	2.77	2.7	1.9	2.9	3.22	2.45	2.8	2.9	3.3	2.81	2.9	Weight with Battery (Kg)
DOCKING STATION						Port replicator							**DOCKING STATION**
CD-ROM option	Yes	No	Yes	N/A	Yes	Yes	No	Yes	Yes	No	Yes	Yes	CD-ROM option
Hard Drive option	Yes	No	Yes	N/A	No	Yes	No	Yes	Yes	No	Yes	Yes	Hard Drive option
PCMCIA Slots	-	No	No	N/A	1 x 16bit AT-Bus	No	No	No	Yes	Two type III	Two Type II	No	PCMCIA Slots
Network card, type	Optional	No	Yes	N/A	Optional	N/A	No	Option	PCMCIA Type II	PCMCIA	PCMCIA	Optional	Network card, type
Game port	Optional	No	Yes	N/A	Yes	No	No	Yes	Yes	No	Yes	No	Game port
Sound	16bit	No	No	N/A	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Sound
Physical size (WxDxH) cm	30 x 10 x 14	-	34.2 x 42.5 x 14	N/A	410 x 250 x 102	43.6 x 41.6 x 13.4	-	41 x 34 x 16	19.9 x 11 x 7.3	29.9 x 23 x 5.5	32 x 40 x 13	38 x 36 x 14.5	Physical size (WxDxH) cm
SOFTWARE													**SOFTWARE**
Operating System version	Windows 3.11	Windows 3.11	Windows 3.11	Windows 3.11	Windows 3.11, OS2	Windows 3.11	Windows 3.11	Windows 3.11	Windows 3.11	Windows 3.11	Win 95 or 3.11	Windows 3.11 or Win 95	Operating System version
Business Applications	None	Office (optional)	None	MS Office 4.3 Pro	Organiser CCMail Mobile	None	Lotus organiser	None	None	None	None	Works, Lotus Organiser	Business Applications
Multimedia Titles	None	None	None	None	Screencam, VFW Runtime	None	None	None	Jazz sound system	None	None	None	Multimedia Titles
Other	Dos 6.2	None	Utilities	Windows 95	Audiofile Talk, Works	None	None	Audio utilities	Utilities	Audio apps.	None	PCMCAI and Audio utils	Other
SALES AND SUPPORT													**SALES AND SUPPORT**
Basic Warranty Length	3 years	1 year	1 year	1 year	3 years	1 year	1 year	3 years	1 year	3 years	1 year	1 year	Basic Warranty Length
On-site Service available (cost)	Standard	£79	12.5% of RRP	N/A	12 Months free	£185 for 3 years	On application	No	No	No	£39 : first year	£149	On-site Service available (cost)
Extended Warranty Available	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	Not from Toshiba	Yes	Yes	Extended Warranty Available
Sold through Dealers or Direct	Dealers	Direct	Direct	Direct	Both	Dealers	Dealers	Direct	Dealers	Dealers	Dealers	Direct	Sold through Dealers or Direct

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6 of the best

Whether you're just sketching outlines or mastering the art of serious 3D modelling, there's something here for you. **Tim Nott** is hit for six.

Last time we took a group look at CAD software, we covered almost everything currently available. This time we've been more selective, limiting the choice to just six applications chosen because they're either new, important or interesting. Prices range from under £100 to over £3,000, so there should be something for everyone.

Contents

AutoCad Release 13

The big daddy of them all, AutoCad has been around since 1983, but only recently has it embraced the Windows interface. This version comes with both DOS and Windows versions on the same CD. Because of its longevity, one of the most important factors to Autodesk is backwards compatibility — ten years is several generations in terms of software development, but a short time in a large building or engineering project.

Compatibility is not just a question of file formats: there's the question of customisation, scripts and programming languages, and interface essentials, which is why you'll find — unusually in a Windows application — a command-line interface at the heart of the matter. A time-transported visitor from the 1980s could sit down at this version and type "LINE 2,2 2,3" and get the accustomed result. Though most, if not all, commands can be now accessed from buttons and

menus, it's still essential to be able to type in precise co-ordinates, and the command-line window also provides a 400-line scroll-back history of commands.

AutoCad is a huge and extremely powerful 2D and 3D modelling package, and a full feature list would take up the whole of this article, so I'll confine myself to concentrating on what's new. Despite its cumbersome heritage, this release is a vast improvement over version twelve in terms of ease of use. There is a generous amount of on-line help and documentation, ranging from hypertext "What's new"
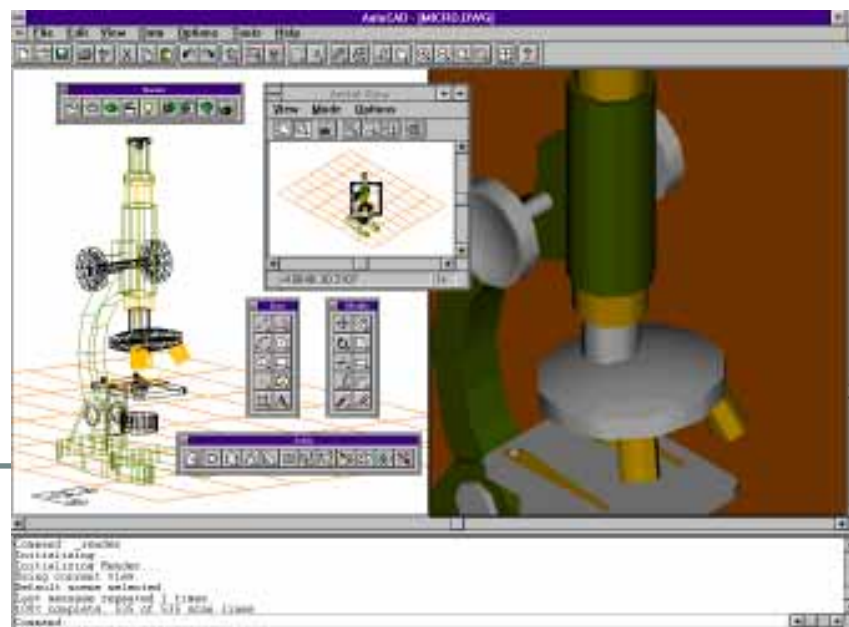
Release 13's brand new Windows interface in action

and "Getting started" overviews, through a series of detailed tutorials, to a complete reference on the CD, complementing several bookshelf-inches of printed material.

The first pleasant surprise is that there is now a thumbnail preview option in the "File/Open..." dialogue. Although this would seem a basic user right, consider that until recently DOS AutoCad veterans had to view a list of files, remember the filename they wanted, then clear the screen before typing in the filename.

There have been great leaps forward in toolbars. Version twelve heaped everything into one big messy palette. This time there are multiple, place-anywhere toolbars for drawing, modifying, dimensioning, zooming and so on. They all have tool-tip bubble help, and can all be customised by dragging and dropping from a palette of available commands. Autodesk has also discovered fly-outs, centre and radius, three points, and so on. An oversight here means the right mouse button, or digitiser "enter" button, which traditionally repeats the last command, reverts to the default, so if you've just drawn a three-point circle, you'll be
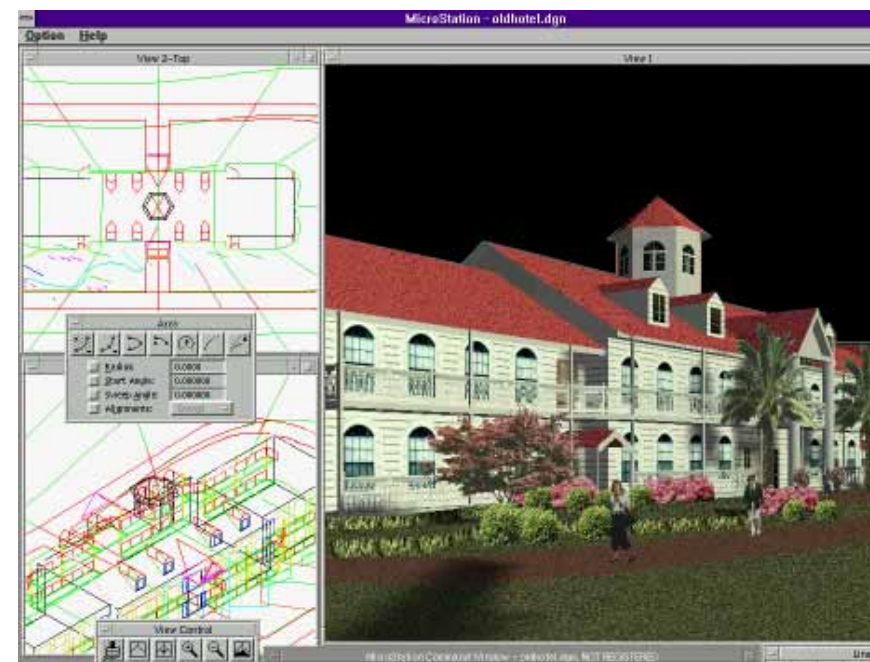
switched back to centre-radius.

Another welcome change, and the sort of thing that users of humble illustration packages take for granted, is that hatching (pattern fill) is now associative. The hatch command can now also automatically detect "holes" in an object without having to select the object and all its holes individually. Clicking on an object with no active tool selects it for editing, again a Windows drawing *de facto* standard.

Other things haven't changed. You can't have more than one drawing loaded at once, and the arrangement of views is still most un-Windows like. And there are still some aspects of the button-bar interface that have a way to go: buttons don't "stick down" to remind you of the current selected tool, and the interface for object snapping is still rather awkward. You can snap to the end or midpoint of a line, for example, on a one-off basis from a button bar. To set up running, multiple snaps — say you want to snap to ends of lines and centres of circles until further notice — you have to open and close a dialogue box. AutoCad's tiny sibling, Autosketch, does this much better, with one button bar with active snaps shown "pushed in".

Three-dimensional drawing is never easy, but view management has been made a lot easier by the inclusion of a simple visual protractor-style control for establishing the angle and elevation of the view point. Boolean operations — adding and subtracting intersecting solids — is now much easier, and rendering options now include Phong as well as Gourod methods. Text can be handled in paragraphs, there's a spelling checker, and for real power drawing, multilines can now consist of up to sixteen parallel lines of various styles and colours.

PCW Details

AutoCad Release 13
Price £3,150
Contact Autodesk UK 01483 303322
Good Points Vast improvements to both the Windows interface and the online help with this release. Powerful, flexible and accessible to third-party development.
Bad Points Expensive and complex — still requires dedication and training.
Conclusion Undoubtedly the industry standard, but not for the casual user.

Microstation 5.0

Formerly distributed by Integraph, Microstation's developers, Bentley Systems, have now taken control over their own destiny. Though not a native Windows product, the "Windows Connection" enables it to run under Windows 3.x. You get a choice of interfaces, with either Windows-style buttons and dialogues, or the more elegant Motif interface, which is surprisingly like Windows 95. The only radical difference for Windows traditionalists is that the menu bar and status line are enclosed in their own free-range window. Despite this eccentricity, the interface is superb. The main toolbox has fly-outs, in the usual manner, but these can be torn off and dragged elsewhere on the screen, so you can have the tools you want to hand in the area you're working. They also expand to show the options for the current tool — the number of sides to a polygon or numeric input boxes for line length and angle, for example.

Much use is made of "cells" — usually referred to as blocks or symbols elsewhere — that consist of small drawings grouped in libraries that can be used over and over again, such as nuts and bolts or standard architectural fitments. Cells have other uses, too: they can be

employed as a pattern fill, such as brickwork, or as line terminators. A special kind of cell is "dimension driven": when you place one of these you have a list of dimensions that you can change on the fly, so one cell of a gasket, for instance, could have a variety of hole diameters and spacings.

Superb 3D visualisation and rendering in Bentley's Microstation

Microstation excels in 3D construction and visualisation. Although you can only load one drawing at a time, you can have

up to eight views of it and switch between them seamlessly. Say you want to draw a truncated cone. You pick the appropriate tool from the 3D objects menu and define the base centre and radius in plan view. Move the pointer over to a side view and you can click in the height, before moving back to plan to define the top radius.

There's far more here, though, than drawing simple primitives such as boxes, spheres, cylinders, cones, wedges and tori. Say you want to draw some ducting. You draw the centre line, which can meander in three dimensions, then extrude the cross-section of the duct along the line. You can define surfaces from independent curves such as contour lines, weave a mesh between joined sections, or extrude a skin between two different shapes along a curve.

Having created 3D objects and surfaces, the range of things you can do with them is also rather impressive. You

have a similar range of editing tools as in 2D, so you can trim surfaces to an intersection, cut holes in surfaces, or stretch them to fit a new curve. Especially useful is the fillet tool: with this you can round off or bevel the intersection of two surfaces, to create, for example, a smooth joint between a pipe and a flange instantly.

For visualising a 3D design, the built-in rendering features are superb. You can assign "materials" to objects, control natural and artificial lighting, and cast shadows. You can even add bitmapped pictures to a model: the trees and figures in the screenshot are transparency-masked bitmaps projected onto simple transparent blocks. Further rendering options include a stereoscopic effect and the creation of animated "fly-throughs".

There's the essential facility to attach text or numeric data to objects for database export, import filters for DXF, CGM and AutoCad 12 DWG files, and special

consideration is given to workgroups with the use of reference files. Using these is like electronic tracing paper: you can draw "on top", and connect objects to those in the reference drawing, without modifying the latter. So members of a team can work, for instance, on various aspects of a building project , secure in the knowledge that no-one has moved the walls.
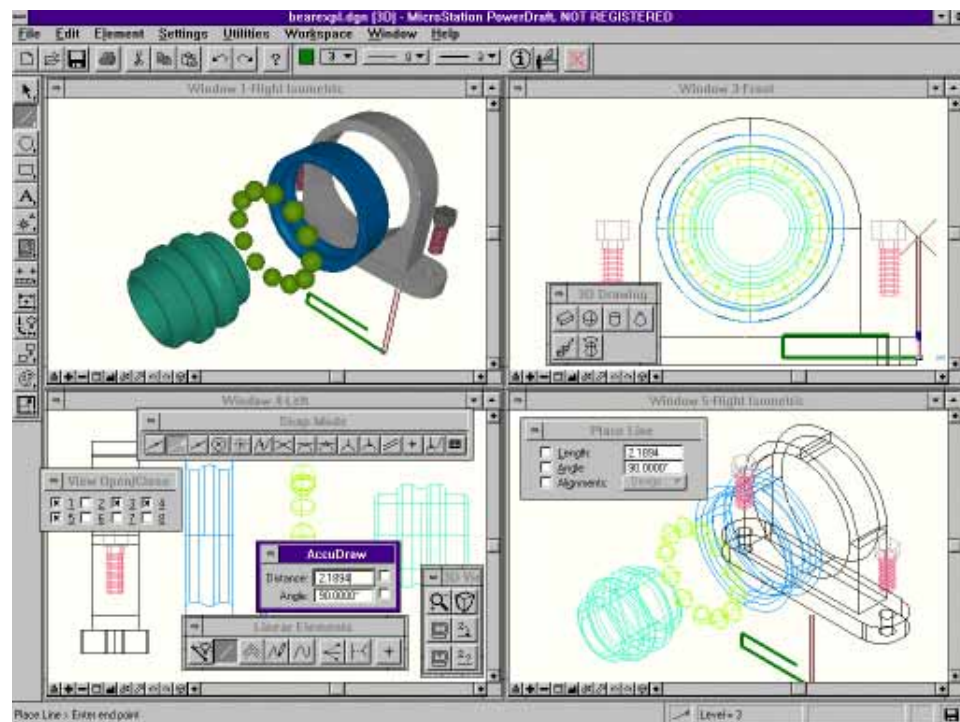
Microstation Powerdraft 5.5

Powerdraft's Accudraw makes 3D drawing easier

Also from Bentley Systems, Powerdraft is not so much a cut-down version of Microstation as a new application in its own right, despite the "5.5" tag. For a start, it's a true 32-bit Windows application — according to the documentation it runs under Windows 3.1, with the supplied Win32s extensions, and NT. It also ran under the beta Windows 95, and a DOS version is again supplied

on the CD. It has a similar fly-out and tear-off button interface, this time with bubble help, but the tool settings dialogue is a separate, context-sensitive box, which is somewhat more economical in terms of screen space. Like Microstation and AutoCad you can also key in commands. You can have up to eight windows on the same drawing, and — a good touch — each has a set of zoom and pan buttons tucked in beside the

bottom scroll bar. As with Microstation you can have 63 levels and you can turn off the display of things such as dimensions or construction lines.

Every 2D drawing tool you could think of is here, including Smartlines. These let you switch between arc and straight segments on the fly, much like polylines elsewhere, but also let you chamfer or round off vertices automatically as you go. Snapping to objects takes a little getting used to: you have to press the "Tentative button" (both mouse buttons) then confirm, cancel or try again with a second click. You can either use the default or a one-off, and although you don't get the AutoCad flexibility of multiple running snaps, objects have keypoints — ends of lines, quadrants and centres of circles — which can be further subdivided to include midpoints and octants, for example.

Another great aid is Accudraw. With this active, you get a co-ordinate box that automatically has the keyboard focus, and the mouse is also affected — a cross appears and as you move to a near-right angle the line direction snaps. The really clever bit is that you can reset the axes of the cross on the fly to draw a series of lines at right angles to each other but rotated to the main

drawing axes.

Compared with Microstation, the 3D facilities are somewhat spartan. You are limited to "primitives" — spheres, cones and slabs created directly — or solids formed by extruding a shape in a straight line or round an arc. Although you can twist and scale the object along a line, you can't create more complex surfaces such as one defined by four 3D curves, like a car roof. On the positive side, view management is simple and efficient with interactive "cube" controls for rotating the viewpoint and applying perspective. As with Microstation, you can start an object in one view and finish it in another, and the Accudraw feature is especially useful here. There's a more limited rendering feature, and though it doesn't support the Microstation Development Environment, there's a Basic-style macro language.
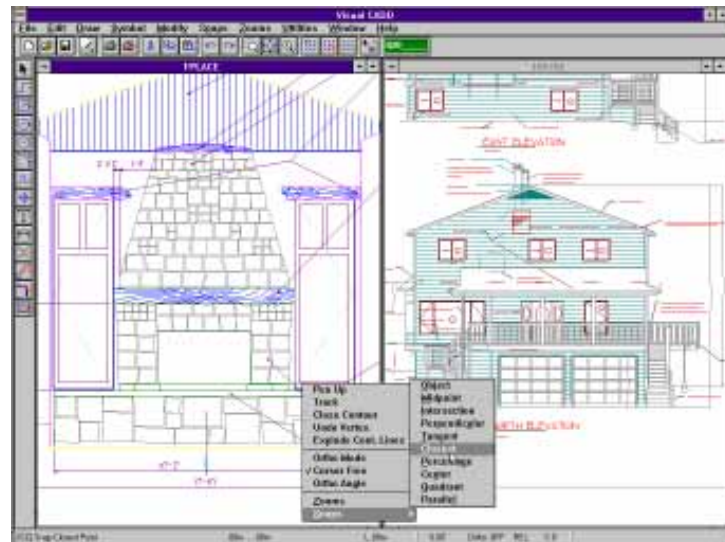
Visual CADD

Multiple drawings — but not views — and Visual CADD's nifty right-mouse menus

One of several CAD products from FastCad, Visual CADD was developed by the creators of Generic CADD as a native Windows application. It's strictly 2D, and its price of £495 puts it firmly in the mid-range. The interface is superficially fairly conventional — a "speedbar" at the top of the screen contains buttons including saving and opening, clipboard access, zoom, grid and line style; and a tool palette at the left of the screen expands into "flyouts" of related tools. These, and the menus, can be customised, but only by editing a text file. Some thoughtful touches rapidly become apparent. For example, the rectangle tool has two sub-options — normal rectangles, that you define by their opposite corners and which are at right-angles to the drawing, and three-point rectangles, where you define a line at any angle for the height, then stretch out the width. Similarly, the "ortho" constraint can have its origin changed, so you can continue drawing lines at right-angles to each other but at an angle to the drawing.

The secret weapon in the interface is the use of the right mouse button context-sensitive menus. If you're drawing a polygon, for example, this menu will include a choice of the number of sides. When drawing lines, this gives options to undo the last section, switch snaps and constraints on and off, zoom in and out, and so on. Another excellent feature is the "Track" command. This is rather like drawing without ink. Say you want to start a line at a precise but awkward spot, such as on a circle, 2.5 units left from the top quadrant point. With tracking on, you'd snap to the quadrant, enter the units from the keyboard, then with ortho on, snap down to the nearest point on the circle. Turn off tracking and you're ready to start the line, which saves a lot of time drawing and erasing construction lines. Backward redraw is another time-saver: as its name suggests this reverses the order in which the screen is redrawn, and with this turned on, you can update the display of the last few objects created, press Escape, and carry on working without having to wait for the entire view to update.

There are some surprising omissions. Although this is a 2D package, I did expect to see some aids for isometric drawing; the ortho rotation helps a little here, but not as much as a proper isometric constraint or grid. A more serious failing is that although you can have more than one drawing open, you can't have multiple, linked views of the same drawing. Finally, a strong selling point is Visual CADD's open architecture, enabling third parties to create custom add-ons in Windows-based programming languages such as Visual C++ or Visual Basic.

FloorPlan Plus 3D 2.0a

Floorplan is a 3D application specifically for architectural modelling. As such, as well as the regular drawing tools for lines, ellipses, rectangles etc, it has tools for floors, walls, pipes and stairs, with symbol libraries of doors, windows, furniture and fittings. All drawing is done in 2D plan view, a floor at a time. Create a floor slab, then place walls — you have a choice of styles, which you can add to or edit. Next select the door tool, choose a door style, pick a wall and slide the door into place. An opening is automatically created in the wall, and the same trick works with windows — even arched ones.

Having completed the first storey, you can move upstairs: up to 20 levels are
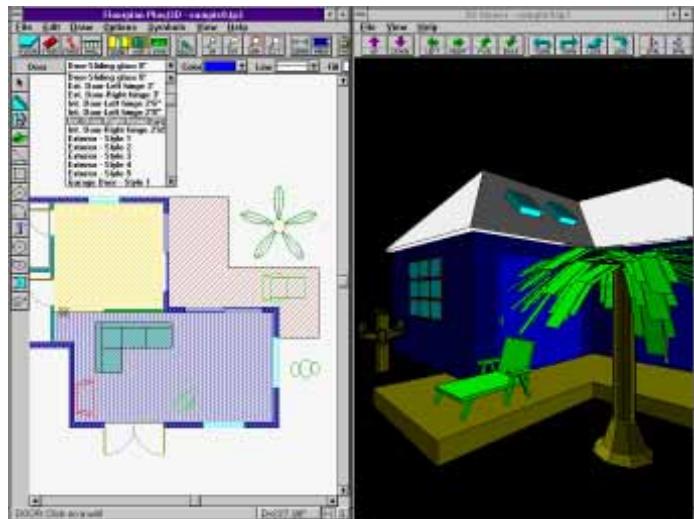
Floorplan — choosing a door, and right, the rendered 3D view

add a roof. The roof editor is a separate module, and here you get a more traditional view, split into three panes which can each be altered to top, front, side or isometric view. As well as being able to create plane surfaces, you can place dormers, skylights and chimneys.

The final part of Floorplan is the 3D viewer. Start this, specify a viewpoint, direction and height, and you see a perspective wireframe model of the 3D parts of your drawing. You can move through

and around this, and at any time render the viewport to see a solid model.

Precision drawing is not intended to be Floorplan's strong point. There's an adjustable grid to snap to, and walls will join to the previous segment, but that's about it — you can't snap to other objects or enter precise X-Y co-ordinates for a point. It is, however, very easy to use, and an ideal way of creating quick visualisations of simple architectural or room-planning projects. You can export both 2D and 3D DXF files, but unfortunately, not import them

supported, and the ground floor walls show through as a guide but are not editable. Objects are arranged in predefined layers — walls, floors, dimensions, and so on, so having drawn the next floor slab, you can turn it off to see the walls below again. Having created each storey, and populated it with 3D fixtures and fittings from the symbol library, it's time to

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PCW *Details*

FloorPlan Plus 3D 2.0a
Price £149
Contact FastCAD Europe 01923 246427
Good Points Quick, easy and inexpensive.
Bad Points Can't import DXF files, short on accuracy.
Conclusion A remarkably cheap and cheerful way to produce 3D sketches.
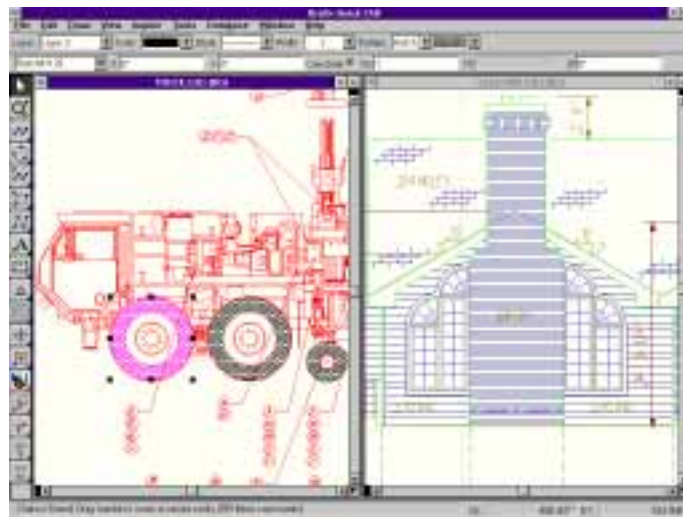

Drafix Quick CAD

D rafix CAD was one of the first 2D CAD programs to appear as a true Windows application, and originally cost over £600. Over the years the price has dropped but there has been little change to the functionality, except that this version doesn't have macro capabilities: for these, you need Drafix professional version, at £199, which also comes with more extensive symbol libraries.

You can have multiple drawings open, multiple views of the same drawing and — rather redundantly — split a window into four panes. There's a wide range of import filters, including DXF and AutoCad DWG. There's but one toolbar, though this is available in "beginner, intermediate and advanced" flavours. Everything else fly-outs from here — zoom options, selection methods, ways of drawing a shape, and so on.

A status bar at the top of the screen shows the current layer, line width, colour and style, and below that, a properties ribbon shows the position and settings for selected objects. With this, you can do things such as change the number of sides of a polygon instantly. Though strictly 2D, there are a fine array of tools and drawing aids, including circular and rectangular arrays, trimming, bevelling, offsetting, and more. And it does merit

the title "Quick": redraws are encouragingly brisk and background redrawing means you can continue working as the screen updates itself — a major frustration-beater. Both dimensioning and hatching are associative — changing dynamically if the object is moved or altered. There are symbol libraries of common architectural, mechanical and electrical components, and an unusual feature at this price is the facility to attach hidden numeric or text data to objects. You could, for example, create an office plan with the purchase date and cost of each computer, the length and cost per metre of network cabling, and so on, and export this to a spreadsheet for costing the project.

My only personal grumble with Quick CAD is the rather inflexible use of object snaps. Unlike most products, where you can snap to a variety of points depending what's in range of the cursor "catch box", here you can only have one snap active at a time and you must use it. Another area that could be improved is the lack of aid for isometric drawing.

Multiple files and a slick interface make Drafix Quick Cad a bargain

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PCW *Details*

Drafix Quick CAD
Price £69
Contact Roderick Manhattan 0181 875 4400
Good Points Fast, well featured and easy to use.
Bad Points 2D only, slightly awkward snaps.
Conclusion Astounding value for money.

Add-ons

There's probably no such thing as a typical CAD user. The requirements of someone designing printed circuit boards are totally different from those of a heating and ventilation engineer or an architect. This is where the "open architecture" of the higher-end products is important. AutoCad has an astonishing level of programmability, starting with basic scripts, through Autolisp routines, Visual Basic, C++ and DDE, an example of the latter being a demonstration of an Excel spreadsheet that interacts dynamically with a drawing of a shaft. There are numerous add-ons available from Autodesk and third-party vendors, ranging from document management to enhanced 3D rendering, as well as libraries of symbols for all sorts of industries.

Microstation, despite its number two status in terms of user base, has a total of 600 independent developers with over 1,000 add-ons available via the Microstation Development Environment (MDE) and Microstation Development Language (MDL). The future will see the development of Objective Microstation, with "intelligent" objects that model more closely real artefacts and can conform to "rules" such as the automatic selection of a fastening to suit material thickness and load. Powerdraft, too, though with limited MDL support and none for MDE, has a Basic-style macro programming language.

Despite its 2D status, Visual CADD is also dedicatedly open: its add-ons include "parametric" objects, where you can specify, for example, gear wheels by the number of teeth and diameter. There are text-handling and waterways add-ons, and under development are extras ranging from dress pattern design to scene-of-crime investigation. Drafix, meanwhile, will create databases and import symbol libraries, with a macro facility available in the Professional version, and Floorplan will import objects created in the budget 3D Design Plus.

	AutoCad 13	Microstation 5.0	Powerdraft 5.5
Supplier	Autodesk UK	Bentley Systems (UK)	Bentley Systems (UK)
Telephone	01483 303322	01344 412233	01344 412233
Price	£3,150	£ 3,495	£1,895
Min processor	386 +co-pro	386 +co-pro	386 +co-pro
Min memory	16Mb	8Mb	8Mb
2D/3D	3D	3D	3D
Layers	Unlimited	63	63
Multiple drawings open	N	N	N
Multiple viewports	Y	Y	Y
Macro language	Y	Y	Y
Development tools	Y	Y	Y
Rendering	Y	Y	Y
Customisable interface	Y	Y	Y
OLE	Server/Client	N	N
DDE	Y	N	Y
Database export	Y	Y	N
Symbol libraries	Y	Y	Y
Export formats	DXF, DXB, IGES, EPS, WMF	CGM, DWG, DXF, IGES	DWG, DXF
Import formats	DXF, DXB, IGES, EPS, WMF	CGM, DWG, DXF, IGES	DWG, DXF

|	Visual CADD	Floorplan Plus 3D	Drafix Quick CAD
Supplier	FastCAD Europe	FastCAD Europe	Roderick Manhattan
Telephone	01923-246427	01923-246427	0181 875 4400
Price	£ 495	£149	£69
Min processor	386	386	386
Min memory	4Mb	2Mb	4Mb
2D/3D	2D	3D	2D
Layers	512	13 (preset)	256
Multiple drawings open	Y	N	Y
Multiple viewports	N	Only for roof editing	Y
Macro language	Y	N	N*
Development tools	Y	N	N
Rendering	N	Y	N
Customisable interface	Y	N	N
OLE	Server	N	Server
DDE	N	N	N
Database export	Symbol count only	N	Y
Symbol libraries	Y	Y	Y
Export formats	DXF, DWG, GCD	DXF, WMF, Estimator	DXF, DWG, IGES, WMF
Import formats	DXF, DWG, GCD	3D Design Plus	DXF, DWG, IGES, WMF

*available in Professional version @ £199

On the
CUTTING EDGE
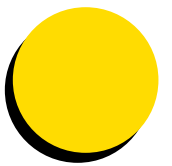
Welcome to Cutting Edge, the section in *Personal Computer World* that combines our regular reviews of games, books and CD-ROMs with features bringing you the latest news about computing, and consumer technologies and online services.

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.

Kids' Stuff:
PB Bear

CD-ROMs:
World Atlas

Screenplay:
Flight Unlimited

CUTTING EDGE

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net.news

Joanne Evans has the very latest news from the Internet

Porn panic

The computer industry has responded to the panic over porn on the Internet by banding together to develop standards for software to block access to undesirable material. Netscape, Microsoft and Progressive Networks, makers of RealAudio audio-on-demand software for the net, started the initiative called the Information Highway Parental Empowerment Group, only to be joined by tens of other major computer companies including IBM and DEC.

The group aims to develop a system that will enable parents to ensure their children do not unwittingly gain access to material that parents deem inappropriate. To do this it may have to develop a method for both content and service providers to rate the nature of the material in a similar way to movies and embed that information in code. The group said it wanted to design a system that "will maximise the likelihood that it will quickly become a standard part of Internet access systems".

Software able to block access to Internet material has already been launched by at least two companies SurfWatch and Net Nanny. The Parental Empowerment Group aims to publish its recommendation in a report by 31st December 1995 and incorporate them into software by 1996. Rob Glaser, president and CEO of Progressive Networks and chair of the study group said: "We hope to move as quickly as possible to make our way through the issues so that we can come up with a stable and reliable technical solution to the legitimate issues that have been raised."

The formation of the group can also be seen as a move to counteract attempts by Senator Exon in the US to change the Communications Decency Act. One of Progressive Networks' backers is Mitch Kapor, founder of the Electronic Frontier Foundation. Fears about pornography on the net have been fuelled by the arrest of nine men in the UK as part of a worldwide police operation, for swapping paedophillic images over the net. Meanwhile, a survey by a researcher at Carnegie Mellon, the US university which became embroiled in controversy earlier this year for censoring its students internet access, has found that 83.5 percent of all image files on Internet newsgroups are pornographic.

French fibre-optics

In France, the state-owned France Telecom has announced it is investing FFr500 million in fibre-optic networks that will carry telephone, radio, images and data to more than 10,000 homes by the end of next year.

Security update

The Internet will be safe for general commerce by next year according to a report from industry analysts Forrester Research. "That's not 100 percent. One hundred percent security can never be guaranteed," said Paul Callahan, author of the report. "Doing business on the Internet will not be that different from the physical world."

However, he said: "We think most companies should expect to lose $1 per $1,000 of transactions to Internet-based fraud. When you compare this to other businesses a 0.1 percent loss rate is not bad. Cellphone fraud is running at an annual rate of close to $20 per $1,000." Callahan believes that by 1996 most Internet applications will be equipped with authentication and encryption technologies. "Lotus' Notes, Netscape's Web browser and server and Premeno's Templar EDI software are already encryption-equipped for the Internet, but we see a raft of Net-secure applications to follow in the next year and a half," he said. "The threat of Internet-based break-ins is overstated. The real problem is making sure that you know with certainty who is at the other end of the conversation, and that no-one can snoop your data or change your bits in transit." The answer, he believes, is encryption so that thieves cannot steal the data, and authenticated digital signatures so users can prove they are who they say they are.

Netscape protocol

Netscape has introduced a new protocol for transactions on the Internet to extend security beyond transmission of data to storage on its arrival. While secure channel protocols such as Netscape's existing Secure Sockets Layer (SSL) encrypt data passing along the network between a client system and a server, the company said the new protocol, Secure Courier, delivers the additional security of keeping the financial data encrypted, or in a "secure digital envelope", when it arrives at a merchant's server or at other intermediate points on the net.

The Secure Courier protocol builds on existing protocols including SSL and will comply with a forthcoming security specification from MasterCard and Visa and is compatible

Gates on the Internet

Bill Gates has admitted in his syndicated column: "it has only been in recent months that I've come to expect the Internet to become mainstream. This sea change is prompting us to critically reevaluate our plans - short-term and long-term. One of our highest priorities has become building Internet support into Windows for example. And the Microsoft Network is evolving to become part of the Internet."

Labour party online

Anyone hoping a change in the ruling party would mean direct government action to develop the information superhighway in the UK will be disappointed by the publication of Labour Party's policy on the information age, "Communicating Britain's Future". The 23-page document insists: "Two-way broadband communication networks must be made available as widely and rapidly as possible" for Britain to keep up with other industrial nations and reap the rewards of becoming an information society.

However, it signals little change from current Department of Trade and Industry policy of relying on industry to do the job aided by a regulatory framework aiming to balance industry incentive with consumer protection. It states: "We believe that the physical infrastructure of these new communications networks will and must be developed by the private sector. The competitive and regulatory environment will therefore be crucial in influencing how it evolves." As well as releasing BT from the ban on providing entertainment across its networks (see Newsprint), the Labour Party would demand a clear timetable from all telecom providers for creating a universal service, covering the whole country "as far as is practicable".

Other measures to reach potential information have-nots include insisting that service providers automatically put a feed into every public library, school, health centre, hospital and Citizen's Advice Bureau in the area they are networking. As broadcast and telecoms services merge, the party would replace Oftel and the Independent Television Commission with two new bodies, one to monitor both telecoms and television infrastructures and one to regulate all content. It also states: "We would also wish the regulator to take action over anti-competitive exclusive deals established between content providers and a particular network owner," which could have far reaching implications for many online service providers such as CompuServe or Microsoft Network.

Some proposals could result in tighter control over the net before the arrival of universal broadband networks. "We would seek to set a framework within which companies and consumers, public services and citizens, could exchange content as they chose," it says, but it does intend to change the law on copyright freedom of speech and privacy. Citing concern over transmission and subsequent copying of music across the networks, it proposes to extend the definition of issuing copies in existing copyright law to include distribution through electronic networks and to establish a legal advisory to work on other legal solutions to copyright problems.

As for freedom of speech, Labour says it would not be restricted accept for legitimate purposes: to stop racial hatred, protect minors and prevent criminal activity such as money laundering which is clearly illegal elsewhere. It does not support a clipper chip-type solution for government agencies to gain access to private data but it would make decryption of data legal with a judicial warrant. Communicating Britain's Future is on the Labour Party Web site at http://www.poptel.org.uk/labour-party/exec-summ.html

across Unix, Windows and Mac. Netscape has published specifications for the protocol and plans to license the technology to partners. A major demand for the protocol is home banking across the net and Intuit and MasterCard have already announced they will support it. Netscape said it hoped to build the protocol into commercially supported software for consumers, merchants, and financial service providers by the end of this year. Specifications for the Secure Courier protocol are available from the Netscape Web site at http://home.netscape.com/newsref/std/credit.html.

Pipex makes loss

The phenomenal growth of the Internet in the UK has taken its toll on Pipex, the country's largest access provider. The company made a loss of £1.08m during the financial year to 30 April 1995, despite growing 10 percent a month and almost tripling revenues to £3.76m. A financial spokesman denied the losses were a result of profit margins being squeezed by fierce competition amongst Internet access providers in the UK. "Every customer we take on is profitable in their own right," he said. "But Pipex is going after new business and so spending a lot of money on marketing, advertising and infrastructure."

Pipex provides access to about 660 large companies, giving it an 80 percent share of the corporate market, and hopes to grow its dial-up service for individuals launched earlier this year to 100,000 subscribers in two years' time. In a fast-growing market the spokesman said: "The best strategy is to grab as many corporate customers as you can because once you've got them, they're likely to stick with you. Profitability is in Pipex's grasp. It depends on when it wants to stop growing." Profits of £31.5 million at its parent company Unipalm kept the whole group £442,000 in the black.

New libel laws

The government has proposed changes to libel law in England and Wales that could prevent online service providers being sued for libel over the content of the messages they carry. The Draft Defamation Bill proposes an updated 'defence of innocent dissemination' of defamatory material to take account of new technology. But it's not clear if services that moderate material would be deemed innocent disseminators. They could be still held liable as in the Prodigy case in the US earlier this year. Copies can be obtained from 0171 210 8560 and comments made until 23rd October.

Jams spread to the net

Realtime information and pictures about roadworks and traffic jams in the UK could be available on the Web early next year in an experiment conducted by the Department of Transport and the CCTA, the government's computing agency. They are currently considering the security implications and the extent to which the data would need to be interpreted for public consumption before going ahead, but the information would be collected from roadside sensors and cameras and fed through a government computer onto the Web.

New net figures

CompuServe is the largest online service with 3.2 million members. American Online is second with 3 million and IBM's Prodigy third with 1.6 million according to a report from Business Research Publications. Delphi Internet has just 140,000 and Apple's eWorld 90,000 members and this is before the launch of the Microsoft Network.

The Telegraph online

The Electronic Telegraph is claiming to be the busiest Web site in Europe with up to one million hits per day. Let's hope its news holds more surprises than the results of its Internet user survey, which tells us most users are "male, under 40, intelligent and computer-literate". http://www.telegraph.co.uk/

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New ISDN service

Warrington-based Internet ser-
vice provider U-Net has started
an ISDN service for standalone
PCs or Lans. A single PC costs
£80 to join and £40 monthly
fees. A Lan costs £150 to join
and £150 per month, regardless
of size. Tel: 01925 633144.

New arts/IT centre

Sandwell Borough Council in
the West Midlands is currently
campaigning to raise £40 mil-
lion to build a new centre for
community development of
the arts and technology. The
centre, which the council
hopes would attract 250,000
visitors a year, would provide
training in multimedia technolo-
gies including the Internet in
complex including training
hotel, multimedia studios and
trading units.
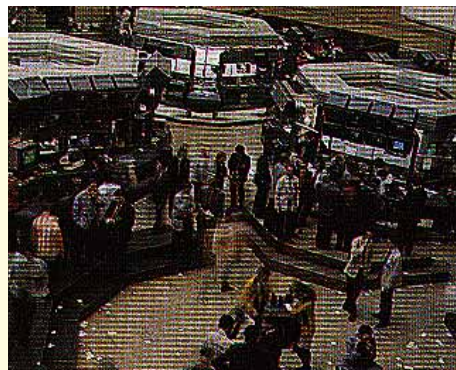
Shares hit the Internet

Electronic Share Information (ESI), a Cambridge-
based company which already publishes UK
stockmarket prices on the Web, is launching a
service which enable subscribers to trade shares
on the Internet early next year. The company,
which is backed by industry heavyweights includ-
ing Acorn founder Herman Hauser, believes it will
eventually create the first retail stock exchange on
the Internet. Subscribers will receive realtime
quotes on the price of all UK shares and then be
able to input their orders through the Internet to
stockbrokers.

The first stockbroker to join the service is
expected to be Sharelink, a broker which
specialises in individual clients rather than institu-
tions. The commission on trades using ESI's ser-
vice will be much lower than other services, as little
as 0.1 percent on trades worth more than £35,000,
while subscribers are likely to pay as they use for
other services such as share tips and company
information.

Concern over the security of share trades and
financial data will be addressed by using encryp-
tion technology. However, there may be problems
online for punters relying solely on the Internet for
their share dealing. ESI's current information-only
Web site states: "You should be aware that the
Internet is not a completely reliable transmission
medium and there may be arbitrary delays and
omissions and pauses in service provision." It
could be bad news if your line drops just as you're
typing "sell, sell, sell". ESI's web site is at
http://www.esi.co.uk

∏et.surf

**Our regular
listing of the
best of what's
new on the web.**

● If you're interested in Golf
check out
http://www.golfweb.com/. It
gives you all the latest golf news
including the Open
Championship at St Andrews.
● Art colleges are jumping onto
the net with a vengeance. The
School of Art and Design at the
University of Derby had its
degree show online in June and
July at
http://vertigo.derby.ac.uk/hitch-
cock/degreeshow/html. You can
still view it, although it really just
demonstrates how poor Web
pages are for large graphics.
● Glasgow School of Art, mean-
while, has a slightly more blue-
chip reputation. Its degree show
is at:

http://www.mech.gla.ac.uk/~gsa
pd/sig.htm
● Miguel Indurain has just won
the Tour de France a record fifth
consecutive time. Le Tour was
well catered for on the net. Info
on Indurain is at
http://www.best.com/~bikiebob/t
df95/riders/indurain.html
● The Hair Loss Handbook and
Support Group Network is dedi-
cated to the countless numbers
of men and women who wish to
be informed about hair loss. As
the average *PCW* reader is a 35-
year-old male it could prove a hit
with Cutting Edge regulars.
http://www.mcny.com/hairloss/
● Plenty of bands are now net-
ted but few have done as good a
job of if as the US rock band
Phish. PhishNet has made a big
contribution to the success of
the band. Unlike most bands
Phish positively encourage their
fans to record shows and trade
in the tapes. Most of the trading
takes place on PhishNet.
You'll find the PhishNet unoffi-
cial web page at

http://hws3.hws.edu:8000/Phish/
● It seems like the whole of this
year has been filled with various
Second World War milestones.
The summer's big one was the
50th anniversary of the dropping
of the first atomic bombs —
Enola Gay hit Hiroshima on 6th
August 1945. There's an excel-
lent web site at

http://www.csi.ad.jp/ABOMB/ind
ex.html. It includes masses of
information about the bombs,
voices of A-bomb survivors and
photographs from the Peace
Memorial Museum which
demonstrate the destructive
power of the bomb, including a
wounded horse and the melted
face of a stone buddha.

Try these...

● http://www.ee.port.ac.uk/Online-Books/hacker-crackdown-
1.2/crack.html — The Hacker Crackdown
● http://www.primenet.com/links/magazine.html — Newspapers
and magazines on the Internet
● http://mirsky.turnpike.net/wow/Worst.html Mirsky's Worst of the
Web: Mirsky's Worst of the Web really is pretty bad and pretty point-
less. Probably the funniest thing about it is the cautionary notice
which appears when you first arrive there — Worst of the Web
requires that you use a Web browser which can display graphics. If
you are using a text-only browser, you can still access the pages
but they will seem even worse than intended.
● http://www.st.nepean.uws.edu.au/stuff/bofh/
Bastard Operator from Hell (funny stories about a systems manager
and his "lusers") — Progenitor of CIX's BOFH conference.
● http://holodeck.infopages.com/cards/ — Greetings cards via the
Net.

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comm together

With the differences between today's online services becoming increasingly vague, choosing the right one can prove daunting. Enter Stephen Cobb, who explains exactly how the comms world is converging, and gives some practical advice about getting yourself online.

If the current revolution in computer communications has a watchword it is "convergence". Data, voice and fax are converging in multi-function modems while ISDN and other technologies promise simultaneous data, voice, fax, and video. Bulletin boards are converging with the Internet, offering net services such as email and newsgroups. Commercial online services are merging with the Internet and the World Wide Web. You can even access bulletin boards and online services from the Internet.

In this month's column we take a practical look at this aspect of convergence, the blurring of the lines between online services, bulletin boards, the Web, and the Internet. One of the immediate practical implications for users involves deciding which services to buy. Do you need an online account, an Internet connection, and bulletin board memberships? There are additional implications if you plan to provide services. For example, if your company wants to provide online information, do you create your own bulletin board, sign up for space on a commercial service like CompuServe, or publish on the Web?

Which Way to the Web?
First of all we will look at two different ways of getting to the World Wide Web. In fact, the Web is what many people mean today when they scream "I want the Internet and I want it now!" Just 12 months ago "getting the Internet" meant something else: the abil-

ity to send email, join newsgroups, use a gopher, and possibly transfer files with ftp. Now Web browsers can do all that, except perhaps for mail, but anyone can now send mail to anyone else, whether they use a BBS, online service, or Internet account (see this month's *net.answers*).

So how are you going to get on the Web? For the SoHo (small office/home office) user the traditional approach is to get an Internet account, say with Demon or Cityscape, install the appropriate TCP/IP software for their machine, then dial up on a PPP connection and fire up a Web browser. The cost of this depends upon several factors. There's the monthly fee for the Internet account, plus the cost of the phone call while you're using the connection, which may be local or long-distance. Dialling long distance to a high-speed node makes sense when you're using your account to retrieve messages and news to be read offline, but the economics of Web browsing are different since you need to stay on the line to browse from site to site.

Now there's an alternative to getting a dedicated Internet account. If you're on CompuServe already you can browse the Web right now, or within 20 minutes, which is about how long it takes to get the necessary software installed. In order to do this you need to be running WinCIM and dialling into CompuServe at a speed of at least 9600baud. If you go through the following steps you'll be browsing the Web through a CompuServe access point with online time billed to your CompuServe account:

1. Log on to CompuServe with WinCIM by using the Service/Go command and entering INTERNET in the Go dialogue box.

2. At the CompuServe Internet Service menu double-click on Direct Internet Access.

3. Select Net Launcher for Windows and then select Download Net Launcher (this file is 1.2Mb and took about 15 minutes to download over a 14.4Kb/sec connection). By default the file is placed in the CSERVE\DOWNLOAD directory.

4. Use File Manager to locate the CLN.EXE file in the CSERVE\DOWNLOAD directory and double-click on it. This expands the file and runs the installation procedure. The default settings should work fine so simply click OK to answer questions.

5. When the setup process is complete you have the option to automatically start Spry Mosaic, the browser owned and supplied by CompuServe. If you accept, the program will dial out to the primary CompuServe access number you've been using in WinCIM, and take you to CompuServe's home page on the Web.

6. If you choose not to start Spry Mosaic immediately after installation you can do so, whenever you're ready, by double-clicking on the CompuServe Internet dialler icon, or by double-clicking on the Spry Mosaic icon (both of which are placed in the CompuServe program group, and both of which launch the Web browser).

The whole process went very smoothly when I tried it. As soon as you have Spry Mosaic up and running you can start customising. For example, you can use the Options/Configuration menu to change the home page that's loaded at startup to something like http://www.mpn.com/vnu/pcw/ instead of the CompuServe page. You can also use the Viewers button on the same menu, which provides viewers for files such as the WAV sound file that's loaded when you click the Hunt button on the CompuServe home page (the Hunt in question is a $1m treasure hunt-style competition that involves visiting Web sites for clues).

In fact, this button represents my only problem with the whole project. As we went to press I had not been able to get it to play using Spry Mosaic. I *can* play it with NetScape on the same machine — hopefully I will have an explanation by the next issue. In the meantime my suggestion is not to get hung up on sounds. Spend your time exploring the hundreds of thousands of Web sites that are out there. If you encounter Web pages that allow email input you'll find that Spry Mosaic is already configured to give your CompuServe address as your email address. So any replies will appear in your regular WinCIM in-basket.

Put a Windsock in it
One other technical note. If you go through the above steps on a system that is already configured for PPP access you may find that your existing Windsock file (winsock.dll) is renamed winsock.000 by the installation procedure — it will warn you if this is the case. This is necessary because

Net Launcher uses its own version of Windsock.

The net effect, so to speak, is that you cannot launch your previous Web browser without exiting Windows, renaming winsock.000 to winsock.dll, and renaming the Net Launcher winsock.dll to winsock.000 (the files will be in different directories — the Net Launcher version is normally stored in C:\WINDOWS, while the previous version will be somewhere like C:\NETMANAG or C:\NEWT). However, I found that it was relatively painless to use this renaming process to switch between different browsers (a simple batch file springs to mind).

Why would you want two different access methods? One scenario is the travelling user. If you have your Internet account with a regional provider who only offers local access in one area, you might find yourself on the road with a very expensive long-distance call between you and your normal Internet access. If you can switch to CompuServe's Web access while on the road you can use the very extensive range of local numbers, which includes most major cities in the world. For users who don't yet have an Internet account, the CompuServe approach may well be the easiest option for instant access to the Web.

But what if you already have an Internet account and the economics of connecting to it are better than those for CompuServe or the nearest decent bulletin board? You may not realise it but you can actually run CompuServe and access bulletin boards over an Internet connection (the BBS must be properly set up for this to happen — something we'll return to in a moment). As far as CompuServe is concerned, accessing your

This is where you get to when you've installed Net Launcher; browsing the Web with Spry Mosaic via your CompuServe account

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account over the net was possible with earlier versions of WinCIM but became official in WinCIM 1.4. Here are the steps required:

1. From the Special menu select Session Settings and click New to name the connection — something like "Overnet".

2. The Name, User ID, and password will be picked up from your normal connection. In the Connector field select WINSOCK (it's on the list).

3. Select 115200 for the Baud Rate and Internet for the Network. In the Access Phone field replace the phone number with 0. Click OK.

4. Now you can run your Internet connection, with Demon for instance, and once you are connected return to WinCIM and select any one of the commands that initiate a connection, such as Get Mail.

Hey presto! The connection is made, not by dialling a phone number, but by sending packets over the net. Unfortunately, you might not say hey presto the first time you try it: I've found that connecting this way sometimes takes several attempts, and will report in next month's column on the reasons for this. And, I have to say that

downloading files on this type of connection is risky. This is a pity because some people can get a cheaper, faster 28.8Kb/sec Internet connection than the nearest 14.4Kb/sec CompuServe node. Mail comes through fine but binary files seem to cause hiccups. Apparently, CompuServe is working on this. My impression is that CompuServe, along with everyone else, yours truly included, has underestimated the phenomenal rate at which interest in online communications of all types has grown in recent months.

Across the board
Many bulletin board operators are determined to benefit from the increase in Internet connections. By installing the right hardware and software it's possible for a bulletin board to allow users to access via the Internet rather than a phone line. This means that if you have an Internet account you can use the feature known as Telnet to visit bulletin boards over your Internet connection. Of course, this opens up a whole new world. Want to visit a speciality board in the US but can't afford the transatlantic phone call? No problem — if the board is Tel-

net-compatible you can get there over the Internet.

So how do you find bulletin boards that offer this example of convergence? There's one search tool on the net that specifically identifies "telnetable" sites. This is Galaxy at http://galaxy.einet.net/search.html. Check the Hytelnet box and the results of your search will all be telnetable BBS sites. I did a search based on com* which includes computers and communications, and the hit list was 469 entries long. What's nice about this way of locating boards is the Web page that appears when you click on any of the entries in the hit list. This page displays a description of the board and allows you to telnet to it by clicking a hot link on the page — you have to register your copy of telnet.exe with your Web browser for this to work.

Apart from this there are lists available in many places. Check out http://dkeep.com/sbi.htm for a file called sbimmy.zip which is the Select Bulletin Boards for a given month (for example, SBI0795.ZIP for July of this year). I hope to post this list in the UKCOMMS forum on CompuServe (library search on sbi). Alternatively, telnet to

dkeep.com. This board is a fun place despite the rather weird Dungeons and Dragons flavour (the prompts are liberally sprinkled with "thee" and "thou").

To telnet without your Web browser, you first log on to your Internet account then load Telnet, a copy of which comes with most Internet software suites. Then you issue the Connect command and enter the name of the board in the Host Name field (for example dkeep.com). The next thing you should see is the board's sign-in prompt. You can use the Telnet window like a normal ASCII or ANSI online session, but you may be limited in areas such as file downloading and session capturing due the particular Telnet program you are using (some do not support downloads or capturing to disk).

To Web or BBS?
Providing "phone-free" access over the Internet isn't the only way in which bulletin boards are keeping up with the latest in cyberspace developments. The recently released bulletin board software called WorldGroup, from Galacticomm, gives any bulletin board operator instant access to a Windows-based online service look and feel. This

Virtual Vegas

Believe it or not, you can now place your bets in Cyberspace. Well, in Antigua to be exact, if you visit www.casino.org on the World Wide Web. This is a trend that is likely to take off like a rocket. Why? Well for one thing, in many areas of the World's largest affluent country, the US, many forms of gambling are illegal. There's no way to put a fiver on the next President, and you may have to go to the races to place a bet on a pony: telephone betting is explicitly outlawed in many states.

So is it legal to gamble on the net? I'm not taking bets on this one. The legal issues are extremely complex. The only thing you can bet on is politicians attempting to regulate or tax it. The state of Florida is already looking into control mechanisms: perhaps a chip inside phones that blocks betting? It's going to be a messy business for several years, during which time the online betting shops will probably make a lot of money.

Just a side note about the implications of cyber-gambling, upon which I have not yet formed any moral opinion. I asked a question about online gambling in the legal forum on CompuServe (GO

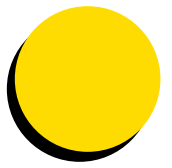*Behold the shrine of the cyber-punter, as gambling comes to the Web*

LAWSIG). I was really hoping to find what the basic parameters would be for assessing its legality (the casino at www.casino.org is quite clear that punters must resolve legal issues with their local authorities). Well, my message must have struck someone as a criticism of gambling because I received a very strident response defending gambling in all forms and venues. It was signed by "Guido". I know that it would be politically incorrect to draw any conclusions from this (see the section headed *Globalisation*). But it made me think very carefully about my response.

program, which I will describe in more detail next month, comes complete with email, online surveys, file libraries, even conferencing (another subject for next month's column). All this is executed in a push-button Windows interface with great graphics and even sound. While the free client software is rather large (2.7Mb) its capabilities are impressive. For example, it supports multiple simultaneous background file transfers, so you can chat online while files are downloading.

Could WorldGroup serve as a corporate bulletin board, even an alternative to hosting a Web site? The answer depends upon what you're trying to achieve. Some companies are bound to feel that they need a presence on the Web if only to keep up with their competitors. On the other hand, if your goal is to serve up data and online services to a group of customers or employees, then

WorldGroup might be the way to go. You have greater control, more security, and the system is arguably easier to set up than Web service (the installation of the WorldGroup client software is certainly a lot easier than getting an Internet connection running).

If you're hoping to make money by offering an online service, then a subscription or pay-per-minute bulletin service is still a much easier model to deal with than the Web, which is fundamentally free and still has no obvious toll-points for the people who provide the content. Bulletin boards still have an edge over the Web in terms of interaction and localised, niche interests. And by the time the Web becomes interactive, I think there will be seamless links to bulletin boards with more advanced Telnet software so that they will continue to be in on the action.

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net.newbies

Getting started on the Net

If you don't know what a "new-bie" 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 technical 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.

PCW Contacts

BBCNC 0181 576 7799
email: info@bbcnc.org.uk
CompuServe 0800 289378
email:70006.101@csi.compuserve.com
Delphi 0171 757 7080
email: uk@delphi.com
Demon 0181 371 1000
email: internet@demon.net
Frontier Communications 0500 468976
email: sales@thenet.co.uk
UK Online 01749 333333
email: sales@ukonline.co.uk

Innovations

Even better than the reel thing

Nagra has been the make of choice for high-quality open-reel tape recorders, and its move into digital audio is signalled by the Nagra ARES. Tim Frost reports.

While open-reel tape recorders and cassette decks have all but disappeared in the studio, they have held on gallantly in the portable market for reporters and for gathering high-quality sound for film and video work. But this is about to change, as new recorders based not on DAT tape but on more recognisable computer formats are beginning to get themselves established.

There is still a big business in truly portable recording systems for professional users. In the film world one tape machine, the Nagra IVS, is still one of the most regularly used recorders to capture sound when filming. The Nagra, roughly the size of a laptop PC (but a bit thicker) is a pure analogue recorder relying on old-fashioned spools of open-reel tape. The design is virtually a quarter of a century old, but the incredible build quality of the unit both in terms of mechanics and electronics means that it still holds its own against most of the digital alternatives and is proved to be one of the most reliable bits of equipment on the film set.

Portable DAT machines have made some inroads into this area and although there are some which have most of the additional facilities that film and TV people require, DAT's biggest success has been in the quality end of the radio reporting. Here, the simpler and cheaper portable DAT recorders can offer ease of use, stereo and better sound quality than the professional portable cassette machines they're replacing.

Nagra made its first move into digital audio with an open-reel portable machine, that, despite its expense, is doing very well in the specialist recording market with classical record labels using them to record at better-than-CD quality. But the new breakthrough comes with the Nagra ARES portable. In size and shape it's much the same as its analogue predecessor, but instead of open-reel tape it uses PCMCIA Flash cards for storage.

There are several advantages in moving to solid state memory, and the first is weight. While the outer case still has to be solid to withstand the hard life of the reporter, the ARES can do away with all the motors, mechanics and general hardware needed to move tape at a perfectly regulated speed. For a reporter, any weight saving is welcome. A secondary advantage is that the system becomes immune to vibration and movement, which in some particularly strenuous reports can upset the tape transport.

The first version of the ARES was released using 20Mb Flash cards which correspond to 40 minutes of mono recording, and this capacity will triple when the 64Mb cards arrive. Unlike tape, which has a limited reliable life span, Flash cards are difficult to damage and can be used thousands of times; in fact, the current estimate is around 100,000 re-recordings per card.

Because the audio is recorded in random access form, ARES can be used to record the interviews and edit them before sending them back to the radio station. Normally the tapes are edited after they have been received in the studio, and working on the interviews in the field should save time and give the reporter more control.
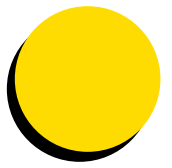
To squeeze the audio down to a small enough data stream to get a useful record time requires a considerable amount of audio compression. The Nagra uses a telecomms compression standard called G722 which gives a moderate level of audio quality. Despite there being better-sounding alternatives (such as MPEG audio compression) the advantage of this standard is that it is common on many of the ISDN digital telephone codecs that radio stations use to get reports back from sports, political and other outside news centres. To complete the package, the ARES includes an outlet for direct connection to an ISDN network and a PC connection so that text can be loaded alongside the audio.

There will be an MPEG audio compression version later ,which, while sounding better, has its own drawbacks. MPEG encoding and decoding is a processor-intensive operation which introduces a 48ms delay, due to the amount and nature of the block processing. Adding the delays generated by the ISDN network, this makes live reporting using the recorder as a terminal rather difficult, as it will create those aggravating delays between finishing a question and getting the answer that used to make transatlantic interviews, before the days of satellite, so awkward.

Nagra isn't the only company working along these lines. Another Swiss engineering organisation, Mandozzi Elettronica, is producing a similar heavy-duty reporting recorder that works with both PCMCIA Flash cards and PCMCIA hard disks. Using a pair of hard drives this DART recorder has the same sort of record and edit facilities, and working with linear PCM rather than data-reduced audio, it can produce a higher-quality result.

Although by hi-fi terms they would both be somewhat expensive toys, these new machines path the way for lower cost PCMCIA recorders, possibly breaking into the top-end memo recorder business. The memo recorder market is particularly ripe for such a machine where the lower audio quality is not a problem, but the advantages of longer recording times and much easier and faster searching would make it a must-have.

Horizons

Flat hunting

The cathode ray tube has finally found a serious rival, in the form of Sony's flat-screen PALC technology. George Cole turns on and tunes in.

Electronics companies have for years chased the dream of a flat-screen display to replace the bulky picture tube found in most televisions and monitors. But Sony is planning to launch flat-screen TVs for the consumer market next year.

The new TVs will use Plasma Addressed Liquid Crystal (PALC) technology, and Sony says they could cost around twice as much as a conventional set. If Sony keeps to its promise, it will be no mean feat considering the various technologies that have challenged the picture or cathode ray tube (CRT) over the years.

The CRT is a remarkable piece of technology — high picture quality with low production cost has made it difficult to replace. Producing a flat-screen display is fairly simple, but making one that's affordable for the mass market is another matter. A good 14in portable TV can cost under £100; but a 14in monitor, made to higher specifications, is around twice that price.

Plasma displays work by passing a voltage through a gas at low pressure. The resulting discharge produces light.

Plasma screens can be made very thin, and Fujitsu has even developed a 50in plasma panel. But plasma displays can cost ten times more than a CRT device and tend to be used in specialist areas such as aeronautics.

But the liquid crystal display (LCD) is the leading flat-screen technology. LCD screens are made by sandwiching a thin layer of liquid crystals between two electrodes. When a voltage is passed through them they twist upright, altering the amount of light passing through. For TV displays, the liquid crystals are arranged in a matrix of cells which represent pixels or points of light.

High-quality LCD screens use rows of transistors to switch the pixels on and off, and although the system works well, it's not cheap. Sharp has demonstrated a 21in LCD monitor, but currently it's too expensive to launch commercially. Sharp markets 12in to 15in screen LCD TVs, but even these cost around three times more than a conventional set because LCD screens are difficult to mass produce, requiring clean-room conditions.

As a result, LCD screens are used in niche markets like notebook computers, PDAs and pocket TVs, where users are prepared to pay a price premium for a compact display. An LCD screen typically accounts for around a third of the cost of a portable computer.

Sony says PALC sets are cheaper to manufacture because the system requires low-grade clean-rooms for production. As the name suggests, PALC is a variant of conventional LCD technology.

The PALC system uses plasma in place of a transistor to act as a switch. Two electrodes are placed in a tube filled with gas that's under low pressure. By applying several hundred volts, a discharge is produced. In a conventional plasma display the discharge is used as a light source, but the PALC system uses it as a switch, which causes data to be passed to the LCD cell. Each scanning line is controlled by a plasma channel, with the whole display composed of around 450 channels.

The pixels in a PALC display are composed of several layers, including a transparent electrode, colour filter, insulation film and the plasma channel beneath them. When a discharge voltage is applied to the plasma channel, the switch turns on. Signals equivalent to a single scanning line in a CRT display are fed into the liquid crystals. The plasma channels discharge sequentially (line by line), and each pixel retains its state until data for the next frame is fed into it. Picture quality is claimed to be comparable to a CRT.

Sony's first flat-screen sets will be launched in Japan next year and marketed under the Plasmatron name. Although the LCD panels are less than an inch thick, the first sets are expected to be around 5in deep. Sony plans to launch a range of 20in to 50in flat-screen sets but the first Plasmatron TV will be a 25in model, and there are plans to target the new flat displays at the PC market. So that Picasso on the wall could soon be making way for a TV set. **PCW**

Bluesky

Strength in numbers

Multiple processors are better than one when it comes to providing the power that tomorrow's computers will need. In the first of a two-part series, Nick Beard explores the realm of the supercomputer.

Computers will never be powerful enough. Today's supercomputer is tomorrow's desktop PC and tomorrow's supercomputer will let engineers taste computational feasts they can only salivate over today. The boundary of practicable computability is continually pushed forward as new methods of programming emerge to populate the fertile terrain. In the first of this two-part series, we take a rapid tour of the realm of supercomputing and examine the flora and fauna of the exotic engineering applications which are evolving there.

Building computers which race with the best starts with the work of the computational architect. Increasingly, power comes from parallelism. Single processor architecture (only one thing can be accomplished at a time) causes a computational bottleneck and cannot compete in the race against multiprocessor rivals.

Parallel architectures are classified according to their instruction streams and data streams. These are analogous to varieties of production lines in manufacturing. A conventional, sequential computer could be called an SISD machine (single instruction stream, single data stream). This is akin to a single assembly worker who receives a continuous stream of lumps of wood to work with, each accompanied by different plans and instructions on what to do with it.

If multiple, separate processors operate on different data items, doing the same thing to all of them, the computer is an SIMD machine (single instruction stream, multiple data stream). This would be like having a row of five carpenters, each receiving a stream of (potentially) different bits of wood, but each receiving the same wood and the same instructions at the same time. They thus (simultaneously) produce many times as many things as the single worker.

The most complex approach is the MIMD machine (multiple instruction stream, multiple data stream). Each processor has a control unit in addition to an arithmetical logic unit and memory — each is a fully fledged computer. This is like a room full of carpenters, each available to do whatever they are asked, not necessarily in any sequence that links them together.

Newcomers to practical supercomputing are always surprised at how little of the theoretical power of high-end machines is actually exploited. A machine rated at 10 GigaFLOPS (1,010 floating point operations per second) will generally deliver a sustained performance of around 100 MFLOPS — a hundred-fold waste of power.

Part of the problem is that software is rarely able to exploit all that power. Various flavours of UNIX exist for different computers, and latterly Windows NT has increased the choice of hardware types to more than Intel-chipped boxes, but extracting the maximum performance means matching software and hardware precisely. That can be expensive. Bespoke software is expensive enough — but bespoke hardware?

So, how do we make the most of the algorithm, the core of the computers' power, on multiple machines?

Many computer programs start as follows: *take a bunch of stuff, tweak it until it looks like some other bunch of stuff, then stop*. Or, if a bunch of rules holds true: *A is bigger than B, C is fatter than D, E is of higher fractional dimension than F* — then do something; *charge interest, diet, shade in light blue* until the rules no longer apply, then stop. If many processes (or processors, painters, carpenters) are at work, more gets done. If tasks can be split up and spread between workers who can solve them concurrently, the overall process should be faster. Charles Babbage, the "father of computing," knew this.

"The division of labour can be applied with equal success to mental as well as mechanical operations, and it ensures in both the same economy of time… The arrangements which ought to regulate the interior economy of a manufactory, are founded on principles of deeper root than may have been supposed, and are capable of being usefully employed in preparing the road to some of the sublimest investigations of the human mind," wrote Babbage in his chapter *On the Division of Mental Labour (Economy of Manufactures and Machinery, 1832).*

Splitting tasks over many processors is a key step to high-performance computing. Next month, we shall look at specific hardware and software architectures and the applications which are emerging to tap all this power.

PCW Resource Guide

High-Performance Computing in Engineering, Volume 1: Introduction and Algorithms

H Power and CA Brebbia, Computational Mechanics Publications.
The first of an advanced two-volume set looking at the engineering use of the rapidly emerging power of supercomputers, especially in the numerically-intensive problems of engineering. A powerful and specialist work.
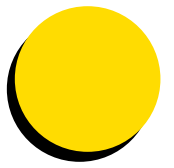
Retro

One bad Apple

The unfortunate Apple III was a real damp squib compared with its hugely successful predecessor. The problems were tame hardware, hostile software and a new dialect of Basic, says Simon Rockman.

Standing at the crossroads of computer history are the IBM PC and the Apple III. We all know that the IBM PC wasn't much cop then, but the Apple III must have been a real turkey to have remained so memorable. The *PCW* review of the machine dates back to May 1982 and, yes, it *was* a turkey.

Steve Jobs, one of the Apple-fathers, is on record as having said at the time that the Apple III was bound to sell well because it offered dealers a much bigger margin than had the Apple II.

But the problem was that Apple III hardware wasn't different enough from its predecessor. The Apple III was an 8-bit machine using a 2MHz 6502B at a time when 16-bit machines were just emerging. It lacked horsepower but possessed good memory addressing. The standard machine had 128Kb but could be expanded to 256Kb without the use of extra cards.

Paving the way for the future, the ROM was minimal (4Kb with the new operating system) SOS, or Sophisticated Operating System, loaded from floppy.

The case design looked as though it had a fixed monitor and a detachable keyboard. But in practice it was the keyboard which was fixed, and the monitor which could be swapped over.

Under the skin, the Apple III was tank-like: as Dick Pountain described it in his review, "a truly massive alloy casting", the purpose of which was to act as a heat sink (something from which modern PC manufacturers could learn a lot). Since there was no fan the computer was silent, and the surfeit of aluminium meant that it didn't even get warm, let alone hot.

The metal chassis also shielded RF emissions and provided a solid base for the array of connectors: two joystick ports, an RS232 port, mono and colour video. There was no parallel port — the first joystick port doubled as an interface to the dedicated Apple printer.

The Apple II had been a huge success, in part because it was so easy to modify. The Apple III carried warnings forbidding users from opening it. The only expansion was through four Apple II style 50-pin slots. The standard 5.25in disk drive had a capacity of 143Kb and up to three drives could be daisychained.

The only really exciting peripheral was the 5Mb hard disk, called a Profile. The operating system took up so much space on a floppy that it was wise to have a Profile, or at least a second hard disk.

The keyboard had a separate numeric keypad but no function keys, and of course no mouse. Like the whole system, the keyboard was very quiet, and this allowed the *PCW* reviewer of the day to notice that there was a buzz from the processor when it was thinking.

If the hardware was tame, the software was hostile. "SOS" may well have been prophetic. Its design was heavily influenced by UCSD Pascal (University College of San Diego) and Unix, and was an attempt at being an operating system polyglot; it was about as successful as Esperanto. Unix already had a proper system of hierarchical directories and aliasing between them, with long filenames.

As with UCSD Pascal, SOS handled all devices as files; things to be read from and written to. The keyboard and VDU were "character" devices, while bigger units like the floppy and Profile were "block" devices. The latter had a volume name as well as a device name, so when a floppy called .D1 was put into the drive, the volume was called something sensible like "ACCOUNTS".

This worked even if the disk was put in another drive: a sensible notion which Macs continue to employ and an area in which PCs are still lacking, thirteen years on.

A radical change was the move to a new dialect of Basic, although an emulation was provided for Applesoft compatibility. The editing capabilities (a separate edit mode as opposed to full-screen editing) were crude by the standards of the day. The only place I ever encountered a program written in Apple III Basic was at a car spares shop in Essex, which had a crude system hated by the people who had to use it.

The Apple III was expensive. too: a basic machine with one floppy and the mono monitor cost £2,545, a second floppy drive £385 and a 5Mb profile £2,256.

It is not surprising that the Apple III died. What *is* surprising is that Apple ever thought it would do anything else. **PCW**

CUTTING EDGE

CUTTING EDGE

BOOKS

Just as the bookshelves are groaning under the weight of all those Internet books, along comes the next wave covering different aspects of the information superway. Ben Tisdall chooses a few.

Netscape Navigator
Author: Bryan Pfaffenberger
Publisher: AP Professional
Pages: 361
Price: t/c
ISBN: 0-12-553132-X
Rating: ✎✎✎✎✎

Netscape and the World Wide Web for Dummies
Author: Paul E Hoffman
Publisher: IDG Books
Pages: 356
Price: £18.99
ISBN: 1-56884-373-9
Rating: ✎✎✎✎✎

Internet books seem to proliferate almost as fast as pages on the World Wide Web. The first Internet books had titles like The Whole Internet and set out to cover everything; but the trend now is towards coverage of particular areas like HTML or Netscape.

This month's crop includes several from IDG Books, best known for its Dummies series. The three latest are BBSs for Dummies, HTML for Dummies and Netscape and the World Wide Web for Dummies. These follow hard on the heels of The Internet for Dummies, 2nd Edition and More Internet for Dummies.

The Dummies books, which have notched up 17 million sales to date, all have bold black and yellow covers and cartoons by Rich Tennant to brighten up the contents. Apart from the cartoons, which are similar in style to Gary Larson's Far Side drawings, the illustrations are black and white screenshots,

with icons in the margin for tips, things to remember and technical details. All the books have different authors.

Netscape's Navigator has become the most popular way of accessing the Internet. The Dummies book about it will probably sell the most copies but it already faces competition from the just published Bryan Pfaffenberger's Netscape Navigator. The publishers, AP Professional, may lack the branding of Dummies publisher IDG, but the author has impressive sounding credentials: he combines an Associate Professorship at the University of Virginia with his other life as "an accomplished Webmaster and confirmed late night hyperlink addict".

Netscape is the best-known browser; it decodes the symbols in Web documents to give them their distinctive font and graphic-rich appearance. Browsers are also able to originate messages to find and retrieve documents each time you click on a hyperlink. The result is a program that is extremely easy to use but is doing a lot for you in the background. Netscape has successfully extended the feature set that first appeared in the ground-breaking Mosaic, particularly in adding a decent Usenet client to allow easy access to newsgroups.

Netscape and World Wide Web for Dummies. in fact has more information on the Web in general than Netscape in

particular: just four chapters are devoted specifically to Netscape. But this makes it all the better as a basic Internet primer. Chapter one explains what the World Wide Web is, what speed of modem to buy and what type of Internet connection to go for. Chapter two explains the Web in more detail; chapter three gets into HTTP, HTML, hypertext and URLs; and chapter four explains what to do before you get hooked up. It's not until chapter five that Netscape makes its big entrance.

Pfaffenberger's book takes a different approach, wading straight into how to get started with Netscape Navigator in chapter one and pressing swiftly on with installing Netscape and configuring Netscape helper programs. The helper programs are supplied with the book on a CD. They include Winzip, an Adobe Acrobat reader and a selection of viewers and players. There's nothing here that you can't download, but the CD conveniently puts them all in one place. Further on Pfaffenberger tackles some of the tougher topics in chapters with headings like When the Surf gets Rough, Digging around in Gopher, and Surviving Telnet and 3270 Sessions.

There's little to choose between the two books. Both titles have an American slant, and prices are given in dollars. The Dummies book is better for non-Netscape users, but non-Netscape users probably won't buy either book. Pfaffenberger's

book is written in a slightly more informal style, which doesn't grate. That and the bundled CD give it the edge.

HTML for Dummies
Authors: Ed Tittel & Steve James
Publisher: IDG Books
Pages: 450
Price: £28.99
ISBN: 1-56884-330-5
Rating: ✎✎✎✎✎

Creating Cool Web Pages with HTML
Author: David Taylor
Publisher: IDG Books
Pages: 244
Price: £18.99
ISBN: 1-56884-454-9
Rating: ✎✎✎✎✎

Teach Yourself Web Publishing with HTML in a week
Author: Laura Lemay
Publisher: Sams Publishing
Pages: 400
Price: £19.50
ISBN: 0-672-30667-0
Rating: ✎✎✎✎✎

For those who aren't dummies, IDG produces other books on comms, including BBS Secrets, which promises, among other things, Everything You Need to Set Up and Manage a Successful Bulletin Board System. It runs to 670 pages and looks as dry as the Arizona Dessert but is no doubt worth a look for budding Sysops.

Rather more interesting is Creating Cool Web Pages with HTML. HTML stands for Hyper-Text Markup Language, the language used to create Web pages. The rather slim Creating Cool Web Pages appears at first sight to be competing head-on with the 450-page HTML for Dummies. Ironically, of the two Creating Cool Web Pages seems easier to follow. Early on it gives you a sneak preview of what HTML actually looks like (ASCII with a load of chevrons), and explains URLs (uniform resource locators) and how to use them. By chapter six you're

adding pointers and hot links, and by chapter eight you're jazzing up your Web pages with transparent colours, pictures, audio and video. The book comes with a disk containing all the HTML files described in the book together with a browser called Winweb. I liked its direct, nuts-and-bolts approach.

HTML for Dummies is thicker and more intimidating, perhaps because the words HTML and dummies sit uneasily in the same sentence. It seems to have been bulked out with general material that doesn't belong in a basic HTML book. It states, for example: "If your goal is to persuade or sell, you'll try to hook readers with compelling visuals and riveting testimonials as a way to provoke their interest, and then follow though with the important details."

Teach Yourself Web Publishing with HTML in a Week from Sams Publishing is another crack at the same subject The title is misleading as it will take most people a couple of weeks just to read it. Although published this year, the book is already showing its age. Mosaic, for example, is described as the most popular browser.

But this book seems to have a more structured approach than the other two and seems better suited to commercial production of Web pages. For example it is the only one to cover how to storyboard a series of Web pages, just as you might storyboard a movie or an advert.

If you want to knock out a fast and dirty home page, try Creating Cool Web Pages. If you want to do the whole thing properly and have a couple of months to do it, Teach Yourself Web Publishing is worth a look.

Best of the Net
Author: Seth Godin
Publisher: IDG Books
Pages: 430
Price: £21.99
ISBN: 1-56884-313-5
Rating: ✎✎✎✎✎

IDG's Best of the Net is a directory rather in the style of a film guide. Rather than trying to be exhaustive, like the Internet Yellow Pages — let's face it, a complete Internet listing is fast become impossible — it offers a selection, generated by asking for nominations.

The problem with books of this kind is that they're instantly out of date. But it is useful as a ready reference, particularly for those who are new to the Internet.

The entries are arranged in alphabetical order and there are lists of newsgroups, Web

pages and email addresses for each category. For example, if you're interested in cats you could join the rec.pets.cats news group, take a look at the http://www.ai.mit.edu/fanciers/fanciers.html or mail the listserv@cornell.edu mailing list. The focus is more on news groups than on Web sites. Cycling has some great Web

sites, for instance, but the Best of the Net lists only the bicycle newsgroups and cycling on Veronica (a Gopher search engine).

Each topic gets two pages, with the introduction and address listings on the left and Net highlights on the right. The first 25 pages of the book are a new-user's guide to the Internet, including information on Net etiquette. It's nicely put together but not very different from other Net guides.

CD-ROMs

Sit back and enjoy a glass of wine while you learn about how and why your body works. The world reference atlas could show you a thing or two, while a biography of Marilyn Monroe takes the schmaltzy Tinseltown approach.

• **How Your Body Works**
• **Bodyworks 4.0**
• **The Ultimate Human Body**

In the words of the private health care advert: "Your body is amazing" — and these three CDs set out to prove it. All three cover the same basic ground, describing the body's organs and "systems". That is, the respiratory system, the reproductive system, the digestive systems and so on.

How Your Body Works was the most fun of the three. The main screen is set out like a laboratory, complete with Bunsen burner and microscope loaded with slides. All the information can be accessed simply by clicking on the various items scattered around the lab, such as the skeleton and the X-ray viewer.

A wide range of topics is covered but the explanations are sketchy. The authors have opted for minimal text complemented by audio clips, and there are numerous animations to make up little movies.

This simplistic approach is reflected in the "medical dictionary" which appears to have been written for small children. The other reference book included is a "health dictionary" which lists advisory bodies for numerous medical conditions — the drawback is that they are all in the US.

This CD is packed with gimmicks instead of concentrating on well-presented facts. The illustrations are not as clear as those offered on the other two disks, and the overall impression is one of good ideas ruined by bad execution.
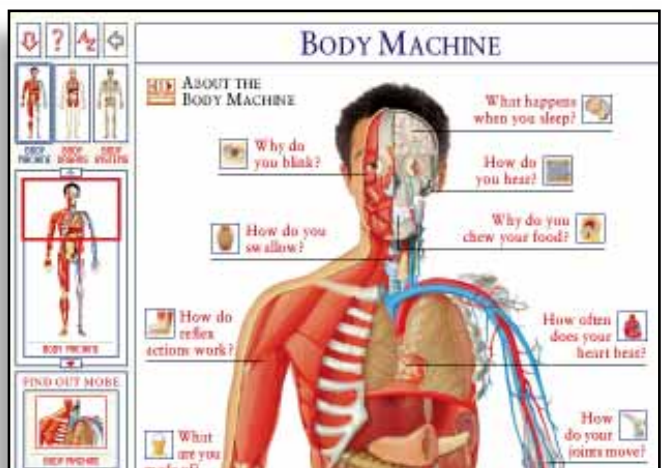
BodyWorks 4.0 is the most comprehensive of the three CDs. Not only does it cover the various body parts and systems in detail, but also includes a section on lifestyle, and there are
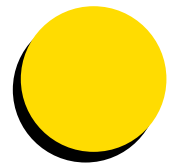

Above *"See how your body works, Igor"*

Left *The exploding, spinning skull in Bodyworks 4.0*

Below *You can pull the ultimate human body to pieces*

lessons to follow, a quiz, and a chance to keep your own medical records in a database.

This CD is aimed at those who already have a good background knowledge (probably A-level students and above), and so the explanations tend to be quite complicated. There are many technical terms used in a densely written style, which can be confusing unless you spend some time going through the text with a fine toothcomb.

Help is at hand in the form of excellent lessons to take you step by step through various aspects of the body, and there is a very testing quiz which requires you to have learnt all the technical terms during those lessons.

The illustrations couldn't be clearer: as each body part or system is explained, there are pointers from the text to the diagram. By clicking on explanations for different parts, you can get to grips with the technical information.

There are 3D models of various body parts as well. For example, you can look at any part of the skeleton and rotate that part to give you a better idea of how it actually looks from all sides. You can even explode the skull and spin it to see how the 29 bones fit together.

Despite the difficulty of the explanations, it is undoubtedly the best of the three as a high-level teaching tool.

Dorling Kindersley takes a very different approach: The Ultimate Human Body is aimed at the beginner, but has plenty to interest anyone who knows a little and wants to learn more.

It is divided into three main sections: body organs, body system, and body machine. You click on maps of the body to choose the area you want to study. The body machine deals with how things work: why do you blink? How do reflex actions work? How do you swallow?

The great thing about this CD is that it not only tells you how individual parts of your body work, it goes some way to explaining how your body operates as a whole. Each of the items link to other related subjects so you slowly build up a picture of how everything in your body fits together.

The straightforward text explanations are helped along by excellent animations and clear diagrams. You can even ghoulishly pull these illustrations to pieces — you can take the head apart by taking out the eyes, then the nose bones, the brain and so on until all you are left with is an empty skull.

While The Ultimate Human Body is not as comprehensive as BodyWorks, it forms an extremely good introduction. But for the true biology student, BodyWorks has to be the best buy of the three.
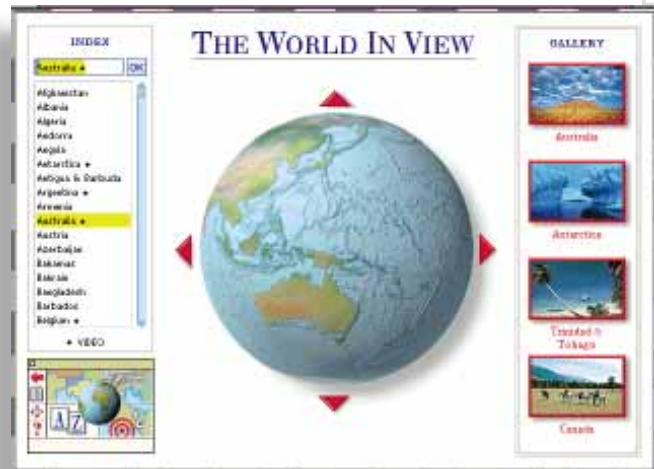**Adele Dyer**

How Your Body Works
Contact Mindscape 01444 246333
Price £39.99
Rating ●●●○○

Bodyworks 4.0
Contact Guildsoft 01752 895100
Price £39.95
Rating ●●●●○

The Ultimate Human Body
Contact Dorling Kindersley
0171 753 3488
Price £59 inc VAT
Rating ●●●●○

World Reference Atlas
In contrast to many of Dorling Kindersley's other titles, this CD is aimed at adults as well as children and is intended as a reference work rather than a teaching package.

There are five main sections: the physical world, the political world, an A to Z of countries, the "world in view" (a collection of video and photographs) and there's a comprehensive index which classifies entries according to people, places and physical features.

The political and physical world maps both allow you to view the world at a glance before zooming in to inspect an area in more detail. You can pan around and then zoom in again. But at this point you jump right into the details of a particular country, which is a shame because these maps do not provide easy-to-see details of the country boundaries for instance. Even though all the information you need is on one map, it is quite hard to assimilate all the information.

Top *This section of the World Reference Atlas has a collection of videos and photographs*
Above *Political and physical views are available*

Within each country section there is a wealth of information and statistics: 18 topics are included for each country, ranging across subjects such as ethnic origin, politics, communications, socio-economic world rankings and the environment. Each includes graphs, diagrams, and text: you can see how each country measures up by clicking on the "compare" button in each section.

But there are drawbacks to all this information. There is very little in the way of statistical explanation so it can be quite hard for a non-economist to grasp the implications of the figures. For example, in a section

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entitled "economic performance indicator" the country's GDP (gross domestic product) is charted against its consumer price index. I found it hard to fully comprehend these until I compared Britain's figures with Japan's: it would have been useful to have had some explanation of these (as well as all the statistics) in one block so you could compare more than one country at a time.

The "World in a View" section is the really fun section of the CD: you can spin a globe, pick an area to look at and pull up video and still shots of anywhere in the world. Some of them are great — the video clip of the Arctic is breathtaking — but others are more pedestrian. For Britain, Dorling Kindersley has included a video of the Trooping of the Colour. It would have been good to see more than one video clip and photograph per country, and in some cases, more imaginative versions.

I was disappointed to have discovered this CD to be less than perfect when Dorling Kindersley has such a good reputation for informative, well-organised CDs. But a few tweaks is all it needs. It is good for its type; just not what we have come to expect from DK.
Adele Dyer

Contact Dorling Kindersley 0171 753 3488
Price £69 inc VAT
Rating ●●●●○

Microsoft's Wine Guide
This is one of the best CD-ROMs I've come across — certainly in my top ten of personal favourites. The wealth of information, the neat and attractive way in which it's presented, linked with the infectious enthusiasm of host, Oz Clarke (wine authority, wine writer and co-presenter of the BBC's *Food and Drink* programme) — all adds up to an attractive disc that's as enjoyable to use as it is informative.

A lot of people are afraid of wine, and it carries certain connotations of snobbery: bottles have to be opened in a certain way, the wine has to be poured just so, it must be sniffed and gargled and drunk from special glasses… Oh, for goodness sake, just give me a brown ale, I know where I am with a brown ale. But it needn't be like that.

It pays to know a little about what you are drinking, but wine should be fun. As Oz Clarke says: "I'll drink vintage champagne out of a tin mug if that's all there is… It may not be correct, but wine is supposed to be fun before it's correct."

So the Wine Guide is a fun wine encyclopedia that covers everything: from the vineyard,

through the winery, to the bottle; and how to glass it, sniff it and gargle it. And probably the best feature is what wine to drink with what food.

In fact, you name it and the Wine Guide will almost certainly have the information you want. For example, click on the category "Wine Tasting" and you'll find all the esoterica about glasses, decanting, corks and corkscrews, and how to open the bottle. Then move on to the important business of actually drinking the wine and, not to be neglected, how to spot a bad wine.

There is a fun and informative video-tasting tour as well. Oz has the enjoyable task of tasting and assessing 18 wines from champagne to port, explaining what to look, smell, and taste for.

The section "All About Wine" uses words, pictures, diagrams, video, and interactive charts to explain in considerable detail the vineyard and the winery. It tells you about the classic grape varieties, how to read a wine label and a wine list. There's a wine atlas which shows the 12 major wine-producing areas. There are 57 interactive maps, extensive geographical and historical information, grape varieties and the way countries classify the quality of their wines. And to cap it all, the Wine Guide has an A-Z list of wines containing almost 2,000 entries, and a glossary of around 700 wine terms.
Paul Begg

Contact Microsoft 01734 270001
Price £40 (street price)
Rating ●●●●●

Bernard of Hollywood's Marilyn
This CD is based on Susan Bernard's book about Marilyn Monroe. It is the result of a collaboration between Bernard and her photographer father who took Marilyn's first pictures when she arrived in Tinseltown, and continued to photograph her throughout her career.

Great chunks of Bernard's book have been put onto the disk (the text is unbelievably schmaltzy), along with a few other bits and pieces. There are video clips, a timeline so you can find out what Marilyn was up to in any given year, and narrated extracts from Bruno Bernard's diary: but true Marilyn fans should not expect anything too probing.

The darkness of Marilyn's inner self is never explored in great detail, and unfortunately there is not very much in the way of a real biography. Such is the world's general fascination with her, the chances are you will already be aware of most of the facts on this CD.

The video clips are quite fun and some of the photographs are excellent. But so many of the latter are posed studio pictures or publicity shots that they do not even provide a glimmer of the soul within the woman herself.
Adele Dyer

Contact Corel 0800 581028
Price $69.95 (£ Sterling price not available at the time of going to press)
Rating ●●○○○

The words might be a bit sickly, but the photos are stunning

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Kids' Stuff

Paul Begg and daughter Siobán (aged 9) have been to a birthday party, done some drawing, found out about spots and leopards, and brushed up on their French. It's alright for some…

I always find it a little difficult to be certain about what young children will like. Siobán never liked Winnie the Pooh (apart from the Disney cartoons) and Beatrix Potter left her colder than an ice-cube. Yet Winnie and Beatrix usually adorn most of the stuff from notepads to china that grown-ups think charming and which they religiously buy for small children. That I found PB Bear's Birthday Party utterly charming therefore worried me. Would a young child greet it with the same enthusiasm as a tea plate adorned with Jemima Puddleduck?

In this case I think not. PB Bear's Birthday Party looks and sounds good and has enough to keep a young child entertained. Being a book transferred to CD-ROM — it's based on the Dorling Kindersley book of the same name by Lee Davis — it's pretty close to Broderbund's Living Books series. The difference is that a mouse click almost anywhere on a Living Books screen causes something to happen, which provides the Living Books with an insurance against boredom. Clicking on a PB Bear screen simply reproduces the same animation. This isn't necessarily a black mark against PB Bear because young children like and in fact

benefit from repetition.

PB Bear also differs from the Living Books in that it has been specially designed to help young children learn to read and spell. The sentences are interspersed with pictures of (generally) familiar objects. Clicking on the picture lets you see it spelt and hear it pronounced — PB Bear works like a kind of wall frieze that introduces children to familiar objects and the connection between written and spoken words.

There are some simple games linked to the story, such as choosing from a selection of objects those which PB Bear would need to bake a birthday cake. These games are quite fun and teach a range of early learning concepts such as colours, shapes, and numbers. They are also a way for the grown-ups to get involved, offering support, encouragement and advice.

On top of all this, PB Bear can be used to introduce young children to the computer and teach them basic computer skills, such as how to handle a mouse.

Amazing Art
Have you ever heard of Binney and Smith Inc? No? Well, Binney and Smith are the people to

blame for having wallpaper with crayoned additions to the pattern and for that lump of Silly Putty stuck on that bit of ceiling above the stairs that you can't quite reach. A subsidiary of the Hallmark Cards people, Binney and Smith manufacture Silly Putty, Magic Marker and Crayola crayons.

Binney and Smith have joined forced with graphics software company Micrografx to produce two absolutely smashing software packages: Amazing Art Adventure for ages 3 to 6 and Art Studio for ages 6 to 12.

Both are drawing, painting and designing packages (yawn

We liked the way words are shown in pictures, text and spoken — PB Bear has great charm

— are they ever going to stop crawling from the woodwork?). But these really are quite special. I got so caught up with Amazing Art Adventure that the best part of an afternoon vanished without my noticing it while I played and watched the on-disc video on how crayons are made.

The opening screen is the Art Room, a comfortably untidy bed sitting-room where a click on almost anything either produces an animation or takes you somewhere. You can create your own pictures to colour in, or you can colour one of the loads of books pages that come with the software. You can even choose a dining table placemat from one of the several designs available

CUTTING EDGE

and colour it however you want.

You can add words, draw shapes, create crazy lines, add stickers, drop in some fun animations, and add a host of special effects, as well as colour with watercolours, markers and, of course, crayons. You can also undo mistakes or get rid of your picture in a number of ways, such as exploding it. Or the masterpiece can be saved, to be stored in the Art Gallery, as Windows wallpaper. The packages comes with a 28-page booklet that includes a page of ideas to help parents use the products with their children.

The Crayola Art Studio is pretty much the same type of product but aimed at 6- to 12-year-olds, and is consequently rather more grown up. There's a certificate maker, badge maker, notepaper maker, a picture show maker (to produce your own animated cartoons), assorted games and a fun joke teller — where do Eskimos keep their money? In snowbanks.

Both packs are "meganeat", as my daughter would say, and I think both are especially good for the younger age group — once children hit the age of 12, Doom probably holds greater appeal!

How the leopard got its spots

New from Microsoft is How the Leopard Got His Spots, one of Rudyard Kipling's Just So Stories. At first glance this looks like just another Broderbund Talking Books look-alike, but there is meat here. You can have the story read to you by Danny Glover, who played the husband in The Color Purple but is perhaps best-known as Mel Gibson's sidekick in the Lethal Weapon films, or you can read the story yourself. A mouse-click on any word gives you a pronunciation and a double-click on highlighted words takes you to further information. This might be a photograph, music, or video — for example, clicking on a zebra produced a video and information narration.

1 *A great selection of drawing tools makes for engrossing colouring with Amazing Art*
2 *This is where your adventures in art begin — just click and something will happen*
3 *This is where the older child begins with Art Studio*

The illustrations by Lori Lohstoeter are very unusual and distinctive; the guide, a laid back cartoon rabbit called PJ, is great (a lesson for children's TV makers, you don't have to have presenters who shout), and there are some games, including Mancala, an African stone game which is the oldest ball game in the world.

This sort of disc is the future of English Literature at home and in school — a great way to understand a story and explore its background.

Zoo-Opolis

Not moving too far from animals, but returning to software for very young children, Zoo-Opolis, from Compton's New Media, Is a nice introduction to animals for children aged three and up, though not very far up, in my opinion.

The program starts with the Zoo-Opolis Rap, a catchy little foot-tapper that gets you in the mood for exploring the zoo with some friends. You can explore

Zoo-Opolis is a fun introduction to the zoo for little ones

by taking one of nine paths, always keeping an eye open for hidden tokens; get enough of these and you get to play on a Bubble Machine.

You explore with one of several friends. Gilda Gorgeous is a giraffe who takes you behind the scenes of a real zoo. You get to see a video of an animal and listen to a zookeeper tell you what's happening.

Splash is a penguin and the Zoo-Opolis' game show host, and his game is Animal Identification. Correctly identify an animal from its silhouette and Splash tells a joke. Then there's Wally Wallaby who hosts two puzzle games, one is a jigsaw puzzle, the other a shuffle puzzle where young children can take pictures of animals, mix them up and put them together to construct weird and wonderful animals of their own.

There are several other games and videos, each hosted by an animal friend and each designed to introduce very young children to the animals of the zoo. I think some of the narration will go over the heads of some children, and some of the video wasn't of particularly good quality. But overall, Zoo-Opolis achieved what it set out to do and the youngest members of the family will probably enjoy it.

Zoo-Opolis Also has an interesting pedigree. It was created by a film maker named David Lee Miller, produced by Bill Patterson (who produced Teenage Mutant Ninja Turtles) and among

the animators and artists was Mark Swanson, who worked on An American Tale and Land Before Time. The Zoo-Opolis Rap was produced by Tom Petty and the Heartbreakers member Howie Epstein.

Zut alors!

A few months ago I reviewed a couple of French language tutors and these provoked a good response from people who were glad to see some software that the whole family could use and benefit from.

One of the better packages I looked at was French Pronunciation Tutor from HyperGlot. Now the same company has launched Vocabulary Builder. It's a smashing little program that teaches over 2,300 words, ranging from those you would use in everyday conversation to rather more unusual words and phrases.

You hear words pronounced by native speakers, so you can be certain that your own pronunciation and accent won't sound odd, but the most exciting thing about this package is that it uses Speech Recognition.

If you have a microphone you can repeat the words and the software will compare your pronunciation to that of the native speaker and score you accordingly. The speech recognition

software visually demonstrates how your pronunciation compares to that of the native speaker, and it's this which sets the package aside. It's like having an expert language teacher sitting at your side whenever you want — a genuinely innovative piece of software.

The package also includes original photographs (or, where this has not been possible, an accurate "library" photograph) to give every single word a visual representation. Thus, in one package you get to see, hear and read the word. The languages covered are French, German and Spanish.

Finally, for those who are interested in such things, the National Association for Co-ordinators and Teachers of IT (ACITT) has voted Microsoft Office (both the Standard and Professional editions) as the best general purpose software package in primary and secondary schools. ACITT is a British teachers organisation and as a result of this prestigious award, Microsoft is planning to introduce tools to Office specifically to help teachers tailor the software to specific requirements. Examples of planned value-added tools are a

lesson planner built into Word, and a pupil database in Access.

The award, together with Microsoft's plans to forge closer links with UK schools, seems to recommend Microsoft Office to anyone wanting a software suite for the home computer.

PCW Details

PB Bear's Birthday Party
Price £39 inc VAT
Contact Dorling Kindersley
0171 836 5411
Rating ★★★★☆

• Amazing Art Adventures
• Art Studio
Price £29.94 each inc VAT (on disk or CD-ROM)
Contact Frontline 01256 463344
Rating ★★★★☆

How the Leopard Got His Spots
Price Under £30 inc VAT
Contact Microsoft 01734 270001
Rating ★★★☆☆

Zoo-Opolis!
Price £39.99 inc VAT
Contact Active Sales
0181 838 1280
Rating ★★☆☆☆

Vocabulary Builder
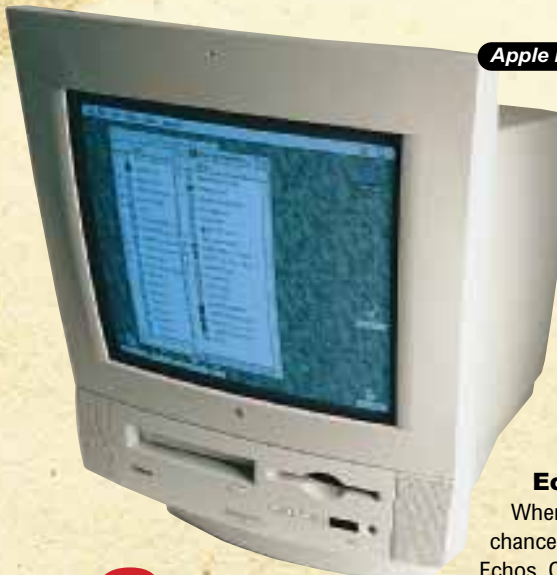**Price** £49.95 inc VAT
Contact Guildsoft 01752 895100
Rating ★★★★★

The Personal World Live 95

Computer Competition

Apple Macintosh Performa 5200

Motorola Flare mobile phone

Yamaha QY22

Yamaha Sound Edge SW20-PC

Olivetti Echos 44c

Creative Labs AWE-32

Come down to the Live 95 Show at Earl's Court, between 19th and 24th September 1995, and enter the PCW Live 95 competition. You can pick up an entry form at the PCW stand and win one of these fabulous prizes. You can find us on stand 3076 next to the Olivetti and Microsoft stands.

Apple Macintosh Performa 5200
A return to the original all-in-one-design, Apple's Performa 5200 is the latest and greatest Macintosh for the home. A 75MHz PowerPC 603 RISC processor gives it plenty of power, while 16-bit stereo sound and a quad-speed CD-ROM drive make it multimedia-ready. Easy to use with plenty of software and expansion options, the 5200 is an excellent entry-level system.

Olivetti Echos 44c
Whenever we get the chance to review the Echos, Olivetti usually has to fight to get it back. Not only is it one of the best-looking portables we've seen, it's great to use and puts the power of a desktop PC in a box no larger than A4. It has all the power management facilities you'd expect in a high-end notebook, including suspend to disk and the ability to power down any device to conserve battery life. The Echos is based on a 50MHz processor and is complemented by 4Mb RAM (upgradable to 24Mb) and a 340Mb hard disk.

Creative Labs AWE-32
The AWE-32 is the sound card to have. It's compatible with just about every piece of software ever written and is supplied with some excellent applications of its own, allowing you to write and edit MIDI and digital audio tracks. The card has 512Kb of sampling RAM enabling you to download your own instruments to use with a MIDI keyboard or sequencer. Its WaveTable synthesiser is General MIDI-compatible and has 1Mb of instruments stored in ROM.

Yamaha QY22
Yamaha has given us its brand new QY 22 to give away at Live 95. Combining an eight-track MIDI sequencer and 16-part multitimbral synthesiser, you can compose your own tracks just about anywhere — even on the beach. The synthesiser is fully GM-compatible, and as well as 128 instruments there are eight drum kits ranging from analogue through to orchestral and jazz.

Of course you'll want to play your stuff to friends, so Yamaha has also given us a pair of high-quality shielded speakers good for both the QY22, the Walkman or even the PC. The YST-M5's provide 6 Watts per channel audio output and have controls for presence, allowing you boost treble and bass fequencies.
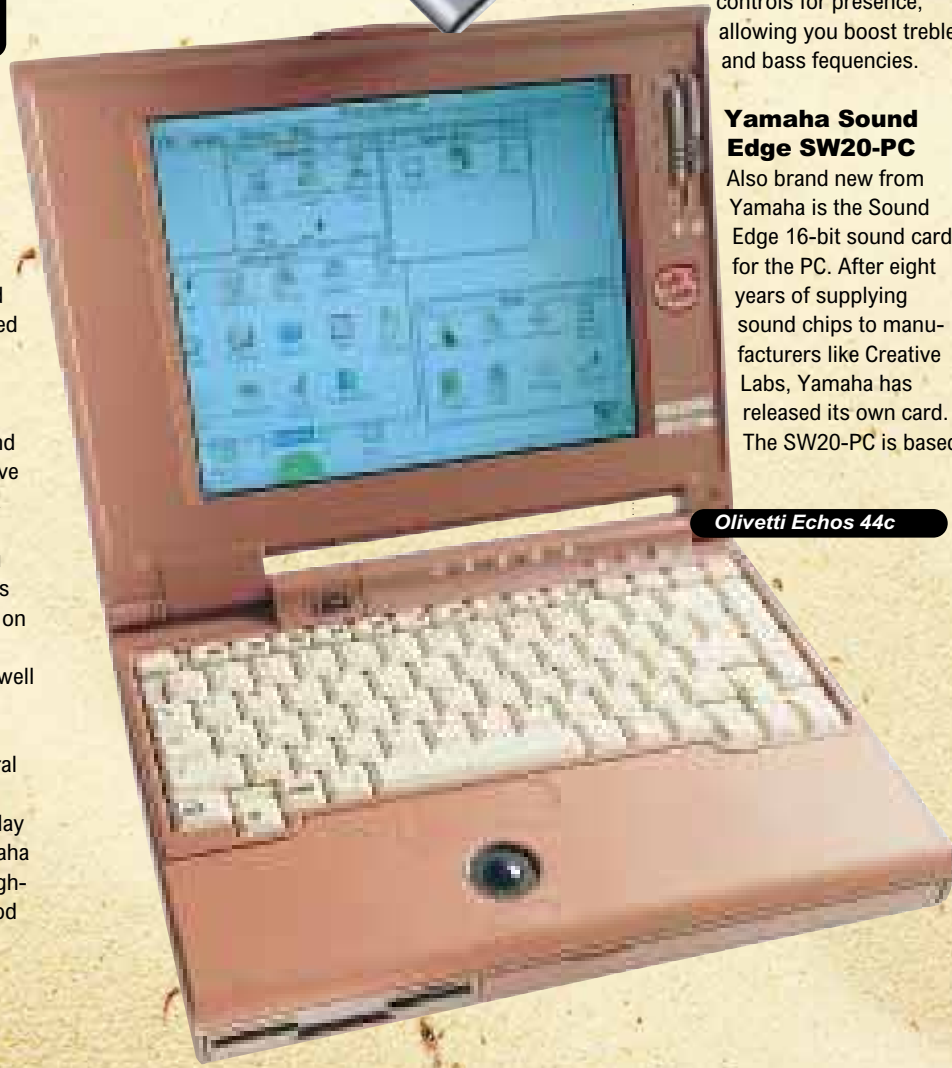
Yamaha Sound Edge SW20-PC
Also brand new from Yamaha is the Sound Edge 16-bit sound card for the PC. After eight years of supplying sound chips to manufacturers like Creative Labs, Yamaha has released it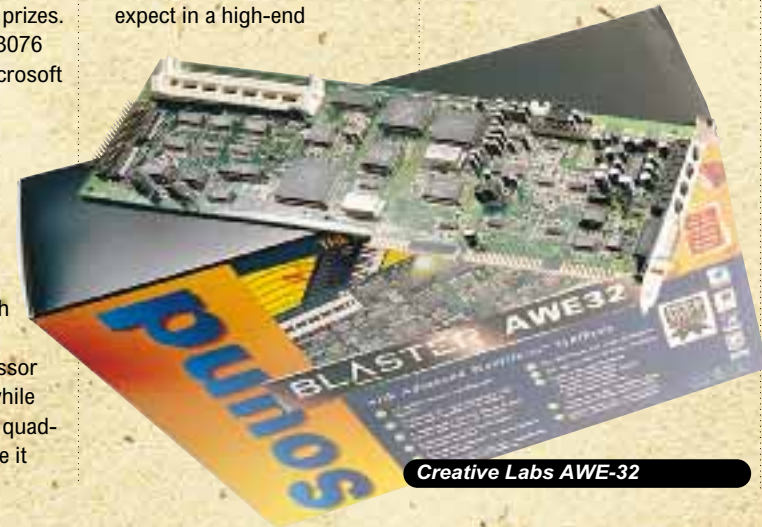s own card. The SW20-PC is based on the OPL4 chipset and provides full GM compatibility with 32-note voice polyphony and built-in digital effects. Effects, which included reverb, pitch shifting and chorus, can be applied to any audio source in real time thanks to the on-board DSPs.

Motorola Flare mobile phone with free connection
Motorola is offering its new Flare mobile phone as part of the PCW Live 95 competition.

When it comes to choices Motorola's on top, offering 5 different styles in its Flare range. Not only is there a choice of analogue and digital networks, but there's a full palette of colours to choose from. Motorola Tel. Co. will also provide the winner with free connection (subject to status).

Rules of entry
The PCW Live 95 competition is open to all readers of Personal Computer World except for employees, and their families, of VNU Business Publications, Apple, Olivetti, Creative Labs, Yamaha and Motorola. The judge's decision is final. No cash alternative is available in lieu of prizes.

CUTTING EDGE
CUTTING EDGE

Screenplay

NEWS

JUMP!

The Lemmings are back, and this time they're in 3D. Just when you thought it was safe to turn on your PC, the green-haired horrors return to send you further up the wall. 3D Lemmings follows the same style as the previous smash hits from Psygnosis, but the action takes place entirely in a 3D world. It may be more of the same, but judging from the demo we've received it looks like a winner.

3D Lemmings is destined for release on PC and Sony Playstation in September.

Psygnosis is on 0151 282 3290

Strategic launch

PC users who like to think about their games are in for a treat with the announcement of several new titles from strategy masters Mindscape and SSI. Together, the companies are launching a range of products boasting detailed 3D graphics, fast action, and more challenging puzzles than ever before.

First up is DeathKeep, a first-person-perspective Advanced D&D adventure billed as "a relentless slaughter on a frighteningly huge scale". An evil Necro-mancer has escaped from his icy prison and is wreaking havoc upon the surrounding lands. DeathKeep sends you into the bleak, frozen wastelands to become a hero and put paid to his plans. Key features include a full 3D view, over 25 detailed levels and a choice of three personas, including a powerful female elf-mage.

Thunderscape takes the player into more traditional dank dungeons on a quest to fight off dragons, gremlins and other things that go bump in the night. Once you've dealt with that you might like to try Silent Hunter, an authentic action-packed World War II submarine simulator.

DeathKeep costs £44.99 for PC, £39.99 for 3DO. Thunderscape and Silent Hunter are PC-only and both retail at £44.99.

Mindscape is on 01444 246333

Deadly deadlines

Drug running, prostitution, muggings and murders — everyday events in New Arhus, the setting for Synnergist. The latest from 21st Century has you assuming the role of Tim Machin, an underpaid and overworked journalist (I know the feeling) investigating the gruesome death of a valued informant. Check out the local drinking establishments, interview undesirables, and uncover dark secrets and cover-ups that will shake the very foundations of the city. Synnergist will appear on PC CD-ROM in October.

21st Century is on 01235 851852

Brain drain

Electronics Arts has announced the release of Fade to Black, the sequel to the highly successful French platform affair, Flashback. Set in the year 2190, it centres on a race of malevolent brain beings that have taken control of the solar system. Returning to the role of Flashback hero Conrad, you must confront the evil and bring freedom to the universe once again.

The plot sounds a little familiar, but with six levels, various missions and a cinematic feel (thanks to varying camera angles) Fade to Black should be fun.

Fade to Back will eventually appear on PC CD-ROM, but no price or release date has been set.

Electronic Arts is on 01753 549442

FX Fighter

Gloves on, fists raised, and left foot forward, Chris Cain checked out this exciting new beat 'em up from Philips Media and GTE Interactive — and despite its slightly blocky graphics, he couldn't help being impressed.

Despite being one of the definitive video game genres, fighting games ("beat 'em ups") have never been big on the PC. Those which have appeared have been mediocre at best, with Probe's conversion of Mortal Kombat II probably the most impressive. This month, Philips Media and GTE Interactive are attempting to redress the balance with FX Fighter.

FX Fighter is a one-on-one beat 'em up, set in the style of current arcade hits such as Sega's Virtua Fighter 2 and Namco's Tekken. It's the first game to use BRENDER, a new graphics technology developed by Argonaut software, famed for the timeless Starglider series and the Nintendo hit Starwing.

As with other beat 'em ups there isn't much of a plot, and FX Fighter's revolves around an alien conqueror named Rygil. Space-hopping Rygil has entered a new solar system and challenged the champions from different worlds, including you, to meet him in a battle for supremacy. Win and you get to claim his planet, the most awesome weapon ever devised. Lose and you and your species are space dust.

Making up the combatants are human warrior and obligatory hero Jake, a praying mantis, a cyborg, an alien priest, Magnon the living rock and four intergalactic females. Each has their own agenda and fighting style, and after reading some brief descriptions you must side with one. I went for Cyben 30, a mean machine if ever there was one. His race is out to destroy all organic life, but what the hell.

To earn the right to fight Rygil you must first defeat the others, whom you can choose to tackle in any order. Each enemy has over 40 attacks at their disposal, but naturally, some are easier to do away with than others. In true beat 'em up tradition not all the moves for each character are printed in the instructions — the idea is that players experiment to find them for themselves. Basic movements and punch and kick buttons are provided, but that's about it.

Moves to discover include jumping kicks, back-breaking throws, multi-punch combinations and ground attacks. Siren will even kick her male opponents in the goolies if you find the right joystick and button combination. Some of the moves are somewhat similar to those in Sega's product, and can sometimes be accessed with the same combinations.

Each opponent is fought on their home world, which is destroyed in a spectacular explosion if they're beaten. Unlike other fighting games you don't have to tackle yourself at any stage, giving some credibility to the storyline. The final stage is Rygil's homeworld, a dark artificial planetoid with devastating fire power.

Thanks to the BRENDER engine, FX Fighter boasts smooth-moving 3D graphics, and motion capture techniques have been employed to provided realistic animation. The polygon-based images are shaded and texture-mapped, with the level of detail adjustable to suit your particular setup. The box quotes a minimum 486DX/33 specifications, but it takes something like a Pentium 90 to have all features at maximum. As characters fight, the camera angle on the action changes to give the player the best view.
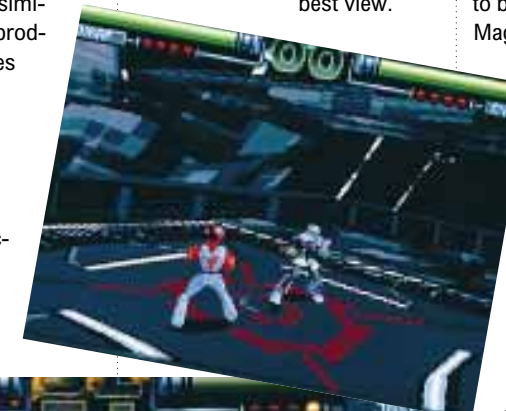
While the characters and backgrounds move smoothly, the level of design and artwork isn't up to the standards of games like Virtua Fighter 2. In fact, some of the graphics are downright blocky, and bad polygon clipping leads to particularly messy visuals at some points. For example, Jake's arms and head seem detached from his body when the camera zooms in for a close-up.

In contrast the sound is fine with good in-game music, except for the "poppy" title tune, and all characters grunt, groan and give a suitable taunt when they win.

Where FX Fighter does score highly is playability, and arcade beat 'em up fans will feel right at home. The game is best controlled with a joypad, such as the Phase 9 Phantom 2 from Euromax, but the keyboard can be used as an alternative. It supports a two-player mode and none of your opponents are easy to beat, although some like Magnon and Rygil are especially tough, so the urge to discover hidden more powerful moves is strong.

FX Fighter is a brave attempt at boosting the PC beat 'em up scene, and those looking for Virtua Fighter-esque action without nipping down to the arcade or the expense of an additional game console should be satisfied. It's not perfect, especially in terms of graphics, but it's certainly the best of its type at the moment.

System requirements:
486DX 33MHz PC, 4Mb RAM, VGA, SoundBlaster or compatible, single-speed CD-ROM drive. Note that FX Fighter requires a maths co-processor.
Price: **£39.99**
Contact: **Virgin Interactive 0171 368 2266**

CUTTING EDGE

CUTTING EDGE

Flight **Unlimited**

"Ladies and gentlemen, this is captain Nicola Kingsley welcoming you aboard the virtual flight of a lifetime, during which we will change planes four times, perform extensive aerobatics, and I will learn to fly. Those interested should consult the flight details below."

It's a clear sunny day. You've chosen your aeroplane, strapped yourself in and as you push back the throttle you feel the surge and weight of the plane as you leave the runway. This latest flight simulator, Flight Unlimited by Looking Glass Technologies and marketed in the UK by Virgin Interactive, claims to be the most realistic available for the PC to date, and it certainly does capture that feeling of really flying.

But tighten those seat belts — these aeroplanes don't fly themselves. This program is strongly focused on the sensation of real flight, as you soon learn while you struggle to get the plane airborne, let alone keep it flying. But after a few crashes into nearby hills and the occasional scrape with a tree top, you quickly pick up the necessary skills and learn to handle the plane effectively.

To help you, there's ground instruction and hands-on flying lessons at all skill levels. The Operator's Manual is also excellent; well illustrated and entertaining with interesting bits of information and insights into the principles of flying.

Flight Unlimited provides a choice of four powerful single-prop planes, all of which are capable of aerobatics to challenge your developing skills. There is also a glider, a Grob Sailplane, if you want to catch those ripe and lovely thermals from the mountains.

To enhance the sensation of flying, each plane — the Bellanca Decathlon, Pitts Special S-2B, Sukhoi SU31 and Extra 300S — has its own specific sound effects, which are actual recordings of engine sounds made in the air. Throaty engine noises are replaced by the sound of air rushing over the cockpit of the Grob Sailplane, capturing the eerie quiet of soaring through the air.

Flying these planes is very different from driving a car. For once, you get the feeling you are suspended in air and using the flow of air over the wings to manoeuvre. Moving the stick to the right doesn't necessarily result in a simple right-hand turn as the program simulates real flying conditions, which aren't always perfect — the flight can get a bit bumpy. Just when you think you've got the hang of it, the sun shines in your eyes and haze limits your vision. Comments like "Next time we'll use your plane" and "Do you know how much these things cost?" appear with alarming frequency in your log book.

When you do complete a successful landing, you certainly feel as if you've been somewhere. And once you've mastered straightforward flying you can move onto aerobatics, with nice realistic touches like simulated G-force which can cause grey-outs and blurring of vision.

Flight Unlimited's rugged and interesting landscape has been created from aerial stereoscopic photographs (two photographs shot from slightly different angles) of five different US air-fields. This method enables the generation of a real 3D landscape to fly in, complete with mountains and valleys. This is complemented by an efficient texture-mapping technique that displays plenty of detail, but not at the expense of speed, so the scrolling of the scenery is pretty smooth although you still need a fairly fast PC. (Even on a DX4/100 there was room for improvement.)

The relatively steep learning curve and level of skill required probably makes Flight Unlimited more suitable for the flying enthusiast than those looking for things to shoot. That said, there's plenty of excitement to be had. Well worth the money.

System Requirements:
Minimum 486DX/33, DOS 5.0, 8Mb RAM, mouse, double-speed CD-ROM, 25Mb hard disk space, VESA 1.2-compliant SVGA graphics card
Price: **£49.99**
Contact: **Virgin Interactive 0171 368 2266**

Charts

LEVEL ONE

PC		
1	Ecstatica (PC/CD)	Psygnosis
2	Star Trek Final Unity (CD)	Microprose
3	Terminal Velocity Shareware (PC/CD)	US Gold
4	Ultimate Doom (PC/CD)	Virgin
5	Player Manager 2 (PC/CD)	Virgin
6	Dark Forces (CD)	Virgin
7	Full Throttle (CD)	Virgin
8	Syndicate Plus (CD)	EA
9	EA Sports Rugby (CD)	EA
10	Hi Octane (CD)	EA
11	DiscWorld (CD)	Psygnosis
12	FX Fighter (CD)	Philips
13	Simon The Sorcerer 2 (CD)	Adventuresoft
14	AIV Networks (PC/CD)	Ocean
15	Last Dynasty (CD)	Sierra
16	Virtual Pool(CD)	Interplay
17	World Cup Year '94 (PC)	Empire
18	Transport Tycoon (PC/CD)	Microprose
19	X Wing (PC)	US Gold
20	Colonization (PC/CD)	Microprose

Leisure Lines

Brainteasers courtesy of JJ Clessa.

This Month's Quickie
A brief puzzle to get your brains going.

I offered my grandson 9p for every sum he got right in his school test, with the proviso that he gave me 6p for every one he got wrong. There were 25 sums and, in the end, we broke even. What percentage mark did he get?

This Month's Prize Puzzle
We think this month's problem is fairly difficult, unless you have access to some very powerful computing facilities. But, since every month there's invariably someone who sends us an entry with the remark "Done without a computer!", so we could be proved wrong yet again.

Three lads — Alf, Bert and Cyril — run a small business buying and reselling tropical fish. One day they go off to the local suppliers where Alf buys only goldfish, Bert buys only angelfish, and Cyril buys only guppies, with the proviso that the number of fish bought by any man must not exceed the price that he pays in pence per fish.

When they get back, they compare their purchases and discover that the numbers of fish that each has bought and the price of each fish in pennies are all 2-digit prime numbers, with all six 2-digit prime numbers being different. Moreover, the total money, in pence, spent by the three of them is a 5-digit prime — which also happens to be palindromic.

How much did they spend altogether?

Now, the problem above should keep your micros whirring for a while. However, we know there are more than 20 solutions possible and almost 2,000 combinations of 2-digit primes which produce these solutions. So, as it stands, things are a bit too easy.

However, it just so happens that two, and only two, of these 20 solutions can be obtained by only one combination of 2-digit primes. So, to ensure that you earn your prize this week, we are asking you for one of those two solutions — either will do.

Answers on a postcard or the back of a sealed envelope — no letters and no floppy disks, please. Then send it to: PCW Prize Puzzle — October 1995, P.O. Box 99, Harrogate, N. Yorks HG2 0XJ, to arrive not later than 20th October 1995. Good Luck!

Winner of July 1995 Prize Puzzle
Just under 100 entries were received for our permutation problem about the school sports — and, judging from the many incorrect submissions, it must have been more difficult than we had originally envisaged. In total, there were 420 ways in which the winning score of 30 points could have been achieved. The answer to the problem was therefore 419, since we asked for the number of combinations possible other than the one given.

The winning card, as usual drawn by our ERNIE (who still hasn't come up with the lottery winners), came from Mr John Stephenson of Bolton, Lancs. Congratulations, John, your prize will be with you soon.

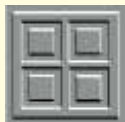Usual pep message to all the others — keep trying, it could be your turn next.

Hands On Contents

Hands On is 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.

We're constantly working to improve the contents of Hands On. If you have any suggestions, send them to the Editor at the address above, or email them to: editor@pcw.ccmail.compuserve.com

Clearing the **desk**

Tim Nott called time on the surfeit of icons cluttering up his desktop and came up with a compromise solution. Plus he offers more hints, tips and observations on Windows 95.

The Windows 95 beta preview program should be history by the time you read this — at least in theory. But the combination of publishing lead times, a French postal strike, and Microsoft UK's apparent policy of making beta updates available to everybody but the press, means I'm still lumbering away with build 347.

I've got far more used to it now, to the extent that when I boot back into Windows 3.1 I get unbearably frustrated when nothing happens having right-clicked on a file. I miss, too, the "kiss of death" button (the X button at the top right of each window) — something I hated at first.

Most of all I miss 32-bit multitasking. It's great being able to copy files, do a long print job, or run Ameol (the CIX off-line reader and, from France, my lifeline to the English-speaking world) in the background without it sequestering the entire brain-power of the processor. And as I type this sentence I'm defrag-menting my hard disk.

This is admittedly slowing things down somewhat — even at my modest typing speeds the screen isn't keeping up — but it's still usable and doesn't throw a wobbly if I save a file (it just re-scans the drive and catches from where it left off). It's a welcome change from the days when you had to exit Windows, run Defrag, and go away and do something else for a few hours.

Then there are all sorts of small but pleasant surprises. The first time I put a music disc in the CD-ROM drive, I was startled out of my wits when it started to play, unbidden. Now the first autoplay data discs are starting to appear. What happens is that Win95 makes the very reasonable assumption that having stuck a CD in the drive you want to do something
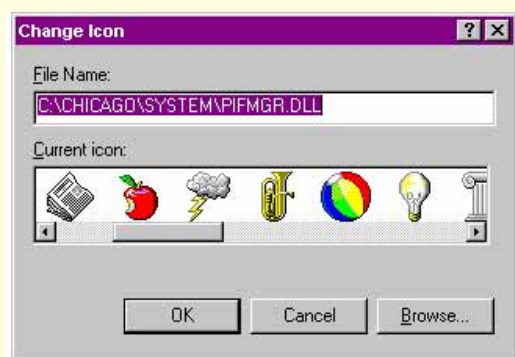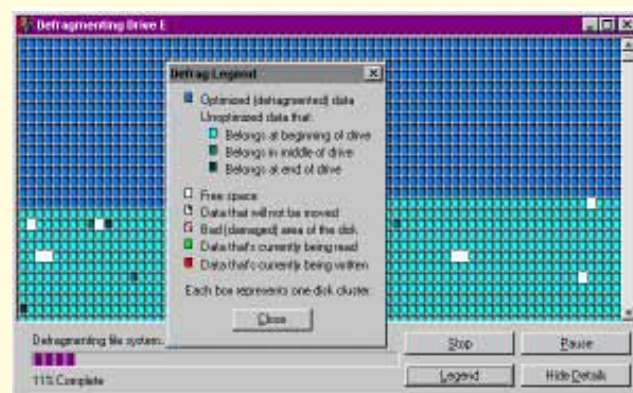
with it, so it looks for a file called autorun.inf in the root directory of the CD and takes its orders from there. Usually, the trick is to load a small program which displays a screen saying something like: "To start the Wizzo Interactive Encyclope-dia of Poisonous Fungi, click here." By the time the user has read this, the main pro-gram has loaded in the background (multi-threading at work) and is ready to go, which, in the immortal words of Microsoft, "Significantly reduces the perceived load time".

It appears that not all third-party devel-opers have quite got the hang of this. I won't name names, as the software in question was itself a beta, but it helps tremendously if the little program that autoloads is capable of detecting whether the application has already been installed. If so, run the main program. If not, run the setup program. Get this wrong and you run the risk of seriously alienating the user by trying to install another copy of the application every time the disk is put in the drive, unless they know the "disabling autoplay" trick (see the Ten Top Tips box, opposite).

Other things I liked at first, I now find annoying. Having shortcuts, folders or documents icons on the desktop was an interesting novelty. Half way through my second column of icons, I began to find it a pain in the neck — too much clutter, and they got buried under windows (but see the "desktop" tip in the Ten Top Tips box). What they really need is a docking station, rather like the taskbar, and I'm sure some-body will come along with one soon. But in the meantime, Win95 and I have come up with a compromise: I've stuck all my short-cuts into a suitably named folder in the root of drive C: — that way I can find it quickly on the taskbar, even when the title is trun-cated. There's a shortcut to this folder in the bottom level of the Start menu (right click, then "Open" on the Start button to add things here) and I've got it positioned and sized to cover the compulsory desk-top icons.

The path to enlightenment

As I implied in my first Windows 95 column (*PCW* July '95), there's so much that is dif-ferent, changing, and as yet undocu-mented that I may well be talking utter codswallop. And I walloped a fine piece of cod in the July issue by saying that you have to re-install your existing applications for them to work correctly if you've opted for dual-booting. Several people pointed out that this may not be necessary, but David Richardson was first off the mark.

Top *Defragmenting drives under Windows at last — now there's no excuse not to do it*

Above *Some of the jollier icons in pifmgr.dll*

Ten top tips for Windows 95

CD-ROM	Holding down the Shift key when loading a disc disables Autoplay.
Desktop	You can minimise and restore all windows from the Taskbar right-click menu. If you've got a Microsoft Natural Keyboard, the shortcut is WinLogo + M, adding Shift to restore. With a normal keyboard, the shortcut (contravening the Trade Descriptions Act somewhat) is Ctrl + Esc, Esc, Tab, Shift + F10, M.
Recycle bin	You don't have to open this to see if there's anything in it. The icon itself changes between full and empty.
Taskbar	Letting the mouse pointer linger over a truncated Taskbar button pops up a bubble giving the full title. Thanks to David Garstin for that one, which I'd been in too much of a hurry to spot…
Taskbar	…and lingering on the clock pops up the date.
Open with...	When I covered this recently I missed a brilliant shortcut: thank you, Mark Fletcher, for pointing out that holding down the Shift key when you right-click on a file adds an "Open with..." option to the menu.
Icons	You can change icons for a file or shortcut from the Properties sheet. Have a poke around the system files for new ones — there are some particularly jolly ones in pifmgr.dll.
Folders	Backspace takes you up one level.
Control Panel	If your Display icon changes into a joystick, don't worry: it's a commonly experienced but harmless bug.
Copying disks	Not with build 347 you can't. At least, not in Windows — you'll need to open a DOS box and use Diskcopy.

So, before you blow the dust off those 20-odd floppy disks, try adding the old Win-dows and Windows\System directories to the Path statement in autoexec.bat. This trick has worked well for quite a few appli-cations, and my initial fears that this might confuse Windows 95 have so far been unfounded. Make sure that the entry to the old Windows path comes after that to the new. You might also have to copy win.ini settings across — all I had to do to get the mighty Corel Draw suite to run was add

```
[CorelGraphics5]
Dir=C:\COREL50\CONFIG
```
to the new win.ini.

In search of a pound

In other respects, this Path trick was a slightly retrograde step. I'm lucky in that my CD-ROM drive and sound card are recent models, recognised by Win95. So goodbye to the real-mode (DOS) SCSI dri-vers, sound card drivers and mscdexe.exe. Disk cacheing is handled by Windows, so cheerio Smartdrv, and my Drivespaced hard disk "just works" without anything in config.sys. Most of this stuff was commented out by the Win95 installa-tion routine, but in the interests of journal-istic research and reckless lunacy, I removed config.sys and autoexec.bat to a place where the sun don't shine and Win95 wasn't going to find them. Every-thing still worked. Everything. And free memory in DOS sessions is a respectable 597Kb. A minor inconvenience is that DOS boxes default to the US keyboard

layout, but this is easily overcome: right-click on the Start button, choose Open, and dig through the folders until you find the MSDOS icon — it defaults to the first level of the Programs folder. Although this icon looks like a shortcut, it's really a PIF (Program Information File). Right-click and choose Properties — you'll get a six-page property sheet that combines options found in the former PIF editor and the old DOS box system menu.

There's a lot here and I'm not going to attempt to cover it now, so when you've finished playing with the fonts, click on the Program tab. In the Batch file box, type ukkeys.bat. Now create a Notepad file consisting of one line — keyb uk — and save it to your Windows 95 command folder as ukkeys.bat. This trick works on other PIF files too, so you can run the DOS edit.com and have your £ signs where they belong. (Windows rather politely cre-ates a PIF the first time you run a DOS application from a folder or the Run... command.)

There's been loads of feedback from July and August's columns. Thank you all very much, and my apologies for not being able to reply to all the letters individually. All tips will be credited, so please keep them coming.

PCW Contacts

Tim Nott can be contacted by post via *PCW* or by email to timn@cix.compulink.co.uk
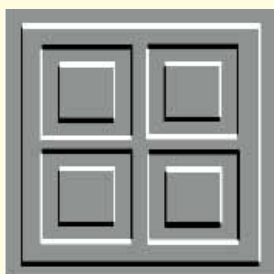
A sense of **insecurity**

To restrict users on a system, it is probably better to avoid the built-in safeguards of Windows 3.x. There are various d-i-y security measures but a more serious approach is sometimes needed. Tim Nott casts his private eye over the options before visiting Bob's country cousin.

"Windows 3.x security" is not a phrase that trips comfortably off the tongue — rather like "underwater cycling" or "acid house tranquillity". For mission-critical security (say you run MI5, or the Bank of England for a living) you need Windows NT. But there are a whole host of situations in which you might want to restrict users in some way.

Administrators might want to stop users messing up their carefully crafted installations or installing unauthorised software. Teachers might want to prevent their pupils from installing SAMFOX.BMP as Windows wallpaper. Small-business users may want to keep junior staff away from the more intimate details of the company's financial affairs. Parents might want to prevent their kids having access to Mum and Dad's work files and personal correspondence.

Although Windows does have a few built-in safeguards they aren't really any good. Take the password-protected screensaver — well, don't bother actually, because all that's needed to get around this is to turn off the PC and restart (possibly losing some of the victim's data in the process). And although the password itself is stored in encrypted form (hah, that'll fox 'em), you can get around this by disabling the password protection in Control Panel or by deleting the encrypted password from CONTROL.INI. You don't even have to be in Windows to do the latter — any DOS text editor will do.If you want to stop people messing around with Program Manager or installing new software, you can add a Restrictions section to PROGMAN.INI. This one has been in previous *Hands On Windows* columns before, but just for the record here it is again:

```
[Restrictions]
EditLevel= 1 — can't create, delete or
rename groups, 2 — nor program items,
3 — can't edit item command line, 4 —
can't change any item properties.
Restrictions are cumulative.
NoRun=1 — disables the File/Run...
command
NoFileMenu=1 — removes the "File" menu
completely
NoClose=1 — can't close Program
Manager
NoSaveSettings=1 — can't save
settings.
```
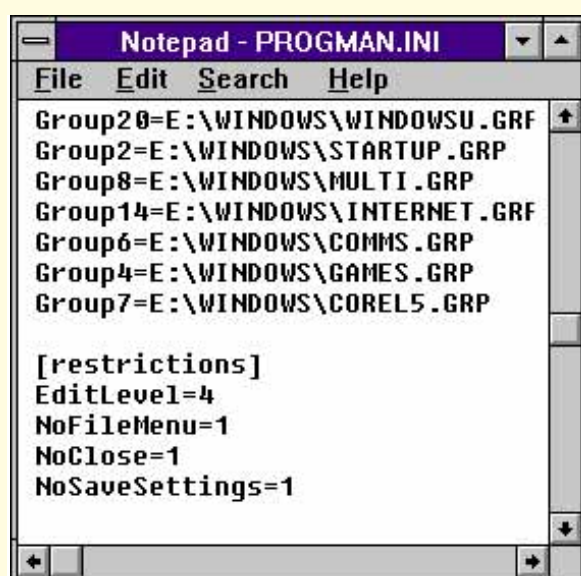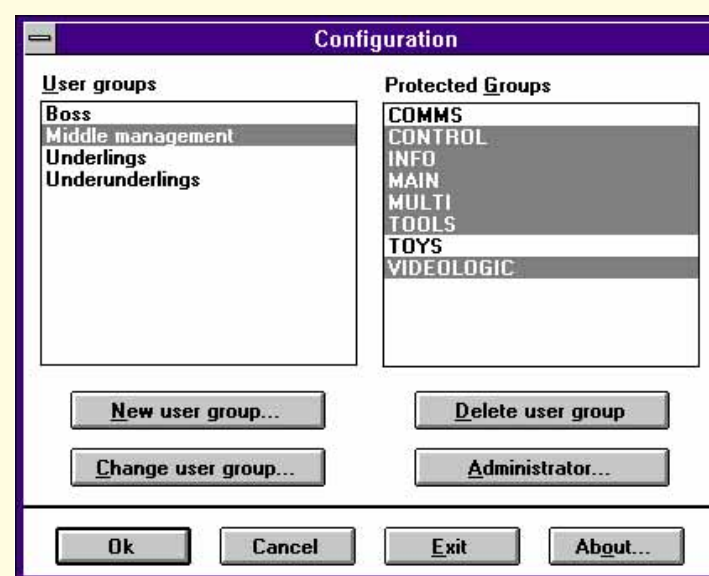
This, you'll be pleased to hear, has only two serious flaws: firstly, you can still add program items by dragging them from File Manager; and secondly, anyone with a text editor can remove the settings.

Another trick is not to use Program Manager as the shell. Open SYSTEM.INI and add to the SHELL=c:\path_to \wordproc.exe (or whatever word processor your office slaves use) and they'll be stuck in there without being able to run anything else. Unless they have the bright idea of using the word processor to edit SYSTEM.INI, or knocking up a few macros to run other applications.

Losing control
Control Panel has a similar feature: create a section in CONTROL.INI entitled [Don't load] and add entries such as desktop=1. This will stop the desktop icon loading when Control Panel runs. This might be fine for discouraging the half-hearted or accidental meddler, but once again, there are two ways around this: edit CONTROL.INI; or use the "control panel" tip shown in the *Ten Top Tips* box (on page 259) to File/Run the item. Unless, of course, some spoil-sport has disabled File/Run in which case go back a paragraph or do it from File Manager.
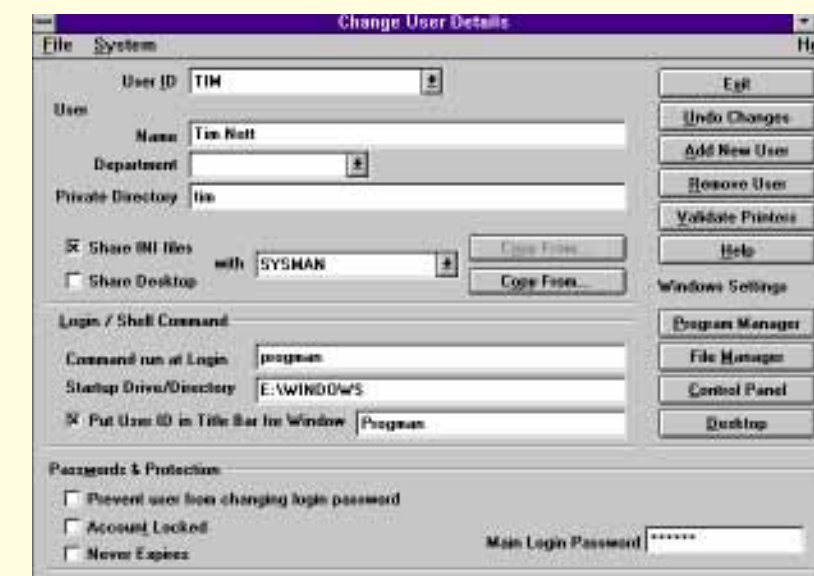
At file level, you can either hide directories and files, or make them read only. But then File Manager has an option to "Show hidden/system files" and the facility to unprotect them again. You could, of course, remove File Manager from the system or make it hidden, in which case Hacker Harry would have to use the DOS ATTRIB.EXE command. Remove ATTRIB.EXE and then you have no way of seeing the files yourself unless you carry a copy around on a floppy. As will Hacker Harry. Then you can have clever batch files that copy standard sets of .INI files before Windows is started. Hacker Harriet edits the batch files. And so it goes on.

So, basically the System manager (whether this is the office boss, a teacher or Mum) has two choices: either to use the built-in Windows restrictions, and leave the PC wide open to anyone with the basic literary and computing skills to operate a text editor; or to restrict the functionality of the PC to such an extent that the users would be better off with a pencil and paper.

Even though there are alternative Windows shells, such as Central Point Desktop that offer some degree of protection you might quite understandably not want to shell out (*sorry*) the money or invest the learning time.

Secgroup, a freeware utility, makes a slightly better stab at Program Manager security. First you must set yourself up as the system administrator and issue yourself a password. Next, you decide which program groups you'd like to protect. Then you set up user groups, each with their own password and decide to which of the protected groups that password will allow access. Any group that's minimised can't be opened without a valid password so there are three levels of security for each group of users: free for all, password protected, and access denied. The System administrator has quick access too, via a dialogue box, to the Program Manager restrictions settings.

The search for security

Pretty poor security...

...getting better...

...and much better

256
PERSONAL COMPUTER WORLD
OCTOBER 1995

257
PERSONAL COMPUTER WORLD
OCTOBER 1995

It's a fairly handy way to keep File Manager or Control Panel, say, out of the reach of small children and casual users. But again, it's terribly simple to crack as it

Bob's your uncle — Bubba's his country cousin

It's Bubba's place! This friendly Windows front-end is simplicity itself, and fun, too

You may have heard of Bob, the easy-peasy Windows shell for those who find Program Manager too much of a challenge. I haven't seen this but I have seen Bubba, a multimedia Windows front-end for those who find Bob too taxing. You'll be pleased to hear that this is freeware and (if everything has gone smoothly) should be on the cover CD-ROM. It's also available on Compuserve GO OSOSOFT, and you'll need VBRUN300.DLL for it to work.

Although you never actually get to meet Bubba in person, you soon gain a clear mental picture of the guy: he's a good ol' boy with a heart of gold and a head of hickory. He drives a '77 Chevy pick-up whose colour scheme is rust and filler, buys his groceries at gas stations, and the loves of his life are shotguns, dogs, beer an' wimmin, in that order.

Opening the Readme file gives a good indication of the ambience of this interface: "This here file ain't got much in it." Start the thing up and you're in Bubba's shack. The moon is shining through the window, silhouetting the john in the backyard. On the desk in front of you is an ancient sit-up-and-beg typewriter (Windows Write), a pencil (Notepad), a hand of cards (Solitaire) and a few other things such as an ashtray (cough-cough), a can of Burpo beer (fart-fart) and a slice of ageing pizza (wait and see). Over yonder, sitting on the trash bucket, is a big, untidy pile of papers — yep, you guessed it, File Manager. Cue the kickin' country banjo music (crack the other can of Burpo) and crank up Terminal on the old wind-up telephone (how apt).

Then there's the television. I must confess I couldn't get this to do much, but it could have something to do with the bullet hole. The babe on the calendar gives a cheerful wave and a wiggle, and the armadillo (don't ask) in the corner dispenses useful "Bubba sez" tips for everyday life. Personally, I found these far more enlightening than Microsoft's Tips of the Day: "Don't fool with no snake nor no drunk"; "The richest man on earth don't wear but one pair of trousers at a time"; and, "They ain't no computer thet kin make a stupid man smart." All have a certain philosophical ring, and frankly, "You can quickly switch to other open applications by pressing CTRL+ESC to open the Windows Task List dialogue box", misses by miles.

And there are the bookshelves (Bubba reads books?). Here you'll find tomes like DOS Prompt and Ctrl Panel, as well as some for your own applications. Though somewhat limited in features, I found it a refreshing change from my usual shell. As Bubba sez: "Tired of the same old pizza? Y'all try our cheese wiggles. They ain't good, but they's handy."

When you're tired of Bubba, y'all click on the Exit sign and watch a rather unusual (but harmless) way for a Windows application to close.

requires SECGRP.EXE to be loaded in the **[windows]** section of WIN.INI. And the idea of a group password is extremely insecure — I reckon half a Mars bar would be about the going rate for a school pupil in class 5c to get the password out of class 5b. But if you want to give it a whirl it's in the Windows/Files topic on CIX (SECGRP.ZIP — 20,794 bytes), on this month's cover CD and you can contact the author, Andreas Furrer, at s_furrer@ira.uka.de.

Latch 22

For a more serious approach I've been looking at the commercial program ,Latches for Windows. This comes in three versions: for home, professional or network use. Looking at the professional version, the range of what can be done is formidable. Not only can it apply restrictions to Program Manager and Control Panel, but it gets its hooks into File Manager too. Settings and restrictions can be configured user by user. Each user, who has to log in with a password when Windows starts, can have their own set of GRP and INI files too. So you can have a whole different desktop, and levels of access for everyone from the managing director to the janitor's dog. Although there's no individual directory protection as such, the system manager can disable "File/Properties..." and "Show Hidden Files" so, for instance, the user can't change a read-only file.

It's all very impressive, and offers similar facilities to Windows 95 for multiple users, but with a lot more security. For a start, you can't get around it by editing CONTROL, PROGMAN or WINFILE.INI. In a very clever bit of chicken-and-egging it rebuilds the INI files from an encrypted copy only after the relevant executable has started to load. It also pre-empts the screensaver so that only the logged-on user and System Administrator passwords are valid.

At present, there is one fatal flaw — but I'm not going to blow the whistle as that would be unsporting, and besides, as Latches is currently undergoing trials with the Ministry of Defence, I might be compromising National Security. Let's just say that anyone computer-literate enough to be reading this column should be able to disable the whole shooting match in a matter of minutes. However, in a secure networked environment SYSTEM.INI (whoops, sorry, there goes the country) would be kept behind a "firewall" so this wouldn't be a problem. Furthermore, having talked to David Biggins, one of the

Ten Top Tips for Windows

Starting Windows	It is an old chestnut but everyone forgets how to do it: so to change the Windows start-up screen, first catch your bitmap. It mustn't have more than 16 colours, or be more than 50K, and must be saved in RLE format, so you'll need a shareware utility such as Paintshop Pro. If you have a DOS badge on the sleeve of your anorak, exit windows and type: **copy /b win.cnf+vgalogo.lgo+newlogo.rle c:\windows\win.com** adjusting paths to suit. If you can't be bothered with all that, save the new logo as VGALOGO.RLE (back up the old one first), then use Setup (from DOS) to change your Windows configuration, then change it back again. This automatically rebuilds WIN.COM.
File Manager	To tile panes vertically, press Shift + F4.
Sounds	Assigning sounds to events can be fun but has its problems: it slows down program loading and can cause "Device in use..." problems when a multimedia application needs the soundcard to start.
Control Panel	You can save time by going straight to any item of Control Panel with the command line (or Progman Icon) **control.exe** *abc.***cpl** *xyz* where *abc* is the name of the .CPL file (e.g. MAIN), and *xyz* is the name of the sub-section, if any (e.g. DESKTOP).
Program Manager	You can create an icon for Program Manager in itself — whatever title you give, it will replace "Program Manager" in the title bar when launched.
Task Manager	If you don't need this, you can get any program to run when you double click on the desktop or press Ctrl+Esc. Add **taskman.exe=***myprog.***exe** to the **[boot]** section of SYSTEM.INI and restart Windows.
Write	You probably know that double clicking in a word selects the whole word. But move the pointer to the left of the screen and it changes into an arrow: one click selects the line; a double click selects the paragraph. Hold down Shift, and the text from the insertion point (flashing vertical bar) to the end of the line, or paragraph, is selected instead. Control + click selects all.
File Manager	With the focus on the right-hand pane, typing a forward slash selects all.
First Aid Kit	When you first install Windows on a PC, take a floppy copy of the main .INI files before installing extra hardware or software. Subsequently, if things go terribly wrong, you can return to an "out the box" Windows installation by using the DOS commands to move the existing .INI files to a temporary safe haven, and using the originals.
Setup files	Sysedit.exe, located in WINDOWS/SYSTEM, loads WIN and SYSTEM.INI, CONFIG.SYS and AUTOEXEC.BAT (and more with Mail enabled) for simultaneous editing.

developers, I'm told that by the time you read this they will have cracked this problem on stand-alone machines as well.

He wouldn't tell me how (well, would you?), but basically, Windows will refuse to start if SYSTEM.INI has been tampered with. Many of you will doubtless have noticed that Windows is quite capable of refusing to start without any meddling on the user's part, so harnessing this great natural force seems a step in the right direction. For more information, get in touch with Rhea International (see *PCW Contacts* on page 259).

Doing a little cross-pollination from the column at the posh end of *PCW* (*Letters*, August issue), a letter from Alan Cox reassured me that I was not the only one clumsy enough to HIT THE CAPS LOCK key by mistake. He asked whether there

was any way of disabling it, short of physical surgery. Well, I have good news and I have bad news: the good news is that there is such a beast; the bad news is that you have to buy a Microsoft Natural Keyboard to get it. One of the options in Control Panel is precisely this, and you have to double-tap the key to turn it on. It is not perfect, because you have to go back to Control Panel to disable the thing again, but it is useful.

PCW Contacts

Tim Nott can be contacted either by post c/o *PCW* or by email on **timn@cix.compulink.co.uk**

Rhea International, Devonshire House, 60 Station Road, Addlestone, Surrey KT15 2AF. Tel **01932 830551**
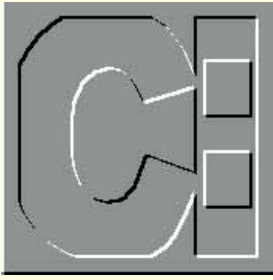
Getting cross with **DOS**

Simon Collin opens his postbag to reveal pressing problems with cross-linked cluster error messages in CHKDSK, controlling a modem, and sorting out the SORT command.

Checking out

Dear PCW: My PC developed a new error message when I last ran CHKDSK. I try and run CHKDSK once a week, and on the last occasion it reported that there was a cross-linked unit. The message included the names of two filenames, of data files that are important. I have tried to run CHKDSK with the "/f" switch to get it to mend the problem, but it keeps reporting the same error. So far, I seem to be able to access the two files without any major problems, but would like to either get rid of or solve the problem.

PCW Your error message is quite common. It occurs because one cluster (one part of the disk) is listed as belonging to two separate files. This normally happens because the FAT (file allocation table) that stores details of where files are stored on the disks, has been corrupted. Unfortunately for you CHKDSK cannot solve this problem, which is why you're not getting anywhere, even when you are running it with the "/F" switch that would normally fix errors.

You will either need to use a disk utility, such as Norton's Disk Doctor or PC Tools, or you can sort out the problem yourself. However, you are likely to lose data if you try and tackle the problem yourself: another case for keeping good backups!

To get rid of a cross-linked cluster error message, do the following:
1. Copy both files to a floppy disk or, if you don't have a floppy drive, copy them both to another separate directory on your hard disk.
2. Delete the original files.

3. Run CHKDSK to make sure that the error message no longer appears.
4. If the files are data files, open them and check for missing data. If they are application files, try and run the programs. If all seems okay, copy them back to their original locations.

The disk utilities I mentioned will try and fix the problem rather than just get rid of the message as I've described. To do this, the disk fixer utility looks at the two copies of the FAT (luckily, DOS keeps two copies of the FAT, just in case) and tries to work out which is correct and so spot the missing cluster. Once it's found the missing cluster, it can re-write the FAT and so both files regain their original full complement of clusters.

Modem muddle

Dear PCW: I have been frustrated by an annoying, if trivial problem that I hope you might be able to solve. I use a bulletin-board software program to provide a way for me to call into my office PC from home. I start the program when I leave and the modem is then set to automatically answer the telephone. In the mornings, when I quit the program, it doesn't seem to properly reset my internal modem and it remains in auto-answer mode. Since I cannot switch off the modem (it's internal), I have to creep under my desk and unplug the phone lead.

Is there an easy way to control a modem from DOS?

PCW There's a neat and simple way of controlling your modem from the DOS command line. In fact, you can use the

same method to control any standard peripheral such as a printer or even your monitor. The trick is to use the redirection symbol ">". Normally, I've given tips on how to use the redirection symbol for processing files, but in your case you can use it to send data to your stubborn modem.

Make a note of the COM port that your modem is using: even if it's an internal modem it will be set to one of the four standard PC serial ports — COM1 to 4. If the modem is a Hayes-compatible model, and almost all are, it will respond to the standard AT command set used to control modems. To turn off the auto-answer function of a modem, the AT command is:

```
ATS0=0
```

To get the modem to respond, you might need to send it a series of three '+' signs first (this is the usual way to tell the modem it's in command mode so that it will respond to AT commands). The full sequence is:

```
+++ATS0=0
```

To send this to the modem, use the ECHO command, which can work with text characters, and follow with the text string (above) and the redirection symbol. The full command is:

```
ECHO +++ATS0=0 > COM1
```

If you include this in a batch file, run the batch file when you get in to the office and the modem will be switched to normal mode. You can equally easily use the same technique to send any other setup string to your modem or to any other serial device.

On the right path

Dear PCW: Is there any way of extending the storage capacity of the PATH statement? I switch between Windows and DOS and so have different applications scattered around my hard disk. I have added a new DOS accounting program and this needs an entry in the PATH, but it's already full.

PCW PATH is an environment variable that is used to store the names of the directories and drives where you want

Out of sorts

Dear PCW: I have been trying out one of your ideas, sorting data using the DOS SORT command, but I cannot get it to work properly. I experimented with the results of the DIR command with great success, and could sort the output on any column. What I want to use the command for is to sort a text file of addresses that I've exported from my time-organiser program. The SORT program just goes haywire and sorts the file into no particular order at all.

PCW The SORT command is a useful little command-line tool that comes with DOS. It lets you specify any text file or input stream and sort the lines by the first character or by any column. For example, to sort a text file called "address.txt" on its 30th column (perhaps the surname of the entry) you would use the command

```
SORT /+30 < ADDRESS.TXT
```

I suspect that your text file has been formatted using tab characters when it was output. This will look fine if you display it on screen (for example, using the TYPE command), but it will fool SORT. The problem is that the tab character is a single character, so if you try and sort on a particular column that you've calculated from the display, the effect of the tab character is lost and SORT treats it as any other single character. The solution is to export the file without tab characters and SORT will work fine.

DOS to look for an executable file once it has looked in the current directory. PATH has a maximum capacity of just 127 characters which soon becomes a limitation.

You could set up a new path just before you want to run your accounting program, but by using the PATH= command you would simply delete the existing settings. An alternative would be to use the APPEND command. Although it can be useful, the APPEND command has a mass of possible switches that generally make it a pain to use.

The big advantage of APPEND over the normal PATH command is that it lets you set up separate search paths: one set for executable files and a second set for data files. This is unlike PATH which sets up a search path for an executable. APPEND doesn't normally use an environment variable, but you can force it to write its search path to a variable called APPEND. For your use, you won't gain anything by using the APPEND command (since you're dealing with executable utilities).

Perhaps the simplest, if not the most elegant, solution to your problem is to temporarily replace the PATH completely. I described how to do this when covering the redirection symbol last year: If you want to run the utility, delete the path, substitute the new path, run the utility, exit the utility and retrieve the original path. The trick to making this far simpler than it sounds is that if you enter the PATH command by itself, it displays the existing path in the form of a real PATH= statement:

```
C:\ > PATH
PATH = C:\; \DOS; \APPS
C:\ >
```

If you want to temporarily save this

Path, you need only redirect it to a file:

```
C:\ > PATH > OLDPATH.BAT
```

Now you have a batch file that, when run, will re-set the Path variable to the original. Now you can go ahead and change the path to point to the utilities and, finally, run the accounting program. For example, to run your accounting program, set up a batch file with one line:

```
PATH = C:\ACCOUNTS; C:\DOS;
  C:\APPS\TOOLS
```

This resets the PATH to point to the accounting program along with DOS and any essential tools. Once you've run the application, to return to your original path, just run the OLDPATH.BAT file.

You mentioned that you also use Windows. This could help improve things (for once): attach the two little batch files above, OLDPATH and ACCOUNT, to two separate DOS icons. Now, if you want to run a utility, double-click on the Account icon and you have a DOS session with the correct path. For normal use, start the other DOS session with your usual, full path.

I explained how to attach a batch file to a Windows icon a couple of months ago, but if you've temporarily forgotten, do the following: Create a new icon and in its Properties box, add the command "C:\DOS\COMMAND.COM /K" followed on the same line by the name of your batch file.

PCW Contacts

If you've been delving into DOS and want to share your experiences, write care of *PCW* or via email to **scollin@cix.compulink.co.uk** or **CompuServe 72241,601**
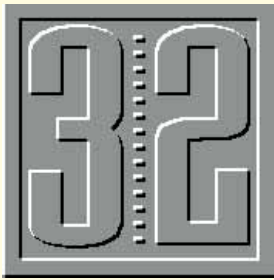
A monolithic **app**… and tickle

Chris Bidmead doesn't approve of monolithic applications but shows that the Linux-FT package's Xadmin, written in Tcl, is the exception. He has some fun with WPS objects and reviews the latest Linux support issues, too.

In the past, I've whinged not just about the shortage of OS/2 applications, but about the difficulty of getting hold of those few that are out there. It seems only fair, then, to report the good news that a UK company has heard my plea and is now delivering a product for review.

I wish I could get a little more excited about the first two packages that One Stop Software (talk to geoffd@cix.compulink. co.uk) has sent me so far, but that's hardly their fault. In any case, I've never believed in the "killer app" scenario that says OS/2 needs to come out with an application that everybody will clamour after, and to which no other platform can do justice. In my humble opinion, OS/2 *is* the killer app — a somewhat brash statement, the truth of which will emerge (or not) over the coming year when we see (or don't see) wondrous things happening with OpenDoc.

Actually, I'm being a little unfair to Partition Magic and Impos/2, because they do what they do rather well. Impos/2 is a modest but subtle bitmap manipulation package for creating images or touching up pictures. It's hardly going to make a dent in the sales of Windows products like Picture Publisher, but for OS/2 users it's fully 32-bit (although it uses 16-bit stuff to read Kodak PhotoCD images) and integrates with the WPS through drag 'n drop. It comes with a comprehensive manual translated from the original German and is, in places, almost totally impenetrable.

Partition Magic is a utility for expanding,

Partition Magic is just the utility you need if, say, you decide you want OS/2's Boot Manager on a disk that's already fully partitioned: just shrink one of the partitions by 1Mb to make room. Unfortunately, once it's on, Boot Manager doesn't take kindly to subsequent movements of partitions, which is just one more reason I'm putting off using the thing for real

contracting and moving partitions. It can also convert FAT into HPFS on the fly. I'm proceeding cautiously with it because it assumes a world of OS/2 and DOS, and seems to know nothing about NTFS ext2 Linux partitions and NeXTStep, and most of my machines carry a veritable tutti-frutti of different operating systems. If I take the bold step, I'll let you know what happens next month.

More Fun with WPS Objects

I like OS/2's WPS for the neat, simple things you can do with it. Here's something I knocked up the other day that may be of some use to you.

I've said before that it's not smart to work directly from the icon of an executable file in its home directory. Instead, create a program object and put that in a folder, then work from a shadow of that object which you keep somewhere convenient. Or work with data objects that have been connected to appropriate program objects via SOM, using Type in the data object and Associate in the program object. (If the WPS doesn't provide a ready-made type that fits the bill, make one up and write it in. I prefix all my new types with CHB so I can recognise them.) The advantage of a data object is that like a folder it has a menu setting with which you can mess around.

If you're like me there will be a number of icons floating around on your desktop that belong in groups. Maybe one icon is for editing a batch program and the other for running it. Or one icon launches a comms package like Ameol and another inspects the download directory. The WPS offers several ways of dealing with this. An obvious one would be to put related icons into the same drawer of the Launchpad. I've already described another in this column: create a folder for Ameol and put the Ameol launcher icon, and a shadow of the download directory into it. Then — and here comes the neat bit — drop the Ameol launcher icon into the Open settings of the folder, and make it the default action. Round the whole thing off by giving the folder the Ameol icon. Thus, the download directory is effectively hidden inside Ameol. But you can always get to it through the Open menu.

Getting to Verity's Topic

I get to my text retrieval package, Verity's Topic, through a pair of program icons: one for evoking the program, and another for doing its indexing and general maintenance from the command line. Why would you need a program object to launch a command line utility? Well, the program object actually opens a tailored OS/2 window, with its own distinctive Window Title and background colour and a custom built PATH that points to the nest of special Topic directories where I keep my Topic

binaries and batch files.

When I began to take the Launcher seriously, I realised it would be nice to put the pair of objects into a single icon. The Ameol Folder solution came to mind. I run Topic more often than I maintain it, so the logical thing would be to make running Topic the default double-click action, with opening the maintenance environment as a secondary action accessed through the menu. Unfortunately, a folder has Icon View, Tree View and Details View as irremovable menu items, and all I really wanted was the choice of Run or Maintain.

The solution was to use a data object instead of a folder object. A data object doesn't have to have data: it can be empty and merely used as a launcher. Drag a new object off the Data object template, open the Settings and remove Plain Text from the Type window. (When you close the Settings again this will remove the unwanted System Editor from the Menu options.) Then put the Topic program object into the Open menu as default, and the Maintenance program object as the other Open menu option. Stick a fancy icon on the front of the data object, and lo and behold, you have a program object that knows two tricks instead of just one. You could use this technique to combine ZIP and UNZIP, or give yourself a choice of text editors. I'm beginning to think that the rule should be to drive everything though WPS data objects.

Linux: the nightmare continues…

…But not for me, I hasten to add: I'm very happy with the Linux-FT distribution that Ian Nandhra, of Lasermoon, sent me for review and you'll be reading about it soon.

But last month, I mentioned the problems Ian was having with the free support he offers. "Linux Tech Support is a nightmare," he says. "There is a hard core of non manual-reading users who don't want to think for themselves, and demand you drop everything until they're sorted. It only takes three of those ringing you up on the same day to completely wipe you out — at which point everything else gets stacked up. The people who call up have paid virtually nothing, consider they are entitled to free support, and have no reason to moderate their consumption of this free thing. We manage to stay sane (ish) here by confining tech support to the hours between 2.00 and 6.00 in the afternoon."

Ian has had to do this because he's seen the effects on other vendors of what he calls "Linux Tech Support Stress". He tells me: "There's an outfit in the US who will remain nameless, because the people concerned are very good friends of mine: one of them is in hospital, and the other only manages to recover at home, at the end of the day, with the aid of five or six bottles of beer."

So the utterly great idea of distributing a major operating system for free is under serious threat. Ian calls the technical support issue "The biggest Achilles' heel in the free software revolution". In theory, you download the software for nothing over the Internet, and turn to the Internet for support when you need it. But because your modem isn't fast enough and you don't have the expertise to install raw Linux, you probably get it as a ready-to-go distribution from a CD-ROM distributor instead. Money changes hands. That's perfectly within the spirit of the GNU licence, but it tends to change the expectations you have about support. As will your experience of the Internet if you're a raw beginner. As Ian says: "What you get on the Internet is not tech support, it's opinion. Some of it happens to be good, and some is awful. The average Joe has no way of telling the difference."

Linux was developed by, and for, people who care about Unix. They are prepared to invest time in it, and that includes sorting the genuine information from the junk that gets handed out over the Net. But Linux has grown up since these ideas were formulated. A modern distribution like Linux-FT is pretty well as ready to run as the copy of Windows NT 3.51 I installed this afternoon, and is ending up in the hands of the same kind of people who buy shrink-wrapped operating systems. These people will almost certainly need outside help at some stage, and that means somebody's time being devoted to their problems. Time is money. The bits may be free, but the bods always cost. The present ambiguities of the "free software" idea are leaving some users frustrated, and turning distributors into screaming wrecks.

It can't go on like this. Linux is in danger of collapsing under the weight of its own success. Or Caldera could save it by eventually replacing all other Linux distributions (I doubt this). Neither of these are welcome scenarios in my opinion.

A new approach

One way around this is the robust yah-boo-sucks approach taken by software developers like Peter Childs (pjchilds @apanix.apana.org.au). He's written a utility that converts OS/2 .INF help files to HTML, either as a one-off effort or dynamically so that a Web server can serve up .INF files directly. He gives it away free as

Taking **shortcuts**

For word processor users, knowing the right keyboard shortcuts can be a real godsend. Tim Phillips demonstrates some choice examples, introduces you to his very own macro club, and even finds time for some DOS advice.

hanks to all those who replied to my call for participation in our macro co-op. By now I should have turned you into a mailing list and set you a few challenges. The more the merrier, though, and if you're competent in any macro language or Visual Basic (or if you just fancy having a go), email me and join the club.

Many thanks as well to those who have written and emailed me with queries. These have snowballed in the past few weeks, and as I deal with your enquiries in batches, my reply might occasionally be delayed. I'm very pleased to be getting so much feedback, but please bear in mind that there's only me to do the admin.

Windows
Lionel Kremer's macro to cycle through open windows caused a lot of fuss. My replies via email were along the lines of: "Yes, I know you can cycle through windows using Ctrl+F6, but I keep forgetting, and when I'm cutting and pasting between documents, using the keyboard is a pain when I can put a button on the toolbar."

Nevertheless, the keyboard shortcuts in Windows are more useful to word processor users than to anyone else, because we have our fingers stuck to the keyboard a lot of the time. I personally prefer to whack in all the text I can and then do the fiddling around with a mouse and a toolbar later, but that's a comment on my typing. All you recently converted WordStar and WordPerfect DOS users will be getting itchy fingers, and anyone recording macros needs to know how to

move the cursor around, so it strikes me that a quick revision course on the keyboard shortcuts available to Windows users would be useful, not least to me. So here we go:

1. The simple stuff
In your dialogue boxes, Alt+the underlined letter of an option selects that option. To move forward and backwards one word at a time, use Ctrl+the appropriate arrow key. The beginning and end of a line is Home and End, and Page Up and Page Dn go up and down one screen.

2. Selecting text
One line (exactly) back from the cursor is Shift+Up, one line forward is Shift+Dn.

Fancy new colours, more lines, and it's now looking for *.*
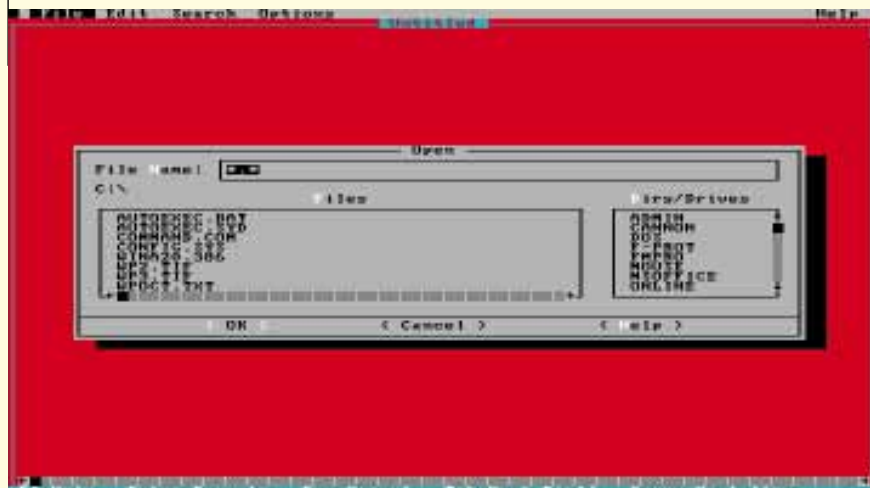
Here's one I had forgotten: Shift+Ctrl+End selects from the cursor to the end of the document — substitute Home for End and you select to the top. Use Shift with Home or End to select the rest of the line, either before or after the cursor. Not surprisingly, Shift+Ctrl+Cursor key selects the letter to the left or right of the cursor.

3. Copying and pasting
You know this — well, you should: Ctrl+C copies, Ctrl+X moves, Ctrl+V pastes, Ctrl+Z undoes.

4. Windows Write
Turn off your Num Lock and Write has a few extra goodies. Use the numeric keypad to select text: 5+Left, 5+Right moves to the next or previous sentence. Use the 5 key with the down and up arrows to move to the next and previous paragraphs. Finally, if your Write document has pages, use 5 plus the Page Dn or Page Up to move to the next or previous page.

DOS
Let's get right back to basics with DOS advice this month. I was shocked, nay horrified to find that a colleague was still editing in DOS using the execrable EDLIN program. Don't tell me — you do it too. I think I'm off to have a lie down.

If you have DOS 5.0 or 6.0, and I hope you have, then why don't you use EDIT for short word processing jobs? It's twice as good for batch files and is a respectable, if not overwhelming, text editor. But there are a few things we can do to immediately make it better: if you have an EGA card or better, type EDIT/H rather than EDIT and you get 50 lines of text on the screen.

You can fine-tune it using the Options menu. It won't let you set a font, but it does let you set the screen colours and the spaces that separate tab stops.

Next, get your DOS mouse driver working, and Edit is mouse-enabled. It's

quicker using the menus and scrolling. If you can't use a mouse, learn the cutting and pasting shortcuts. Edit is not at all quirky, in fact it is extremely well-behaved, and if you want to start someone off in simple DOS word processing it teaches good habits. You will find a list of shortcuts in the Help menu under Keyboard.

I admit to having learnt the last tip initially from the excellent *DOS 6.0 Techniques*, published by Ziff-Davis Press, which I highly recommend. EDIT defaults to looking for *.TXT files, which is a pain. To make it default to *.* you have to hack QBASIC.EXE with DEBUG.

I cannot stress enough the importance of making a backup copy of QBASIC.EXE. Please do this. Don't mail me if you haven't and everything goes wrong.

So copy QBASIC.EXE to QBASIC.TIM or similar to back it up. Then:

```
REN QBASIC.EXE QBASIC.PRG
DEBUG QBASIC.PRG
```

You get a "-"as a prompt. Type:

```
R DS
```

and it comes back with

```
DS 0DAA
```

Note this number (that is, the last four digits). If you're in DOS 6.0, add 2 to the left digit — that would be 2DAA in this case; if you are in DOS 5.0, add 3, to make 3DAA.

Now type:

```
E xxxx: DD70 "*.*", 0
```

(For DOS 6.0, xxxx is the number you got by changing the old number), or type:

```
E xxxx: C76F "*.*",
```

(in Dos 5). Then:

```
W
Q
REN QBASIC.PRG QBASIC.EXE
```

If it doesn't work, and be warned there are many cases in which it doesn't, at least you have your backup to rename to QBASIC.EXE. Don't you?

Tim's Macro Club

Welcome to the introductory session of Tim's Macro Club. Members were set these interesting problems:

1. John Lea, of Highgate, wants a macro so that both his document windows in Word 2.0 will scroll simultaneously (he's a translator). I'd like this too — any package, any solution.

2. David Harris of Easynet Cyberspace would like to enhance MarkCitation because he doesn't want to mark the same citation more than once on the same page. To elaborate: if he has text that generates a footnote, and this text appears twice on the same page, he doesn't want the same footnote to appear twice.

Big, big fonts — don't let your word processor tell you it isn't possible

3. Just a quickie: I'm interested in macros that provide some sort of billing function. For example, if someone bills by the word, or for the time spent on a document, I'd like a macro that automatically generates an invoice for it, or some type of report. Nothing too complex, please.

As a reminder: the macro club offers excellent prizes but operates by email only. You join by emailing me to tell me you're interested, and every so often I'll mail you all a challenge. Mail back your efforts (uuencoded if it's Internet mail) and the best ones will win prizes and get into print. All macro languages, Visual Basic (sometimes) and even simple workarounds (if they're very clever) will be accepted. Please note: by sending the macro to me, you thereby agree that I can redistribute it or publish it in this column, but you will be credited at all times.

If you don't have email, by all means have a go at answering the problems by post, but the time lag between when I write this and *PCW*'s publication date means that you're unlikely to win anything. This section will be used for reporting the results of our little competitions and publishing the macros if they're short enough.

Top tips

More macros this month. A few of you said there's no point in writing a macro to flick through open windows, as Windows provides Ctrl+F6 specifically for this purpose. You're right, but if you put the macro on your toolbar it means you can keep hold of your mouse while cutting and pasting between documents.

Another shorty macro, from Dave Symington of Edinburgh: a simple four-liner that reverses two characters if you've made a mistake. This is WordBasic but you can record it as a keystroke macro in any word processor. Give this macro a shortcut key, because when you mis-type

you just want to hit the shortcut key immediately and carry on.

```
Sub MAIN
CharRight 1, 1
EditCut
CharRight 1
EditPaste
End Sub
```

You can record versions of this in almost any package. It's a good introduction to macros.

Phil Knight, of the School of Science and Technology at the University of Teeside, has noticed that the toolbar on his word processor only offers fonts up to 72pt. He wants something bigger.

Don't believe everything you see, Mr Knight. Just type in the bigger size in the box which shows font size, and providing you have chosen a software font, you get it. The 72pt size seems just a stylistic thing, not a restriction on fonts which you previously didn't have.

TrueType fonts, the standard in the Windows environment, will effectively scale as large as you want. If there are limits, I haven't met them, apart from in Write (see screenshot on previous page) which establishes an upper limit of 127pt. They will also be as small as you want. The pick boxes commonly offer only sizes between 8 and 72pt, but click in the box and type any number, and you'll get a font in that size. Note that smaller than 6pt is illegible and bigger fonts need kerning (adjustment of the spaces between letters manually) if they are to look good.

Problem solving

Simon Parmenter's wife Mo hacked into his CompuServe account to ask about auto-numbering paragraphs. Does Word support numbering 1(a), 1(b) and so on or just 1, 2, 3? she asks.

Yes, like Ami Pro or WordPerfect or, as she is accustomed to, WordStar 6.0, Word's implementation is quite powerful. In the Format menu, find bullets and num-bering, and you get one of those multilevel dialogue boxes. Click on the Multilevel tab, and you have a variety of styles for multi-level numbering. If you want to change these, click on the Modify… button, which controls style, font, indent and gives you a preview. This goes nine levels deep, and if you need more — I'm not reading your document even if you pay me.

When Sharad Patel, at Xerox.com, tried to double-click a chart in a document, "Cannot open Microsoft Organisation Chart 1.0" was displayed. But what did this mean? Where could he find Organisation
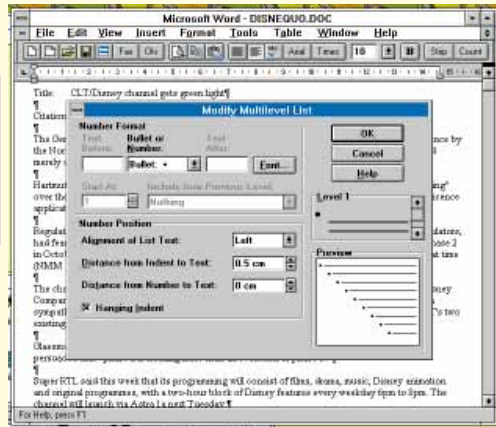
Auto-numbering — as sophisticated as you like

Chart 1.0?

This is another example of the applet problem that we're all going to have to get used to. Unfortunately for Sharad, his chart was prepared using PowerPoint, then embedded — it's PowerPoint's Org Chart applet and has been available since PowerPoint 4.0. You must find a user with PowerPoint if you want to see it, because you can't get the applet separately.

This will be a feature of all our lives if OpenDoc catches on. The idea of Open-Doc, which is IBM's, Apple's and Novell's version of OLE on steroids, is that all documents will be composed of "parts", and one part will generate text, another will do the spell checking, another will generate a table, and so on. If you want to view the document, you need to own a copy of the part, or a "part viewer".

What's the point? Firstly, it means an end to monolithic applications. You're all struggling to keep up with the range of features in word processors (I know I am), and you don't use them. The idea is for you to buy only what you need. Secondly, OpenDoc will be cross-platform, and should spell an end to tedious convertors for file formats. It's a neat idea, but idealistic, and not slated until 1996 at the earliest. I'll report in more detail when I have something to show you, although the previews I've had are impressive.

The idea with OpenDoc is to give away the Viewers that correspond to each part (which means you can look but not edit) for free. So in an OpenDoc environment, Mr Patel could have got a viewer and looked at his chart for nothing.

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**

Salted peanuts

Making up 'pay packets' for the RNLI was far from plain sailing. Stephen Wells smooths the waters.

As a relative of mine is the helmsman of our offshore lifeboat, I felt a twang of empathy when I heard from Tony Nixon of the Isle of Anglesey. He wrote: "I was recently asked by the local secretary of the RNLI to assist him in computing the making up of 'pay packets', and providing a summary for the treasurer to draw the necessary from the bank. I thought this would be a simple task, eminently suitable for the shareware As-Easy-As spreadsheet which you included in your July cover disk.

"I include a working version of my program and a printout with some notes. You will see that it did not give the expected results in all circumstances with regard to the number of 20p and 10p coins. I don't think I've done anything wrong. It seems that the program maths has rounding errors somewhere. I use a 486DX33, not a Pentium. I would be grateful for an explanation of what is going on and perhaps a warning to users with similar errors."

I returned Tony's disk with an instant solution to get him in business using his present worksheet. This was to go to any cell which had an unhelpful formula and press F2, F9, Enter. What this does, in this and most other leading spreadsheets, is replace the existing formula with the calculated value as seen on the screen.

It's one thing to get a vehicle going so it will get the driver home, but it's also important to understand what is happening so the problem is circumvented in the future.

Firstly, I would clarify that the work of most lifeboat crew is voluntary. The "pay packets" referred to hold nominal honorariums. Secondly, Pentium paranoia should not be allowed to deter us from suspecting simple programming shortcomings.

Here's what Tony has on his worksheet: column B holds the pay packet amounts, B5=£34.70, B6=£24.70 and B7=£4.70. From there on out, rows 5 through to 7 have the same formulae with only the logical row number changing.

Column N calculates the number of £10 notes required. Cell N5 has @INT(B5/10). Column O gives the balance, calculated in O5 as +B5-(N5*10).

Column P calculates the number of £5 notes. P5=@INT(O5/5). And the new balance is in column Q. Q5=+O5-(P5*5).

This series continues logically to the right with the number of £1, 50p, 20p and 10p coins shown in columns R, T, V and X, respectively.

The balance columns change, so cell S5=(Q5-R5)*100, U5=+S5-(T5*50) and W5=+U5-(V5*20).

Further down the sheet, he sums each column so he knows the total number of each type of note and coin to get from the bank.

Now, in Tony's example, everything works out fine in rows 5 and 7. It's row 6, based on an amount of £24.70, that's making him seasick. The answer should be two £10 notes, four £1 coins, one 50p coin and one 20p coin. Yet As-Easy-As is telling him he doesn't need any 20p coins, but one 10p coin instead. No, there's nothing the matter with the software. The *PCW* July issue cover disk provided version 5.5F, a mature, fully-featured, DOS spreadsheet.

The first thing is to dig in and examine what is happening. If you go to cell N5 and enter

/ Range, Format, Science, 7 (decimals), N5..X7

you'll turn everything into a load of asterisks. Now enter
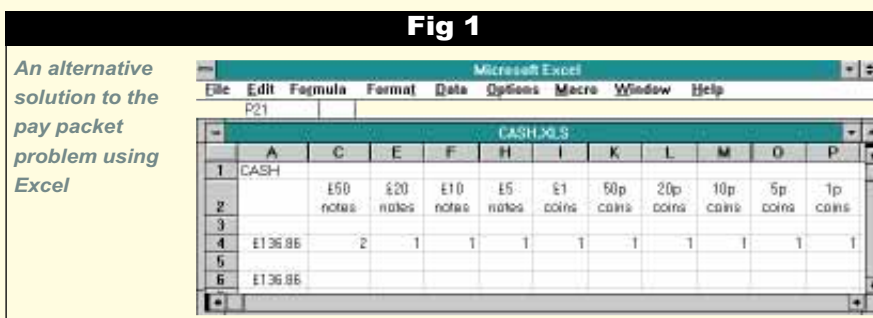
/ Sheet, ColWidth, RAnge, N5..X7, 15

Column S displays

7.0000000E+01

in rows 5 and 7, but row 6 shows

6.9999999E+01.

So, although all three rows show one

Fig 1

An alternative solution to the pay packet problem using Excel

---

Panel (a) Converting currency to coinage

```
A4   ENTER AMOUNT                                    I2   £1 coins
A6   =SUM(C4*50,E4*20,F4*10,H4*5,I4,K4*0.5,L4*0.2,   I4   =IF(G4>5,G4-5,G4)
        M4*0.1,04*0.05,P4*0.01)                      J4   =VALUE(MID(RIGHT(B4,3),2,1))
B4   =DOLLAR(A4,2)                                   K2   50p coins
C2   £50 notes                                       K4   =IF(J4>=5,1,0)
C4   =IF(A4>99.99,MID(RIGHT(B4,7),2,1),0)*2          L2   20p coins
D4   =IF(A4>9.99,MID(RIGHT(B4,6),2,1))               L4   =INT(IF(J4>2,(J4*10-(K4*50))/20))
E2   £20 notes                                       M2   10p coins
E4   =INT(IF(D4>4,(D4/2),0))                         M4   =(J4*10-(K4*50)-(L4*20))/10
F2   £10 notes                                       N4   =IF(RIGHT(B4)>0,RIGHT(B4),0)
F4   =IF(D4>2,D4*10-(E4*20),D4)/10                   O2   5p coins
G4   =INT(RIGHT(B4,4))                               O4   =IF((VALUE(N4)>=5),1,0)
H2   £5 notes                                        P2   1p coins
H4   =IF(G4>5,1,0)                                   P4   =N4-(O4*5)
```

Panel (b) Financial analysis template listing

```
A40  GEARING RATIOS (%)
A41  Debt to Equity
B41  =Total_Liabilities/Stockholders__Equity*100
A42  Fixed Assets to Long-Term Debt
B42  =Net_Plant___Equipment/Long_Term_Debt*100
A43  Long-Term Debt to Working Capital
B43  =Long_Term_Debt/Working_Capital*100
```

50p coin, the balance in pence in cell U6=1.9999999E+01, a sliver under the single 20p coin mark, but more than enough to provide a 10p coin in column X.

The best solution is to use the ROUND function. To solve the immediate problem, if you edit cell O6 to read @ROUND(B6-(N6*10),2) the 10p coin disappears and a 20p coin surfaces. As insurance, you could use the ROUND function in all formulae in the balance columns.

As-Easy-As also offers the MOD function. This returns the remainder (or modulus in number theory) after a number has been divided. It is a variation of the INT function and it just depends on how you want to construct your worksheet.

As the subject of translating spreadsheet-calculated currency to coinage is of interest to more people than those making up pay packets, and as so many readers use Excel, *Fig 1 (page 270)* shows one solution for doing it in that spreadsheet.

I've only entered one line but you can see how it would continue down the page. The total numbers of each denomination would then be added at the bottom. The amount to be converted to coinage is entered in cell A4. The figure in A6 is a simple cross-check. That formula multiplies the number of each note or coin by its size, and adds them all up.

The layout is shown in Fig 1. The formulae are listed in *Panel (a)*. Columns B, D, G, J, N have been set to zero width (using the shortcut Ctrl 0, zero). They hold intermediary formulae.

To eliminate potential rounding problems, I started by converting the entered amount to text using the DOLLAR function. Then I've referred to individual digits in the amount with functions like MID and RIGHT. Fortunately, Excel is generally smart enough to recognise a number in text when you want to calculate with it. After some entered amounts gave Excel pause in columns J and O, I popped in a VALUE function to give it a nudge. It was probably because of this that I had to throw in two or three INT functions here and there when Excel occasionally came back with a result of one and a half for the number of one denomination.

I wouldn't want to swear that this work-sheet works in every instance, but I've tried numerous random entries from £0.99 to £999.99 and the final version shown here always gave correct answers.

Financial analysis

Last month, we looked at the Liquidity Ratios in the financial analysis template for service companies. We now come to the gearing section. It's what they call "leverage" in the US. Both terms communicate the same idea: using someone else's money to finance the company's expansion plans, albeit at a cost.

Panel (b) shows the listing for the three Gearing Ratios. Rows 39 and 44 are blank. Column A gives the definition. Column B gives the formulae. They are the same in columns C through F because we're using the Names created in the July issue *Spreadsheets* column.

Column G holds the average results for the company's industry for any ratio which is commonly collected. As the example we have been using is an advertising agency, and the majority of agencies typically don't carry much Long-Term Debt, here the only average available is for the Debt to Equity ratio: everything the company owes compared with everything the company's stockholders own through the company.
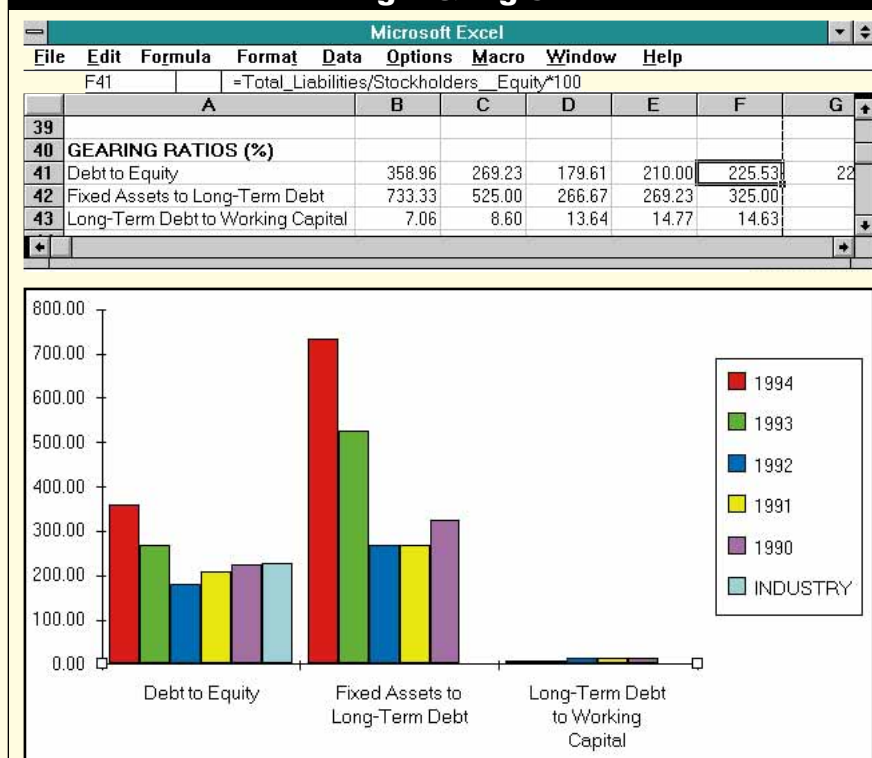
Fig 2 (page 272) shows the results if you use the sample Balance Sheet and Income Statement figures from the July and August issues. As trends are more easily recognised with a chart, we'll make another here.

Of all the ways to make a chart in Excel, here's the easiest in this instance: open the worksheet we've been creating, SERVICE.XLS. Because many people like to print out all the ratios on a page, the labels of the years are on line 34 in the template which you can obtain on disk. To save a bit of work later, simply copy these headings from B34:G34 to B40:G40. They are not shown in *Fig 2* because this is just a working procedure. You can get rid of the headings later by closing the worksheet without saving it.

Now select the range, A40:G43. Select, Edit, Copy. Then select, File, New, Chart; and then Edit, Paste Special. In the dialogue box choose Values in Columns.

Fig 2 & Fig 3

		A	B	C	D	E	F	G
	F41		=Total_Liabilities/Stockholders__Equity*100					
39								
40		GEARING RATIOS (%)						
41		Debt to Equity	358.96	269.23	179.61	210.00	225.53	22
42		Fixed Assets to Long-Term Debt	733.33	525.00	266.67	269.23	325.00	
43		Long-Term Debt to Working Capital	7.06	8.60	13.64	14.77	14.63	

Fig 2 (top) *Example results for the Gearing Ratios portion of the financial analysis template for service companies*

Fig 3 *A chart of the results shown in Fig 2*

Accept the default selections of Series Names in First Row, and Categories in First Column.

Select, Chart, Add Legend. Select Chart, Attach Text and choose Chart Title. In the Formula bar, enter an equals sign and select Window, SERVICE.XLS, cell A40. Delete the word "Title" on the end of the line.

As the x-axis legends are extra long, their last lines may not appear on the bottom of your screen. Simply choose Format, Text, Horizontal Orientation and they'll sort themselves out. You should now have the chart shown in *Fig 3*.

Advertising agencies typically carry huge Accounts Payable because on the books they can have multi-million pound media bills to pay for their clients. It all balances out because their Accounts Receivable are higher still, but it tends to inflate their perceived debt. However, it is not Long-Term Debt (i.e. more than a year). That's why on the chart, the Debt to Equity ratio peaks at over 350%, and although the Fixed Assets to Long-Term Debt rises to more than 700%, the Long-Term Debt to Working Capital is way down there between 7% and 15%.

The latter ratio is included on the template, though, because in other service businesses it can be quite significant, particularly if they own real estate.

Gearing ratios measure the use of debt by a company. The lower the Debt to Equity ratio, the more the company may be reducing its debt and increasing its ability to repay.

If this ratio increases from year to year, reflecting a higher percentage increase in Net Worth, then the annual interest charges will add to the overhead — even if bank loan interest rates don't rise. Management can find itself spending more time with bankers than clients.

But a low ratio can indicate that management is too conservative and not capitalising on the potential of the business.

To summarise: The ratio compares the investment in the company by all creditors and the amount invested by the shareholders. It is an indicator of whether the company is carrying too much or, in the case of too conservative a management, too little debt. Ideally, the ratio will not change much from year to year and be comparable with the company's industry. In the example, shown in *Figs 2 and 3*, the company dropped below the industry average for three years but then in '93 and '94 started climbing. That the ratio not only exceeded the industry average but also climbed for two years may not necessarily mean trouble, but it's important for management to find out why it happened.

If the Fixed Assets to Long-Term Debt

ratio is high or rising from year to year, it indicates a shrinking dependence on Long-Term Debt to finance major investments in items like buildings or perhaps information technology hardware. It also indicates that less of the company's capital is used for plant and equipment and more is available for current use.

A low or decreasing ratio indicates some loss of protection to long-term creditors. And it shows that more of the company's capital is used for plant and equipment and less is available for working capital.

To summarise: This is a useful indicator when deciding whether to invest in new plant and equipment. Fixed assets which may appear to be a good investment are no bargain if they tie up working capital. However, a very high ratio may suggest an under-investment in plant and equipment. In the example, the position has been more stable than the chart would suggest. But because the relatively small Long-Term Debt of the company halved over the five years while the investment in Plant and Equipment rose 13%, the ratio rocketed from 325% to 733%. Nothing there to get the wind up about.

If the Long-Term Debt to Working Capital ratio is more than 100%, the company can find that much of its capital is locked up in relatively fixed assets, and management will need to borrow even further in order to operate. A low or declining ratio is usually the better position.

To summarise: This is a ratio which may not be recorded in many industries, one reason being that the ratio is so closely related to the Fixed Assets to Net Worth Ratio. This latter is among the Activity Ratios which we'll come to in a later column. When the Fixed Assets to Net Worth ratio is exactly 100%, the Long-Term Debt to Working Capital ratio will also be 100%. However, this third Leverage Ratio is included in the template because it is a useful measurement of the amount of Long-Term Debt that a company can comfortably handle.

Next month: Activity Ratios.
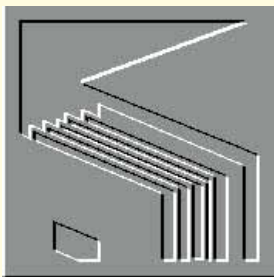
Join the **gang**

Mark Whitehorn finds another variant of the gang-screen, struggles with Access, and covers more of Ted Codd's rules for running a tight database.

Is there no end to the gang-screen wars? Having reported last month how to find the gang-screen in Paradox for Windows, and some time ago the gang-screen in dBase 5 for Windows, I came across a sub-variant of the dBase one. If you open up the Help-About dBase 5.0 for Windows screen, and press ALT-28 (hold down the left-hand ALT key, and then press the 2 and 8 keys, above the normal keyboard), the number 28 strolls across the screen. This was apparently inserted into the code by a former Borland employee called Kevin Brown as a tribute to racing driver Davey Allison, who died in 1993. Presumably Allison drove car 28?

No Access for groups

Having installed Access 2.0 as a net-worked version a couple of weeks ago, I was able to run Access from a variety of different workstations, create tables and run Wizards, and foolishly assumed all was well. I discovered I was wrong when trying to teach Access to a class of ten people. I demonstrated the table Wizard and invited the participants to have a go. Only one managed to run the Wizard, while the others received the error message: *"Another user or instance of Microsoft Access is currently using the Table Wizard or the Field Builder."*

I found this impossible to contradict; after all, I had just told ten people to use it at the same time. But I also suspected that an attempt by multiple users to use the same software simultaneously shouldn't have come as a major surprise to an application installed for use on a network. I assumed that I had fluffed the installation in some way, perhaps failing to set the correct access rights to the *.MDA files which contain the Wizards. While the participants were enjoying lunch, I went hungry, logged in as Supervisor and gave every user their own copies of the *.MDA files. After altering the [Libraries] section of their MSACC20.INI to point to the new sub-dir, I was able to continue the course.

At the end of the day, I contacted Microsoft. It transpired that I had followed the installation instructions perfectly, but they happened to be wrong. Three of the *.MDA files (WZLIB, WZTABLE and WZBLDR) contain Wizards which modify the library database they reside in and can't run concurrently. The solution Microsoft has found for this problem is the same as the one I used; namely to give each user their own copy of these files and alter their MSACC20.INI to point accordingly. You can even get a document (REF Q121662) from Microsoft which details the changes.

Now, I accept that software is likely to have bugs, but going by the date on the documentation of the bug fix, Microsoft has known about this bug since 13th October 1994 at the latest, and has neither fixed it nor amended the documentation. Instead, all over the world, individual network supervisors are expected to install the software incorrectly (as per instructions) and then suffer an intermittent fault as different users on different parts of the network occasionally clash in their attempts to use the same

Wizard simultaneously. I was lucky: the fault was obvious to me because I was teaching a class who were working in sync, but this is the sort of problem that could plague you for months.

How many person-hours have been spent attempting to sort this problem, for which a fix (albeit an untidy one) has been known for nearly a year? How many Microsoft-hours would it have taken to fix the problem, the install routine, or to slip a note into the manuals? Does Microsoft actually care one way or the other?

Microsoft's answer to my complaint is as follows: firstly, very few people actually install the software on a network, so it isn't a major problem. Secondly, two of the .MDA files have been fixed and are up on CompuServe (LIB 15 - Wiznet.EXE) so people can download them.

The first seems an odd response from a company which professes so much interest in networking. The second is really no answer because everyone still has to discover the problem first (which is where the time is wasted), and since WZTABLE.MDA hasn't been fixed, you still have to mess around with sub-directories, .INI files and the like.

Input masks

I used to like input masks, but now I'm not so sure. Having thrashed the phone number version to death two months ago, I thought I was safe, but no. As David Probett has pointed out, the input mask for Access which I suggested (>LL0a\ 0LL) is unsuitable for postcodes like B1 2BC. Arghhhh! In this electronic age, why don't the committees which design entities like postcodes ever think about databases? David kindly suggested (>LA9a\0LL;0_) which will allow all of the correct forms, but allows mutants like D23 4HN as well.

This isn't David's fault; the problem is the variability of the codes themselves. I still think the only real cure is to use Access Basic.

Fig 1 *Paradox treats nulls as equal during a join, not something I would like to explain to the relatives (or next of kin) of some of these patients*

Fig 2 *Access treats nulls with the respect they deserve, and doesn't treat them as equal in a join*

Does anyone out there have any code they would like to share?

Codding about

Following on from last month's list, here are some more suggested rules for modern, PC-based RDBMSs:

3. 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.

The main point here is that a null value means: "We don't know the value which should be inserted here." A null is not the same as a zero or space character. Since the value in the primary key field is used to provide a unique identifier for the record, we have to be sure what value it has, so null values are highly inappropriate in a primary key field.

4. Every piece of information in a table must be accessible by using a combination of the table name, field name and primary key value.

This excellent rule is essentially Codd's Guaranteed Access Rule (see *PCW* May '95).

5. Null values must not be treated as equal in joins.

Some RDBMSs, like Paradox, treat nulls as if they were equal in joins, which, as Mr. Spock would have said, is illogical.

Values which are known can be said to match; so 2 equals 2 and 3 equals 3. However, an unknown value cannot be said with any certainty to match another unknown; so one null value cannot be said to equal another null value.

What happens if they are allowed to "match"? Have a look at *Figs 1* and *2*, showing the results of a query on two joined tables in Paradox and Access. We are matching blood in a blood bank, to patients. Some of the blood in the bank has yet to be typed, and some of the

patients are new, so we haven't yet discovered their blood types. In other words, some of the information is unknown, so quite correctly it is represented in the tables with null values. Given this example, do you think nulls should be treated as matching? If so, you get the job of explaining to the relatives of patient 5 why he was given un-typed blood.

6. Joins on non-identical field types must not be allowed.

Lotus' (sorry, IBM's) Approach breaks this particular rule and serves as an excellent example of what happens.

I was told by a Lotus person that it is a "feature" which makes life easier for the users. You see, some users are unable to distinguish between text and numeric fields because they can put numbers into both types. Thus a user may have a text field in one table and a numeric field in another, both of which contain numbers. When they try to join these fields, they become disgruntled because the RDBMS refuses to sanction the join. The solution, according to Lotus, is simple: remove the restriction and allow the RDBMS to join them.

However, let's have a look at why the restriction needs to be in place. The two tables in *Fig 3* are clearly meant to be joined by their respective ID fields, but one is a text field, the other is numeric. The problems which arise if the RDBMS allows you to join them is clear from *Fig 4*. Approach is unable to distinguish between the person with the ID of 3 and the person with an ID of 3A. The result is that both of them end up responsible for the orders attributable to person 3. This will delight Sarah Jones and infuriate Jerry Ferish.

7. 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.

If an RDBMS imports data, we cannot expect it to be responsible for the prior integrity of that data. However, as soon
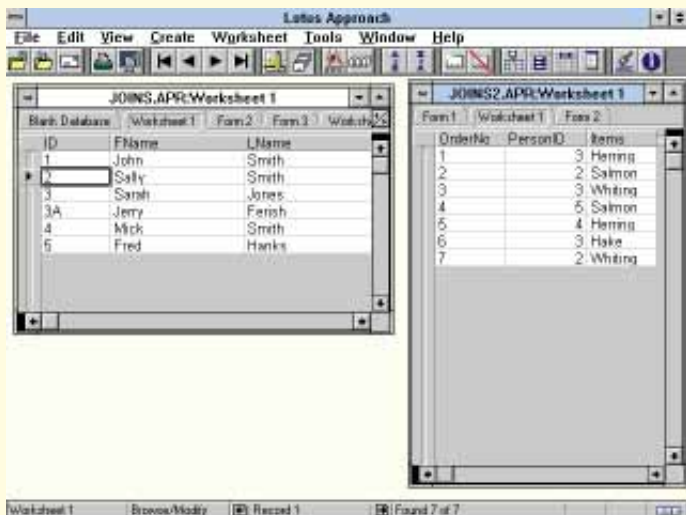
Fig 3 Here are two tables in Approach which have been joined by the Identity Field (ID in JOINS.APR and PersonID in JOINS2.APR). However, ID is a text field while PersonID is a numerical field
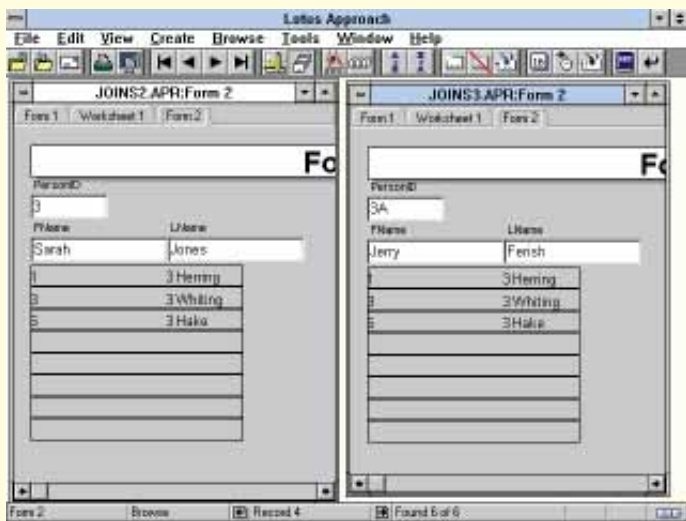
Fig 4 Both Jones and Ferish end up responsible for orders 3 and 6 because Approach seems unable to distinguish between 3 and 3A in a join. I've had to fiddle this screenshot to get both records onto the screen together, but the effect is just as shown
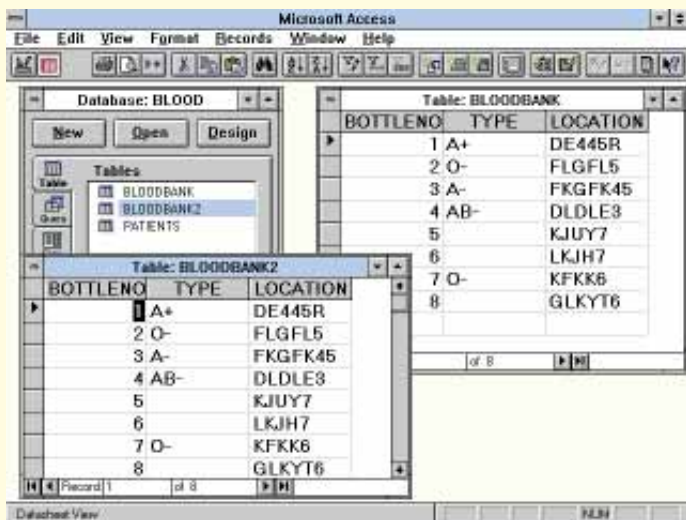
Fig 5 The result of pasting a table, complete with data, in Access. Note that the two tables must have different filenames

as we use that RDBMS to, say, establish referential integrity between a pair of tables, we have every right to expect the RDBMS to check that the existing data conforms. Many RDBMSs make this check, but here again Approach falls short of perfection; it doesn't check.

"Why might this be?" you ask. According to Kevin Harvey, the designer of the product, very few people import existing tables of data. Odd that, especially as we are also told that Approach used the dBase file format just to be compatible with existing datafiles. However, as long as you are sure you will always create data from within Approach, and never import it, you need not worry about this problem.

Tips and tricks

Forms in Access
In Access, I often construct several forms which are similar, but subtly different. For example, I might have two forms: one for entering data and the other for viewing the same data. Both contain the same fields but they have different labels and colours, and the latter would be read only. Clearly it is a waste of time to build both forms from scratch, so from within the database window Access allows you to select a form and treat it just like any other object. Thus you can cut or copy it to the clipboard and then paste it back.

Access is quite smart about this. If you paste a table, for example, it will ask if you want to paste the structure, the structure and data, or append the data to an existing table. The same trick can be performed with Queries, Forms and Reports. With some imagination, this trick can be used for more than just copying objects. For example, suppose that you have a relatively complex query which works well, but needs improvement. If you take a copy before you start the improvement process, should anything go wrong and you end up destroying the original rather than improving it, you have an instant backup. This is a really useful technique.

Paradox for DOS
"I have a MASTER table of Users like this:

```
User ID        A1
Address        12 The Cottages
etc…
User ID is the key field.
```

Periodically, an ASCII delimited text file is created which includes all the users. I import this into a TEMP table and then I need to add only the new users (i.e. those for whom the User ID is not in the MASTER table) into the MASTER table. What I have been doing is performing a delete query to remove those that *are* in the first table and then inserting those that remain. Is there a way to perform this sort of query in one step? I have tried various combinations of sets, NOT and NO with no luck."
You just need to perform an ADD of the TEMP table to the MASTER table. All the "key violations" should drop out into a KEYVIOL table which you can then ditch.

The steps are: TOOLS{More}{Add} *type in* "TEMP" <Enter> *type in* "MASTER" <Enter> SELECT {New Entries}.

PCW Contacts

Join up the **dots**…

…to reveal good, budget drawing packages. Gordon Laing fills in the detail on paint packages that are easy to work with, remarks on bitmap tracing applications, and uses an unusual cordless tablet pen.

Whenever I write a group test of software or hardware, I always try to provide lots of boxes on related technologies or concepts. Judging by the amount of feedback we get at the *PCW* office, it would seem that these information boxes are sometimes more popular than the actual buyers' guide feature within which they have been included. Two topics which always seem to generate interest are: "pens and graphics tablets" in the paint and photo-retouching features; and "bitmap tracing" in the scanner group tests. This month, I'm going to examine both subjects in more detail.

Before going any further, it's all very well extolling the virtues of high-end drawing packages such as Macromedia Free-Hand, Adobe Illustrator and, to a certain extent, CorelDraw, but for most users they're far too expensive, sophisticated, and difficult to use. It's easy to forget that these apps are supposed to allow you to draw on a computer, and should therefore feel as natural as drawing with a pen.

Get smart

As far as painting packages are concerned there are some brilliant low-end products, but good budget drawing apps are much thinner on the ground. There's Serif's DrawPlus 2 reviewed in our Sep-

tember issue's *First Impressions*, but the most impressive I have seen recently is SmartSketch, by FutureWave Software (available from CGS ComputerBild for a giveaway price of £49.99 on Mac or Windows).

The really nice thing about paint packages is that they're dead easy to work with: just wave the mouse around with a suitably sized brush and you get your desired shape. The problem is that they are bitmaps of fixed resolution, which either means huge file sizes to counteract the blockiness, or poor enlargements and prints.

The answer is drawing packages which describe shapes with device, and hence resolution independent vectors… but hang on, that's a bit of a mouthful. The idea is that instead of painting a line of jerky dots, a drawing package says: "Join two dots here and here, with a line this thick." This message is then interpreted and displayed or printed as best the device can, whether it be a low resolution screen, mid-resolution laser, or high resolution image setter.

The beauty of this is that the same vector file is used for all devices: its suitability ranges from low to extremely high resolution. Better still, vector files are usually quite compact thanks to their basic geometric descriptions. If this were a bitmapped file from a paint or photo retouching application, a high resolution version would be huge due to the greater number of pixels required to describe finer detail.

But the reason we don't use vector drawing applications all the time is twofold: firstly, they don't handle continuous tone photographic images very well, and secondly, they're not that easy to use.

A vector shape is made up of at least one bezier curve, passing through or between at least two points. The shape is defined by the nature of the points and the direction of the curve as it passes though them. In simpler terms, if you want to modify the shape, you must manually adjust each point, forcing the line which passes through it to twist and turn until it's just right.

These are known as path operations and were covered in much greater detail in an earlier *Graphics & DTP* column (*PCW*
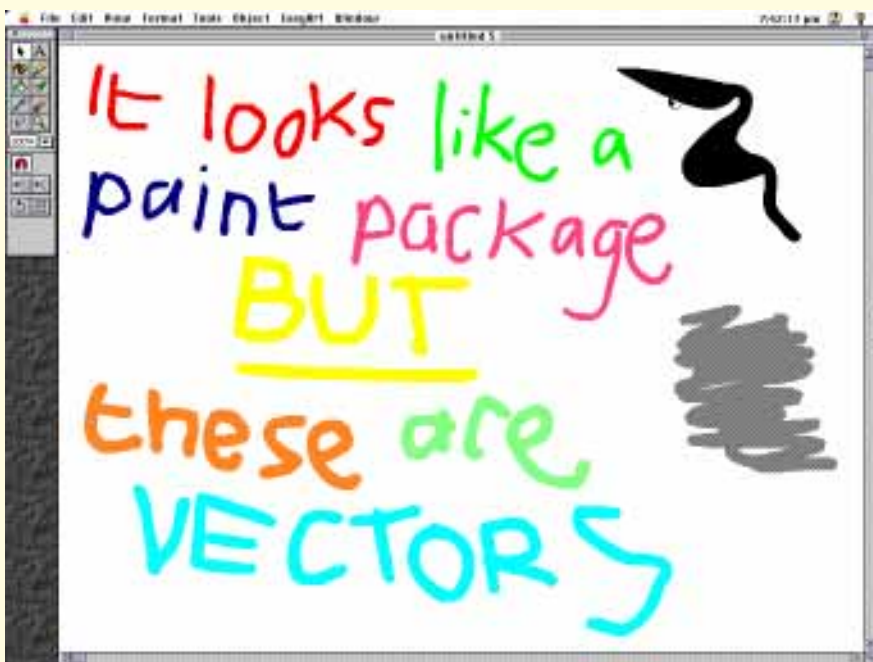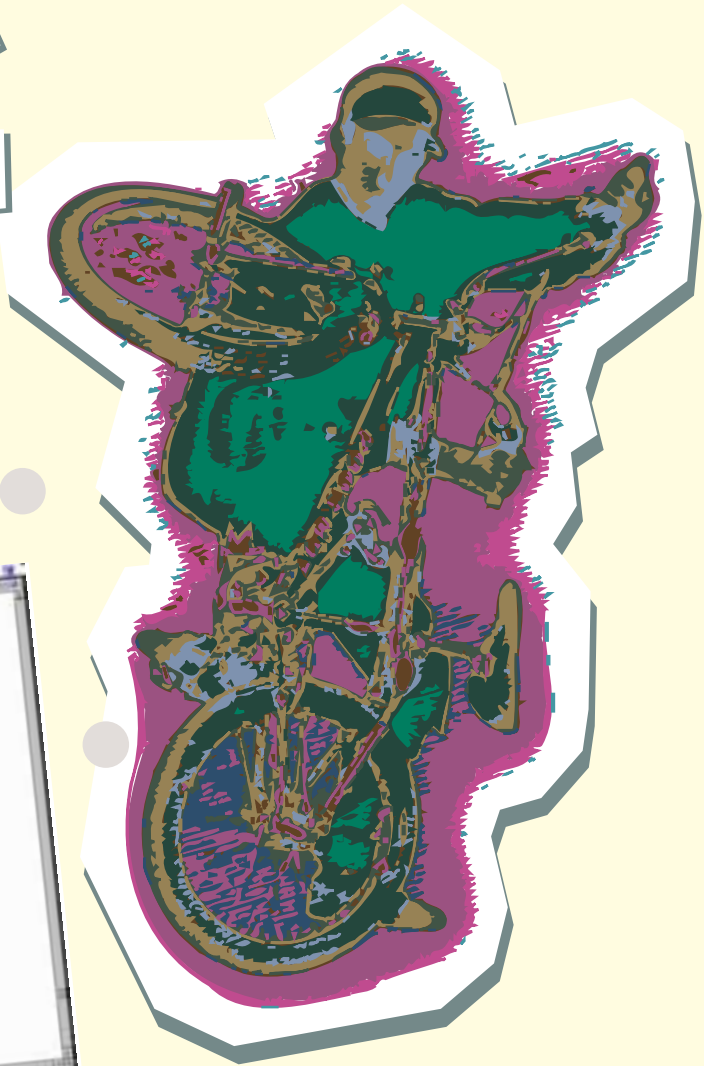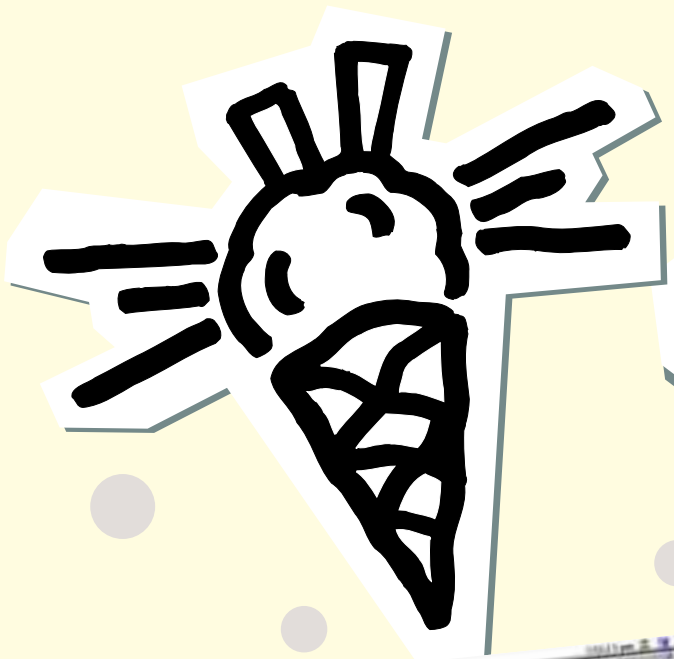
Tracing photographic images often produces interesting posterised effects

Below Fig 1 *Adobe Streamline importing a bitmapped TIF and tracing the outline*
Above Fig 2 *The traced image in EPS format opened in Macromedia Freehand*
Top Fig 3 *The traced EPS placed directly in Quark Xpress — look, no snaggies!*

April '95). Suffice it to say that you can't casually doodle in a drawing application in the same way as a paint package.

Until, now that is. I recently met up with the Wacom people, who demonstrated their latest pens and graphics tablets with numerous software packages, including the aforementioned SmartSketch.

What really appeals to me is how easy it is to sketch and doodle away in SmartSketch, just as you would with a paint package. The important difference is that, as with any other vector drawing application, you can stretch and reshape the images .

The really clever part is that you don't have to select suitable points in the path, then drag and modify the handles to create the desired effect. Instead, with SmartSketch, you grab anywhere you want on the path and drag away.

There's an eraser tool as well, pretty much unheard of in most drawing apps, which works in exactly the same way as in a paint package. Just rub away, and SmartSketch will rejoin the broken paths automatically.

Finally, I must mention the optional shape recognition facilities which, as their name implies, recognise your quick sketches as common shapes and corrects them. Draw a rough circle, polygon or line and SmartSketch will neaten it up for you.

We'll be doing a full review of SmartSketch in the near future, but I felt I had to let you know in advance about the usability of this package, which is remarkably simple and intuitive.

Putting pen to tablet

Returning to the subject of Wacom, the launch I mentioned earlier was concerned with some neat new pen and tablet products. If you thought that pressure sensitivity was the be-all and end-all of tablets, think again. Wacom has come up with the UltraPoint Eraser, a cordless tablet pen which actually has a rubber on the non-pointy end — an electronic rubber, that is. It looks like a pencil with an eraser on the end, which seems a little silly, but is in fact really rather good.

Whereas previous models carried electronics only in the tip of the pen, Wacom has fitted electronics into both ends of this new pen. When it is turned upside down, suitably equipped software notices the change in ends and reacts accordingly. Conventionally, you would have it select the erasing tool, but there's no reason why it couldn't be assigned to anything else, very much like pressure sensitivity. I had been sceptical, until I saw it demonstrated in Adobe Photoshop 3 (version 3.04), Fractal Design's Painter 3, SmartSketch, and even Microsoft Word and Excel, where it was used to delete unwanted words or cell contents.

It really is intuitive to use, and works well. This UltraPoint Eraser should be the standard pen with all Wacom tablets by the time you read this, including the new 4in x 5in ArtPad II.

Another clever idea of Wacom's is to fit an ink or leaded pencil nib onto some of its pens: this way, you place a sheet of paper over the tablet's surface and draw naturally, leaving a mark behind just as you

would when using a pen or pencil. Very cunning. Take a look at this month's Gadgets spread (on page xxx) where, amongst other goodies, are three new Wacom pens: the ink nib, pencil nib and eraser models.

Tracery

If imitation (or copying) is the sincerest form of flattery, then I would say that bitmap tracing applications are some of the nicest around. Every time I mention tracing, in the information boxes I include with scanner group test features, I get loads of enquiries. So here's something to satisfy those whetted appetites.

As I have mentioned, vector descriptions have several advantages over bitmaps, like scalability, device independence and small file sizes. However, bitmaps are the raw output of scanners and that's what is used to digitise original artwork.

By original artwork, I'm referring to paper-based illustrations such as signatures and company logos. If you want to use these in electronic documents like DTP pages, you'll need to scan them at a sufficiently high resolution. Although this will work, sometimes the file size becomes too large, or you may want to modify the shape without losing quality. Simply, you want to convert it into vector-based form.

The process of converting a bitmap to a vector is known as tracing, and is performed by a variety of applications with this facility built-in (such as Macromedia FreeHand). Under Windows there's the CorelTrace module of CorelDraw, which has now been present for several versions, the most sophisticated of which is StreamLine 3 by Adobe (sadly, for the Macintosh only).

They all do the same thing to varying degrees of complexity. At a basic level, the bitmap is usually opened in TIFF format. Then the application traces the outline, ignoring the very small steps inherent in bitmaps. By the end of the process, a vector outline of the original shape remains.

All tracers offer options to vary the accuracy of the outlining process, and a fair amount of trial and error may be required before the desired effect is achieved. In most cases, it should be as accurate as possible but not to the extent that every step of the bitmap is recorded. Whereas in other circumstances, a rather pleasing effect may be produced with a loose outline.

The more sophisticated tracers are able to detect a user-defined number of colours, resulting in a posterised effect. Continuous tone colour photographic images do not trace well most of the time, but very interesting results can be discovered with a little experimentation.

The best results are achieved with simple bitmaps such as basic logos or signatures, preferably in few colours (or only one). *PCW* needed to trace a hand-drawn logo. The original bitmap was subsequently traced in StreamLine *(Fig 1)*. The vector shape is shown in FreeHand *(Fig 2)* as a screenshot, and finally the EPS itself *(Fig 3)* which, barring disasters, should be nice and smooth. Notice how StreamLine has spotted the gaps and created white vector shapes to represent the holes.

Just my type

Probably the last of the new *PCW* fonts is Bell Gothic, seen above in Roman face. This is a classic face, ideal for a style that will be respected. It was designed by CH Griffith in 1938 and is on the BitStream books. Contact the usual suppliers.


Font of the Month

Bell Gothic

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abçdéfghijklmnöpqrstuvwxyzß&1234567890

PCW Contacts

Please do let me know if you have any comments — write to the usual *PCW* address, or those suitably equipped can email me as
gordon_laing@pcw.ccmail. compuserve.com

Faces **01276 38888**
FontWorks **0171 490 5390**
CGS Computer Bild **0181 679 7307**
Adobe **0181 606 4000**
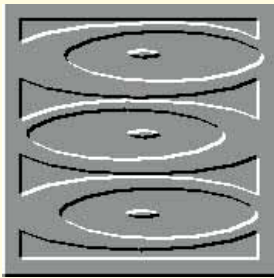
Time to plump for **Pentium**

WIth more manufacturers developing products specifically for use with Pentium processors, Panicos Georghiades and Gabriel Jacobs reckon it could finally be time for multimedia fans to invest in an Intel. There's also a new CD-ROM for Macromedia Director, and more on MPC standards.

Although high-end 486-based PCs can run multimedia quite acceptably if fitted with 8Mb RAM or more, it seems that if you want a multimedia playback PC with a future, you should seriously consider a Pentium processor.

This may sound like the kind of sales hype you normally have to be wary of. After all, there's always something faster than what you've got, either here and now or just round the corner. It's obviously in the interest of manufacturers to try to convince us that we can't expect good results for multimedia without the extra speed of the Pentium chip — the higher we set our sights, the more money we spend.

But you may have to consider a Pentium for reasons which go beyond its raw processing speed. Over the last year, despite Pentium's bad press over floating point calculations, a number of multimedia-related manufacturers and developers have been introducing products which specifically make use of Pentium features to achieve improved performance.

For instance, one of the leading multimedia companies, Macromedia, has recently released a minor upgrade to Director 4.0 for Windows. This new version (4.0.4) is optimised for the fast performance and graphics capabilities of the Pentium. On a Pentium, the new version can display twice as many frames per second as the older version. Other improvements include DIB support, embedded QuickTime compressed PICT files, and mixing sounds that use different resolutions and sampling rates. The upgrade is

Test your PC's performance with the MPC Wizard. Individual components and complete systems can be checked

available at £25 to all registered users from Macromedia (01344 76111).

Having other firms make use of the Pentium's native operations is what Intel is aiming for, as is evident from the number of tools it provides free to developers. At the end of April this year it unveiled version 2.0 of its 3DR technology, first

released a year earlier but now optimised for the Pentium. Version 2.0 offers features not available in current 3D-graphics Windows software, and will help multimedia, virtual reality, CAD and games applications by providing better image quality and transparent scalability. Software libraries include a general lighting model, matrix operations and camera model, texture processing and user interface kits, a comprehensive geometric mathematical library, and support for Visual Basic.

Another Intel technology, NSP (Native Signal Processing), developed in conjunction with other manufacturers, enables realtime multimedia tasks such as audio signal processing or video file capture and compression to be done on the Pentium. A second developers' kit, Native Audio, was released last May as part of NSP. This enables functions which otherwise require specialised dedicated co-processor hardware, such as WaveTable MIDI synthesis, 3D audio and special effects, to be delivered using software only and the Pentium. Some of the most important benefits of this will be digital mixing of multiple audio tracks, simultaneous record and playback, and advanced compression algorithms including MPEG sound.

Intel isn't the only company providing software-only solutions with the Pentium. Xing Technologies, pioneers in MPEG compression/decompression software, have recently been working in conjunction with several graphics card manufacturers

Media Book CD

If you're developing multimedia using Macromedia Director (Mac or PC), you'll be interested to know of a new CD-ROM containing information and development tools provided by professional dedicated users.

There are over 100 royalty-free XObjects, as well as re-usable Lingo code. With this, not only can you save development time but you can also learn more about Director's not-so-friendly Lingo programming language.

The CD contains a Lingo directory with all known and some officially undocumented Lingo keywords including syntax, results, functionality and cross-platform considerations. Each keyword is accompanied by interactive examples, illustrations, and some by QuickTime movies.

The Lingo library contains contains more than 200 ready-to-use Lingo handlers and functions for string, data and file manipulation that you can copy and use in your applications. A general reference library contains 100 articles on topics such as using the FileIO XObject and optimising load times when reading from a CD-ROM.

There's also a collection of Mac and Windows XObjects, including some for printing, file management, memory management, and system analysis. Most of these are royalty-free.

On top of all that there's the Toolbox, a suite of development aids including score, cast, sprite and movie-in-a-window management tools, and Lingo analysis, debugging and formatting tools. Finally there's a resource directory of where you can get even more tools and further information.

The CD-ROM is rather slow, but we were very impressed with many of the techniques.

Media Book CD is manufactured by Grey Matter Designs and sold by Computers Unlimited (0181 200 8282).

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to deliver software-only MPEG video playback on Pentium machines.

XingMPEG Player is bundled with a graphics card from Miro: the MiroVideo 12 PD. This ordinary S-VGA card for PCI and VLBus slots costs only £99 and can scale AVI files to full screen. But if you have a Pentium 90 or higher you can also playback full-screen MPEG video. At £99 it's over £100 cheaper than the cheapest dedicated MPEG playback card on the market.

On the other hand, £100 is nowadays more or less the difference between a 486 and a Pentium. So you may find that by paying the extra and investing in a Pentium instead, you'll save money on dedicated multimedia peripherals such as video playback cards and audio cards with DSP.

And, of course, you get all the other speed advantages of that faster processor we're told we can't be without.

Testing for performance

Last month we described the specifications of the MPC standards. But manufacturers' quoted specifications can be presented in ways that suit them rather than us, and can often be found inadequate in real-life situations.

Therefore, whether you're a professional multimedia developer, or just your common or garden user, you really need ways of testing individual multimedia component peripherals as well as complete systems. It could be for the purpose of buying a system, or developing an application, or simply because you need to change a configuration in order to maximise performance when running a particular application. For example, you may want to alter the screen resolution and colour-depth so that a particular multimedia application's video clips run better.

To find out how a system will behave you have to carry out the right kind of tests. If you dabble in programming, you could devise your own tests, but it usually takes far less time to use existing ones.

There's a plethora of benchtest programs around, some of them bundled with various pieces of hardware such as SCSI adaptors, co-processor chips and graphics cards. But most of these tests are inadequate for testing multimedia, since in their efforts to be accurate and independent, they tend to test in the kind of ideal conditions few of us meet in the real world.

There are, however, a few programs specifically written to test multimedia machines or functions. One we use often, and which has proved accurate and reliable, is MPC Wizard. Unlike most other Wizards it doesn't come from Microsoft, but from Softkey, and it tells you all manner of revealing little things.

Using it is simple. You run it, and it informs you how well your computer performs several multimedia-related tasks. The tests are divided into four sections: CD-ROM Drive, Graphics, Sound, and Video.

Many of you will no doubt remember those test programs you could buy a few years back which told you how well your

PC was doing compared to an IBM AT. You got an overall figure which made you feel good because it was rather hard for any PC clone not to outperform the IBM AT.

Well, you're unlikely to get the same feeling automatically with the Wizard tests, since it shows you not how your machine stacks up against the competition, but against several of the MPC Council's requirements and recommendations.

For example, the CD-ROM tests check out the MSCDEX version you're using, the access time of the drive, and its real (as opposed to its theoretical) transfer rates on your system. It may come as a surprise to some readers that this latter figure will depend on how much of the CPU (Central Processing Unit — the main chip) is used during the transfer process. CPU time is critical in assessing performance of multimedia elements, as we shall see.

The written specification of your double-speed CD-ROM drive will be around 300Kb/sec, but you'll find that if your PC devotes all its processing power to read from the drive, this value will be higher, whereas if it devotes a low percentage of CPU time to the operation, the transfer rate will fall well below the theoretical value. In fact, if your processor is too busy doing other things, the transfer rate from your double-speed CD-ROM drive can fall below single-speed values.

This kind of thing is important. The MPC Level 1 minimum specification for CD-ROM transfer rates is 150Kb/sec for a sustained period of time, during which it should command about 40 percent of your CPU's time. If the rate drops significantly below 150Kb/sec, the result will be that video, animation and sound will break up if they're played directly from the CD. Poor lip synchronisation in video clips of talking heads is a typical example of too low a transfer rate, though there may be other causes.

MPC Level 2 specs require the CD-ROM drive be able to read data at a sustained rate of 300Kb/sec at a recommended CPU usage time of 60 percent maximum, so that the CPU can get on with other things and give an impression of real multitasking. MPC Wizard tests transfer rates at 40, 60 and 100 percent of CPU usage.

Another set of tests that may reveal interesting results is for the graphics adaptor. You might well imagine that if you bought a machine with a 32-bit SVGA local bus graphics adaptor, it would satisfy MPC requirements. Well, maybe yes,
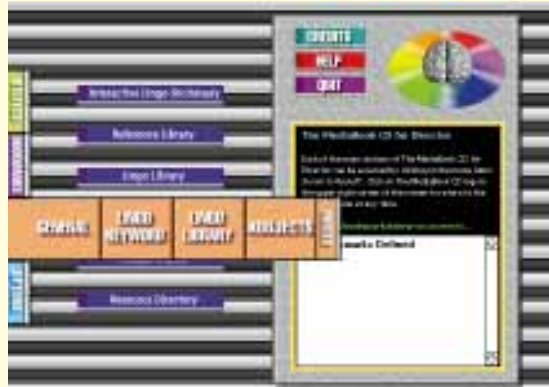
Media Book provides over 100 royalty-free XObjects and re-usable Lingo code. A must for the budding Macromedia Director developer

maybe no. It depends on the resolution and colour depth you're using — and again, on how much of your CPU's power is devoted to graphics.

In addition, even though your system may be capable of displaying more than 16 colours, the Windows display driver software you're using may not be taking advantage of this capability.

MPC Wizard tests the colour depth and resolution that your currently installed driver is capable of, and also carries out bitmap display speed tests.

Now back to those talking heads, since the problem of synchronised audio and motion video is obviously also related to graphics capabilities, and in particular the pixel-write speed of the adaptor.

This is something which is often virtually ignored, with spatial resolution (the number of pixels displayed) and colour resolution (the number of bits per pixel) taking pride of place. In fact, pixel-write speed can be just as important as the other two parameters, since if the pixels can't be drawn rapidly enough, even the fastest transfer rate from a CD-ROM won't be of much use.

MPC Level 1 specifications recommend that the graphics adaptor should be

able to draw 1-, 4-, and 8-bit-per-pixel DIBs (Device Independent Bitmaps) on the screen, at a rate of at least 358,400 pixels per second while using 100 percent of the CPU time, and 143,360 pixels per second at 40 percent of CPU time.

Most graphics subsystems can handle that kind of speed, but MPC Level 2 specifications are far harder to meet. Here, we're talking of a minimum of about 1.2 million pixels per second using 40 percent of the CPU time, which is the kind of value necessary to ensure that video at 15 frames/sec in 256 colours and 320 x 240 resolution plays back as it should (the calculation is 15 x 320 x 240 = 1,152,000).

The Wizard test loads 18 1-bit, 4-bit or 8-bit images into memory, then measures how fast it can draw those images at either 40 or 100 percent of the CPU time.

The program also carries out tests for CD Audio, Wave Audio, MIDI and loudspeakers. In the case of audio, the recommendation is that it shouldn't involve more than 15 percent of CPU time.

The test for Video for Windows, which will be important to many people, counts the actual number of frames displayed for two frame sizes and three compression formats (Video 1, Intel Indeo, and Cinepak). The program will also perform a test on MPEG hardware if you have it fitted.

In addition, MPC Wizard lists all the MPC specifications, and has a selection of drivers for various multimedia peripherals.

We don't suppose many readers will have access to a large range of machines to test them all out and compare them, but it might not be such a bad thing to wander into computer shops with Wizard in your hand, to see if the claims made by manufacturers are real.
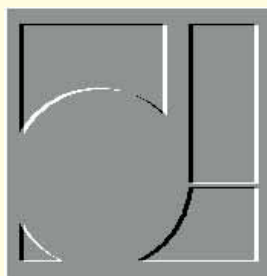
Or maybe not. Salespeople might get quite upset at that, especially if you don't buy anything after tying up their demo machines for hours. Anyway, shops take note: have your own copy of Wizard (at £19), or a similar program, ready running on your best machine.

An absolute GAS

Steven Helstrip grooves with an analogue sequencer, samples a new sound card from Roland and finds a cheap way to upgrade it, and sings the praises of Vienna.

The problem with sequencing is that unless you have plenty of musical ideas, there's very little you can do other than play through the sounds on your synth or sound card. Unlike a word processor, which gives you a template on which to base a document, a sequencer offers no starting points.

To remedy this, Intrinsic Technology has written an application that enables you to create grooves and musical parts simply by sliding a few faders, pressing a few buttons and generally having fun. It's called GAS, or Grooving Analogue Sequencer, and can run alongside a sequencing package such as Cubase .

The main screen is daunting at first, to put it mildly. But once you're familiar with the myriad controls it really

is just like using an analogue sequencer. The idea is to manipulate up to ten software-generated monophonic parts, which can be on as many MIDI channels. Each part can contain up to 16 notes and has its own sliders for pitch and velocity. Because of the random nature of the program, not everything will sound musical, so there's a scale correction utility to ensure each part is at least playing in the same key.

There are quite a few nice features, like the ability to copy the velocity of one part to the

Top *Upgrading to WaveTable now costs as little as £66 with Orchid's WaveBlaster plug-in board*

Right *GAS allows you to create sequences with an analogue touch. You can then import them into your sequencing software, such as Cubase or Cakewalk*

pitch of another. This works well when applied to percussive, or analogue effects, particularly when a filter is applied. There's also MIDI echo built into the software and an auto-chord facility. Grooves can be saved in standard MIDI file format, allowing them to be loaded straight into a sequencer. The package comes with a video tutorial and costs £76.

Play your cards
There have been plenty of sound card releases recently. The most interesting is from Roland, which has announced a PCMCIA card. Based on Roland's tried-and-tested Sound Canvas technology, the SCP-55 has 354 multi-sampled instruments and ten drum kits along with DSP-based reverb and chorus effects. Those familiar with the SCC-1 can expect a similar range of high-quality, General MIDI-compatible sounds in addition to two mono, or one stereo, channel for sampling audio up to 44.1kHz 16-bit. The card is expected to cost around £320. An optional MIDI interface is available.

Making waves
A cheap and easy way to improve your sound card is to add a WaveTable upgrade to your existing card. Easy to install, this sits on top of your sound card and connects via a standard plug.

Orchid has recently reduced the price of all its upgrade boards and you can now have WaveTable quality for as little as £66. The WaveBooster 2 has 2Mb of samples on board, providing 263 General MIDI-compatible instruments. Even better value is the 4Mb version for £90, which has 514 instruments and effects including reverb, chorus and digital delay. Both are supplied with Cubase-Lite.

Held in AWE
If you have an AWE-32 sound card, chances are you also have Vienna, which is used to create banks of samples. If Vienna wasn't supplied with your card, then it's well worth getting hold of a copy from Creative Labs. It allows you to take any mono 44.1kHz wave file and create an sbk file, or new instrument, that can be played over MIDI, usually from a sequencer. With 512Kb of on-board sampling RAM, up to six seconds of audio can be downloaded to the card — that could be a new piano sound, a selection of percussive instruments, vocal samples or even a combination of these.

The software enables you to create multiple keygroups, which means more than one sound can be assigned to the

keyboard. For example, you can have an acoustic bass over the lower keyboard and a piano covering the rest. Layering of sounds is also possible: you could combine a piano, choir and a string pad, for example. This is quite easy to do and there are plenty of other useful features.

Before loading samples into Vienna it's worth spending some time editing them first in WaveStudio. Make sure they are at their optimum level, or volume, and that they start and finish exactly where you want them to — more audio than you need will only take up memory.

Samples are loaded via the sample manager dialogue box, which can be found in the instrument drop-down menu. Clicking the import button will allow you to select wave files from your hard disk, CD-ROM and the card's ROM chips. *Fig 1* shows seven samples which were loaded from various libraries. There are six percussion samples and one drum loop which will be used to demonstrate how to build a new drum kit. The final sound bank, and the accompanying MIDI file, have been placed on this month's cover CD-ROM.

Once the samples are loaded they have to be given a keygroup. To do this, click the "add sample" button followed by the sample to be grouped. The sample will appear beneath the on-screen keyboard mapped to every key on the keyboard.

In most cases, or at least for non-percussion instruments, following the above will produce an instrument patch. But more often than not, further tweaking is required. When dealing with more than one instrument, for example, keys have to be mapped individually. In *Fig 2*, the 909 kick drum is mapped only to C2, the key
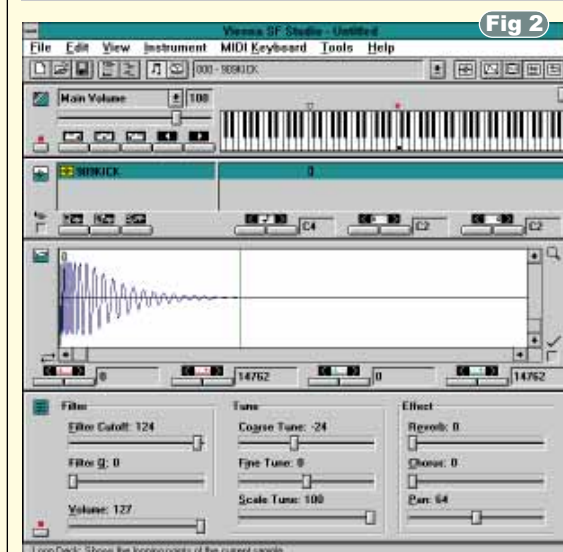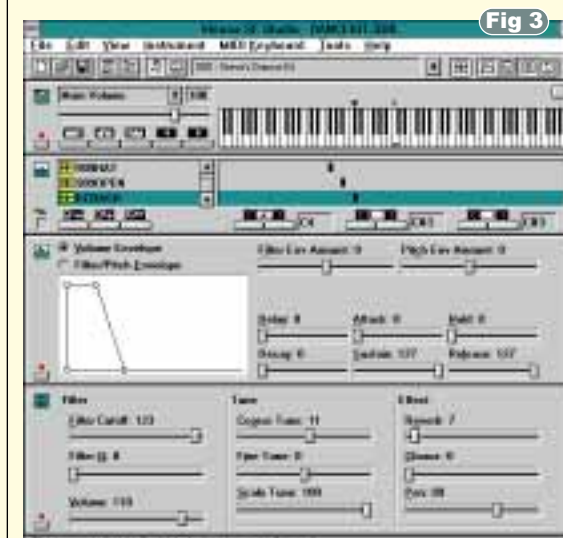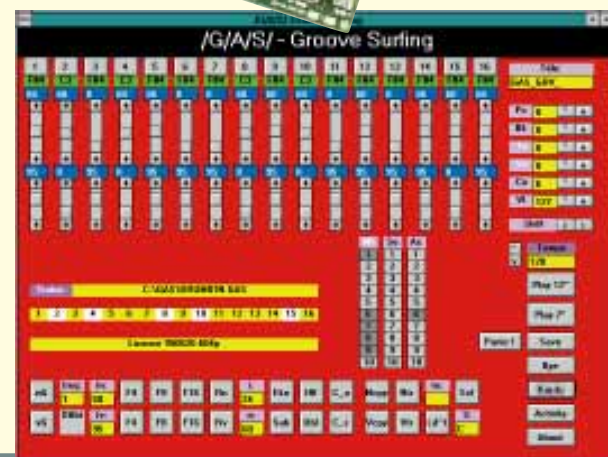
Fig 1 *Vienna's import dialogue enables you to use samples from the card's ROM*
Fig 2 *When assigning a single percussion sample to an area on the keyboard, you may need to transpose the sample by adjusting the coarse tune*
Fig 3 *Give short percussion samples a long release time using the envelope shaper*

D-Zone Loopisms Vol 4 — *Huh-huh, hmm, yeah...*

I wasn't quite sure what to think when I saw Beavis and Butt-head on the front of this CD. In fact, it isn't full of "Huh-huh, yeah" and "These guys *rule*" samples. It does, however, have some pretty cool drum loops and samples taken from the TB303, Juno 106 and Matrix 1000. As in the rest of D-Zone's sampling CDs, you are presented with 24 drum loops, not just one or two bars of each, but around 90 seconds of the same loop over and over. The loops have been recorded both dry and with stereo effects. If you have an Akai s3000, you'll also find the digital backups for each loop.

The loops, like D-Zone's other CDs, vary dramatically in style and tempo — from 116bpm funk patterns to 160bpm jungle rhythms. The quality of the recordings are excellent.

The much sought-after TB303 is captured in true style on this CD — great fat bass sounds, through to acid-style bleeps. More analogue patches, but mainly strings and pads, have been taken from the Juno 106. Unsurprisingly they are just preset patches, but are worth having in your collection. The samples have only been recorded at middle C so cannot be multisampled. For just £12.50, though, you can't grumble. This is probably the best value sampling CD around.

There's one drum loop on this month's cover CD as a .wav file and sound bank for the AWE-32.

Price £12.50
Contact D-Zone 0181 651 2222

used for kick drum in the General MIDI specification. You can specify the limits of the keygroup by dragging the handles beneath the on-screen keyboard. When you want the sample on just one key, the highest and lowest keys must be the same.

Having the right instrument on the right key is only half the battle. You must then change the pitch, or transpose, that keygroup. By default middle C (C4) is set to play the original pitch of the sample. As the kick drum is positioned two octaves below middle C, the "course tune" has to be set to +24 semitones. It should now sound the same as the original sample.

To enable the sample to play right to the end when you press a key on a MIDI keyboard, the release time of that sample needs to be set to 127. This can be found on the envelope section within Vienna. In this example, I have also set the reverb for each instrument to zero, enabling you to use external effects instead of the built-in ones. You can turn the reverb on again either from Vienna or from your sequencer's mixer module.

Once each percussion instrument has been assigned to a key group, transposed and panned (given a position in the stereo field), it can be saved as a sound bank. But first you can add further instruments to the sound bank and assign them to a different program change number. Above

the on-screen keyboard is a drop-down menu that lets you select the active program number. There are 128 to choose from and on program change number two you will find a drum loop which was grouped in exactly the same way as the other instruments. To access more than one program from your sequencer, you need to "talk" to each program on a separate MIDI channel.

On this month's CD-ROM (d:\magazine\hands_snd\) you will find the sound bank along with MIDI files in standard MIDI file format and as a Cubase arrangement. For this to work, you must first load the sound bank into bank one. This is done from the AWE-32 control panel.

PCW *Contacts*

Readers' contributions — hints & tips, suggestions, information — are music to our ears. Send them in to the usual *PCW* address, or to
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Intrinsic Technology 0181 761 0178
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MICRO*MART*
### CLASSIFIED

All in a **day's** work

The OCX is designed as a universal Windows component. Tim Anderson tries it in a calendar application, explores DLLs in Delphi and glances at Visual dBase.

Fancy constructing your own PIM (personal information manager)? Sheridan's new Calendar Widgets makes the job easy. Calendar controls that show a month at a time are two a penny, but Calendar Widgets also offers yearly and daily view controls. The daily view control is what makes PIM construction so easy since it provides an editable grid of appointment slots complete with a time selection bar, and a facility to define overlapping tasks. The monthly and yearly controls can be bound to a table in an Access .MDB. There is also a date combo that drops down a graphical calendar, enabling users to enter dates by point-and-click. It's just the thing for applications like project management, scheduling, or presenting date-related information.

Calendar Widgets is useful, and interesting for the new techniques it demonstrates. Sheridan has hedged its bets by supplying three control types: version 3.0 VBXs for compatibility with VB 3.0 (but not Delphi), 16-bit OCXs for the likes of Access 2.0, and 32-bit OCXs for VB 4.0 or other OCX containers such as Visual FoxPro. Since Calendar Widgets plopped onto my desk before the final version of either FoxPro or VB 4.0, Sheridan has shown a touching faith in the stability of the OCX standard. All was well with our late beta versions.

The main benefit of OLE controls is compatibility. The VBX standard is a way of extending Visual Basic, and to make VBXs work with other environments such as Delphi or Visual C++ requires emulating VB. By contrast, OCXs use OLE 2.0 communication. There is a price to pay for this application-independence. Some aspects of performance may be improved, especially in 32-bit OCXs, but other things will be slower: for example, there is a noticeable pause when inserting a Calendar Widget OCX into Access or FoxPro, and again to display its property page, compared to the snappy performance of the VBX equivalent in VB 3.0. It is like working with embedded OLE objects in documents: you sense that Windows is running very fast under the
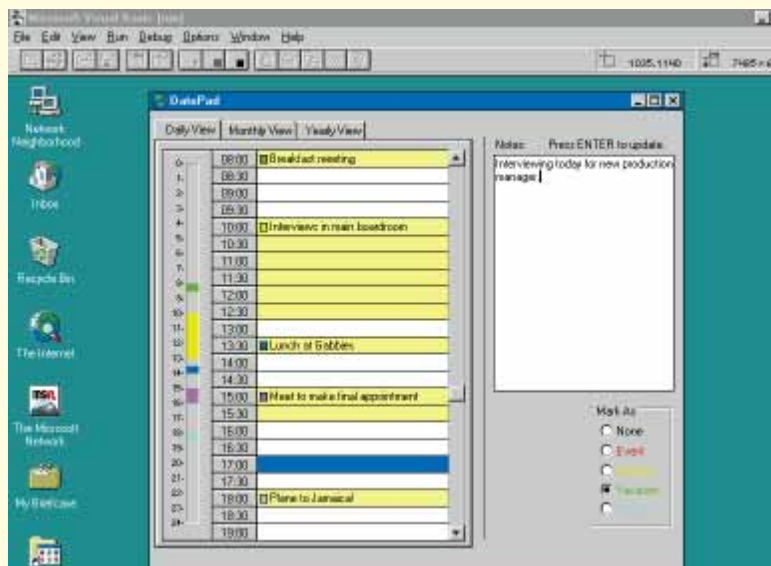
Calendar confusion

It is disheartening when the sample code supplied with a product fails to run. This was the case with Datepad, a simple PIM example in Calendar Widgets. The reason was a problem with international date formats. The code that failed was like this:

```
sMySql = "select * from appoint
    where date = #" & sSelDate & "#"
Data2.RecordSource = sMySql
Data2.Refresh
```

where sSelDate is the date returned from a calendar control, converted to a string. Because my PC is set up for UK dates, the calendar control was correctly returning a date in dd/mm/yy format. But JET's SQL expects a date in mm/dd/yy format, whatever the international setting in Windows. So the application failed with an error: "Syntax error in date in query expression."

VB and Access store dates internally as a double-precision number. You can take advantage of this to overcome the above problem. The following code works on both sides of the Atlantic:

```
Dim dDate as Double
dDate = DateValue(sSelDate)
sMySql = "select * from appoint
    where date = " & str$(dDate)
Data2.RecordSource = sMySql
Data2.Refresh
```

surface to present the illusion of seamless integration. But once the OLE object is up and running, performance should be as good or better than a VBX. Processors are getting quicker, and the concept of universal components has great appeal, so I guess it's worth it.

Another area of doubt is over compatibility. You would have thought that OCX support would be all or nothing, but in fact OCX containers vary in the level of compatibility they offer. For example, Visual FoxPro does not support the ISimpleFrame interface, which means that you cannot embed one control in another. In practice, while all OCX controls should work in FoxPro, and in other OCX container environ-

Build your own PIM with Calendar Widgets. This VB 3.0 application demonstrates the DayView control

Using OCXs in other applications
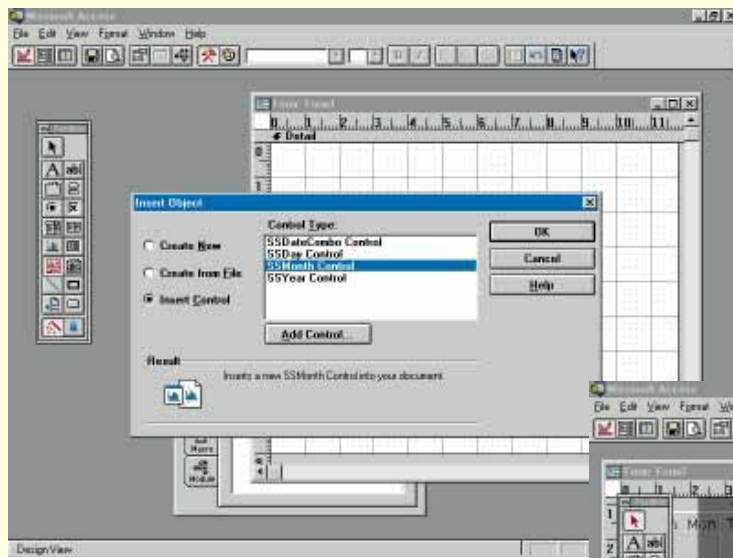
To use an OCX in Access 2.0, first place an Object Frame on a form. From the dialogue which opens, select Insert Control. Then you can choose from all the OCXs registered on the system. Note that Access 2.0 can only use 16-bit OCXs, which are likely to be less common than the 32-bit variety
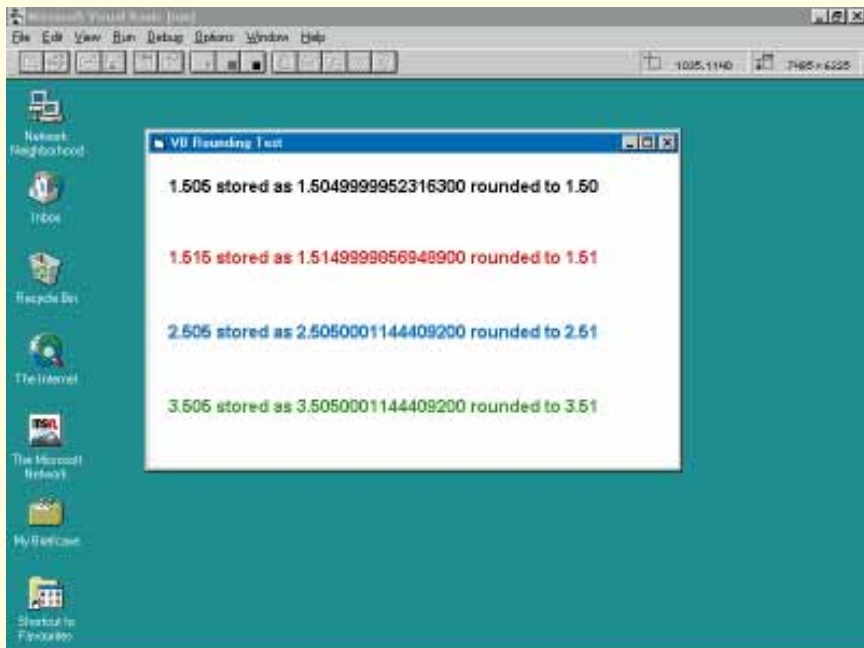

Next, the control can be customised by setting properties at design-time. The Property Sheet is a dialogue created by the OCX control itself, normally accessed by right-clicking on the control. That is one reason why OCXs are larger than VBXs: they contain their own user interface. This example adds a user-defined styleset to the control. A styleset in Calendar Widgets defines the appearance of a date cell
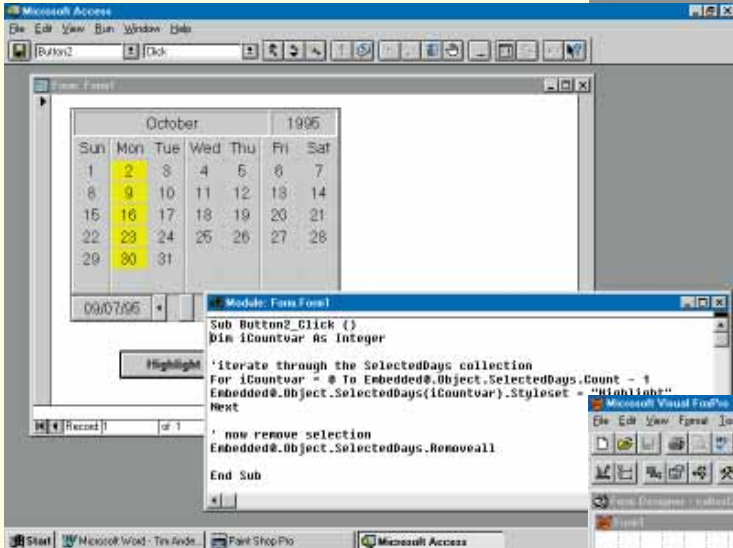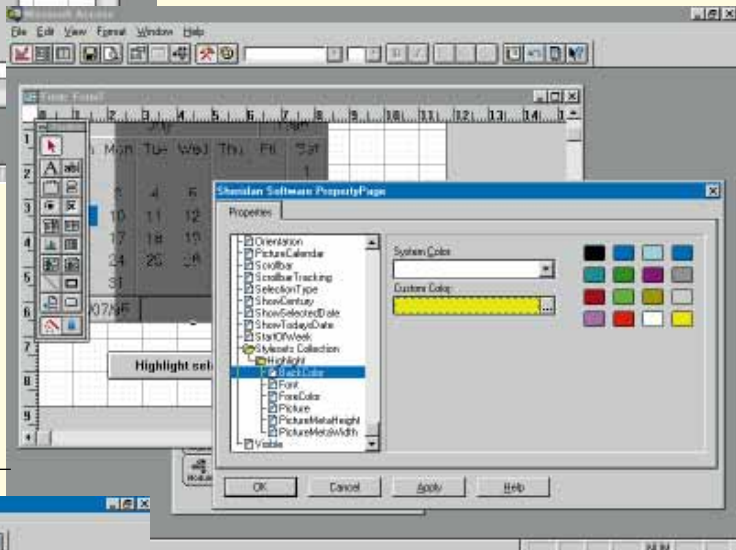
The form at runtime, showing some highlighted date cells. The code which does the work refers to the OCX control, laboriously, as Embedded0.Object. Access 95 supports the With ... End With construct to tidy up code like this
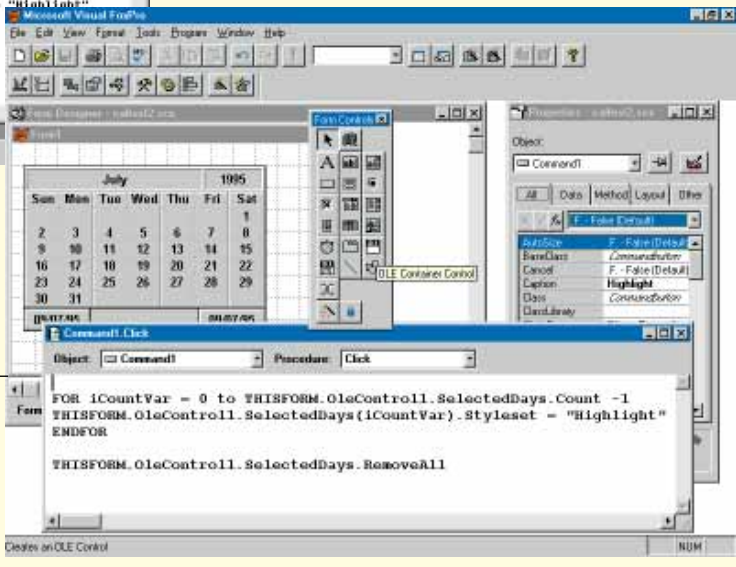
Using a Calendar Widget in Visual FoxPro requires painting an OleControl frame on a form, then inserting the control from a list of available OCXs. Right-click brings up the property page; and xBase code addresses the control in much the same way as Basic

ments, they do not all offer the same functionality. As another example, OCXs in FoxPro have no data-aware capabilities. A final problem is that Visual C++ in its current version (2.1) has no integrated support for OCX controls. Expect this to change soon. Borland also intends to support OCXs in future versions of Delphi, dBase and C++. In the meantime, don't assume that an OCX control is really plug-and-play and check before purchase that it will do what you need. At worst, a particular OCX could be next to useless; at best, the vendor will have developed with each of the main supporting environments in mind.

Not just Delphi

Following the discussion of floating point rounding in the August issue, thanks to John Plumbley for the following email:

"This does not seem to be banker's rounding — Borland (or the company that does the tech support for them) must have been wrong when it said it was.

It is caused by the way computers store fractional floating point numbers and is a well known problem for the unwary.

To see what's going on use FmtStr with %.15f and you will see that:

```
1.505 is stored as 1.504999999999200
(which %.2f rounds down to 1.50);
1.515 is stored as 1.514999999999418
(which %.2f rounds down to 1.51);
2.505 is stored as 2.505000000001019
(which %.2f rounds up to 2.51);
3.505 is stored as 3.505000000001019
(which %.2f rounds up to 3.51).
```

A similar thing happens in C, and it also

Above *John Plumbley's demonstration that VB has rounding problems too*
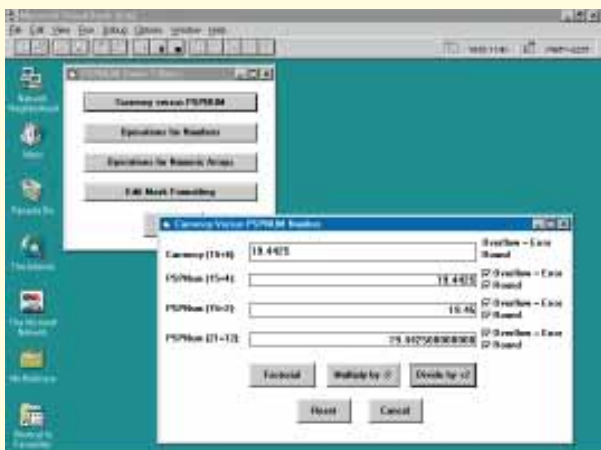
Left *Prospero's PSPNUM is a VBX to handle fixed-length precision numbers and arrays*

From this dialogue you can build an executable in Visual dBase, although in dBase "compiled" is just another word for interpreted
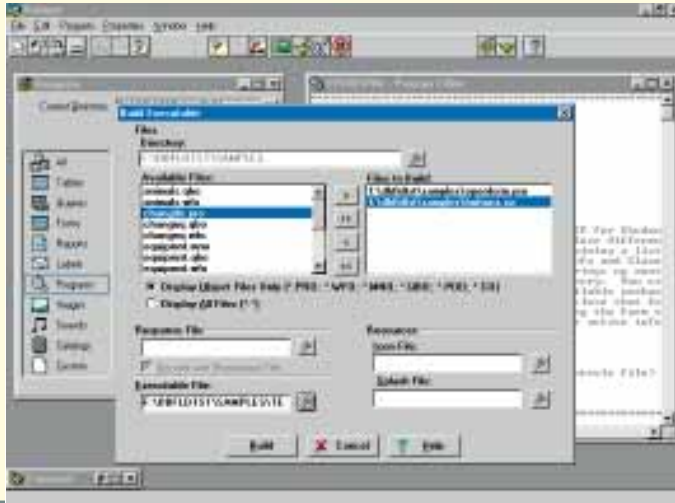
happens in VB, not only in Delphi.

In my opinion this behaviour is not a problem, as anyone doing this kind of work should not be using fractional real numbers. They should scale all numbers to avoid fractions (i.e. work internally in pennies, or tenths of a penny, instead of pounds)."

John includes listings in Delphi, VB and C to prove his point. So if you are rounding matters in your application — you have been warned. I've also received a VBX intended to overcome exactly this kind of problem from a small company called Prospero. PSPNUM.VBX is a masked edit control which allows you to work with fixed-length precision numbers; a more flexible version of VB's Currency data type. It's a specialist tool which could be valuable for accounting and business applications.

dBase gets Visual

The word "visual" is beloved of marketing departments worldwide, judging by the way it pops up in new product versions. The latest casualty is dBase, now at version 5.5 and called Visual dBase. The xBase language is about as non-visual as you can get, but both Microsoft and Borland have added object-orientated language extensions which, combined with visual design tools, lend some credibility to the "Visual" tag.

I looked at a late beta of the product. Despite the change of name, Visual dBase is not a major upgrade, but adds significant enhancements to the original dBase for Windows. It is not a 32-bit product, although it does recognise Windows 95 with limited support for long filenames. Since neither the IDAPI database engine nor the Crystal Reports report writer support long filenames, dBase developers

should stick with 8.3 names until the release of 32-bit versions of these products. OLE automation is now supported, but not OCX controls. There are few language changes but two are particularly welcome: class definitions can now include protected properties (without which true encapsulation is impossible), and at last SQL queries can be executed on local tables without the need for any special SQL mode of operation.

Borland has long been rumoured to be working on a dBase compiler that would create true executables in the style of Delphi or C. Sadly, the project seems to have been abandoned, as the compiler now released for Visual dBase is no more than a runtime version. It's nicely integrated into the product and comes with an Install Builder for creating distribution disks. Overall, Borland has plugged many of the gaps between dBase and Microsoft's Visual FoxPro, arriving on the market at about the same time. Borland's product has a snappier, less cluttered interface and slightly more modest system requirements.

Despite the new features this is an interim release, although likely to be the last 16-bit version, and the dBase to watch for will be the 32-bit version for Windows 95 and Windows NT. It's strange how it always seems to be the next version that promises to deliver the goods.

Calling DLLs in Delphi

Alan Bontoft sent the following query:

"I am a recent convert to the world of Delphi (from VB of course) and am trying to write software which involves the use of third-party DLLs.

"When used with VB, one simply has to declare the procedure/function in a .BAS file and it can then be accessed by any of

the forms in the application. I came to use a DLL called INPOUT.DLL with Delphi, and after much searching in both the on-line help and Delphi manuals I came up with the following declaration:

```
procedure Out(Port, Value: integer);
far; external 'D:\DLLS\INPOUT';
```

"This seems to work fine, but only if placed in the implementation part of a unit. As soon as it is placed in the interface part, which is where a declaration has to be in order for other units to access it, an error occurs. Does this mean a DLL procedure has to be declared in every unit in which it is used?"

You *can* declare a .DLL in the interface part of a unit. For example:

```
unit CallDll;
interface
procedure Out(Port, Value: integer);
function DiskSpaceFree(DiskID: byte):
  longint;

implementation
procedure Out; external
  'D:\DLLS\INPOUT'
function DiskSpaceFree; external
  'SETUPKIT';
end.
```

I've included a function (from the SETUPKIT.DLL distributed with VB) alongside your procedure. Remember, that even though you declare the function in the interface section, to make it public you still need to make an entry in the implementation section to show that its implementation is to be found externally. Another point is that procedures in the interface section are implicitly far; you don't need the "far" keyword.

The most common method is to stuff DLL declarations into a unit on their own. Then, any units in your application which need to call these functions can simply add the unit name to the "uses" clause. That is how Delphi handles the Windows core functions, which are defined in units called WINTYPES and WINPROCS.

PCW Contacts

Tim Anderson welcomes your feedback, tips and suggestions. Contact him at the usual *PCW* address or as **freer@cix.compulink.co.uk**, or **100023.3154@compuserve.com**

PSPNUM: Prospero Software Products **01624 681090**

Calendar Widgets: Contemporary Software **01727 811999**

Visual dBase: Borland **01734 320022**
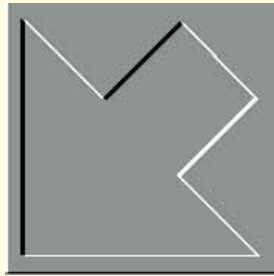
Equal opportunities

Mike Liardet **investigates some equation-solving techniques, using both symbolic and numerical methods, and includes a practical and efficient Basic implementation of a numerical method that can be applied in a large number of problem areas.**

Most computer programs are based in part on theories that include some mathematical equations. For example, financial applications encode the equations for profit, loss, compound interest, and so on. Many games and graphics programs use the equations of projective geometry. Scientific software typically borrows the equations of physics, with anything from an elementary Fahrenheit to Celcius formula through to the equations of atomic theory and beyond. Even a simple accounting program must encapsulate the equations for VAT.

In many cases it's possible for the programmer to solve the equations while the program is being written, hard-wiring his solution explicitly in the code with the appropriate formulae. Experienced programmers do this almost subconsciously, forgetting that they are actually implementing something that's based on a firm mathematical theory. For example, the equations for VAT might be written in this form:

```
VAT_on_Goods = Invoice_Total -
  Goods_Value
VAT_on_Goods = Goods_Value * VAT_Rate
VAT_Rate = .175 (at present!)
```

For a typical invoicing system it is likely that, when the program needs to work with these equations, the Goods_Value is already known (it is simply the sum of the prices of all the items on the invoice, which were presumably typed in by the user) and that the VAT_on_Goods and Invoice_Total are the unknowns. In this context these are the values for which the equations must be solved. With the aid of a trivial manipulation of the first equation and some straightforward re-ordering of the equations themselves, the VAT calculations can be (pseudo-) coded as:

```
Sub VATCalc(Goods_Value,VAT_on_Goods,
          Invoice_Total)
  Set VAT_Rate = .175
  Set VAT_on_Goods = Goods_Value *
          VAT_Rate
  Set Invoice_Total = Goods_Value +
          VAT_on_Goods
End
```

This may be enough for most accounting software, but it's interesting to note that this simple little routine does only half the job of the original equations, since it can work in only one direction. Specifically it can only determinine VAT_on_Goods and Invoice_Total when given Goods_Value, but it is unable to determine, for example, Goods_Value, given Invoice_Total. This is something

that a VAT Inspector may want to know, and the only way to provide it with a conventional program is for the programmer to code another routine to provide this functionality, working with the same set of equations as before, but using them in a different way.

For the small set of VAT equations above it is simple enough for the programmer to hand-solve them and then implement all the necessary routines to support the application. For more complicated situations this may not be feasible. Either the formulae may become too complicated for reliable hand solution, or the "direction" of use may not be known in advance — for example, spreadsheet systems often have a "back-solver", where the user can specify any combination of variables in a formula as input, to derive the remainder as output.

In these situations the program itself needs equation-solving capability. There are two ways of tackling the problem: by symbolic manipulation or by a numerical

method. A symbolic solution generally provides 100 percent accurate answers, whereas there is always an error factor with a numerical method. Neither approach guarantees a solution in every case — symbolic manipulation can get overloaded by the complexities of symbol manipulation, and numerical methods can miss the mark either because of accumulated rounding errors, or else because the underlying iterative method diverges away from the theoretical solution instead of converging onto it.

Outside of the Artificial Intelligence laboratories there is comparatively little equation-solving software that uses symbolic manipulations; Wolfram's Mathematica is one notable exception. Most other equation-solving software uses numerical techniques. There are a number of reasons for this, not least because most of the common programming languages (e.g. C, C++, Cobol, Fortran, Basic) are better equipped to handle numbers rather than symbols.

In this month's Low Level we will explore some of the equation-solving techniques, using both symbolic and numerical methods, and finish off with a practical and efficient Basic implementation of a numerical method that can be applied in a wide number of problem areas.

To get a flavour of what's involved we will start work with a set of three simple simultaneous equations (Fig 1), which are to be solved for the three unknowns: x, y and z. To solve these equations symbolically by computer, it is essential to first represent them in an appropriate data structure, such as the "nested list" which is a standard construct in programming languages like Lisp or Prolog. Fig 2 shows how these equations can be converted into lists.

Once held in list form it's much easier to operate on the equations, but this begs the question of what operations can usefully be performed on them. There are various rules which are commonly used when attempting to solve equations. Fig 3 outlines the common manipulations, although we have glossed over some of the mathematical niceties: for example, you have to be careful not to divide equations by zero. To show how these rules are used in practice the solution process for the equations is given in Fig 4.

Using rule 1 we can see that there are three variables and three equations, so it's likely that it will in fact be possible to reach a solution. Fewer equations would

leave the problem under-constrained, with not enough information to reach a solution. More equations would over-constrain the problem, and, unless there was

some redundancy (such as one of the extra equations being a trivial variant of another equation) there is likely to be an inconsistency with no solution possible.

Fig 1 *A set of three simultaneous equations, with three unknowns: x, y and z*

```
x y z = 450        (A)
5 y² + 5 x y = 50 x    (B)
3 x² - 30 x = -75      (C)
```

Fig 2 *A Lisp-like internal representation of the equations in Fig 1, using list structures*

```
(= (* (* x y) z) 450)                    (A)
(= (+ (* 5 (^ y 2)) (* (* 5 x) y)) (* 50 x))   (B)
(= (- (* 3 (^ x 2)) (* 30 x)) 45)             (C)
```

Fig 3 *Ten rules of thumb for solving equations*

1. To be solvable the number of equations should equal the number of unknowns.
2. Equations involving powers of 2 (e.g. $x^2 - 7x = -12$) have two solutions ($x = 3$ or 4 in this case). With powers of three there are three solutions, and so on.
3. Equations can be shuffled into any order without affecting their solution.
4. Sub-expressions within an equation can be shuffled and re-arranged in various ways, controlled by mathematical rules and identities.
5. A value, or expression (possibly including unknowns) can be added to or subtracted from both sides of any equation.
6. A value or expression can be used to multiply or divide an equation. This is done by applying it to both sides simultaneously.
7. The left- and right-hand sides of an equation can be swapped.
8. Two or more equations can be added (or subtracted) to make a new equation by adding (or subtracting) the left-hand sides of each, giving one side of the new equation, and performing the same operation on the right-hand sides of each for the other side of the new equation.
9. Two or more equations can be multipled together (or divided) to make a new equation by simultaneously applying the appropriate operation to the respective equation, adding (or subtracting) the left-hand sides of each for one side of the new equation, and the right-hand sides of each for the other.
10. When an unknown is isolated on one side of an equation, it can be eliminated from all the equations by replacing its every occurence in the other equations by the expression that it's equal to. The original equation need play no further part in the solution process.

Fig 4 *Solving the equations in Fig 1*

```
Divide (C) by 3
x² - 10 x = -25   (C1)
Add 25 to each side of (C1)
x² - 10 x + 25 = 0   (C2)
Rearrange LHS of (C2)
(x - 5)(x - 5) = 0  (C3)
So x = 5, substitute in (A) and (B)
5 y z = 450      (A1)
5 y² + 25 y = 250     (B1)
Divide (B1) by 5
y² + 5 y = 50      (B2)
Subtract 50 from each side of (B2)
y² + 5 y - 50 = 0  (B3)
Apply identity
 a x² + b x + c = 0 => x = (-b +-sqrt(b² - 4 a c))/ 2 a

to (B3)

y = -5 +- sqrt(25 + 200) /2 (B4)

So y = 5 or y = -10   (B5)

Substitute in (A1)

25 z = 450 or -50 z = 450  (A2)

Divide one equation in A2 by 25 and the other by -50

So z = 18 or z = -9

Solutions: (x = 5, y = 5, z =18) or (x = 5, y = -10, z = -9)
```

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Rule 2 tells us that there may be multiple solutions for x and for y as well. Most of the other rules are used in the solution process itself. With an appropriate programming language, such as Lisp or Prolog, each rule can easily be encoded as an operation that can be performed on a list structure. For example, adding a quantity Q to each side of an equation (= LHS RHS), converts it to the form (= (+ LHS Q) (+ RHS Q)). List processing languages can easily manipulate lists in this fashion.

Notice that, contrary to expectations, the equations produce only one solution for x (x = 5). Equation C3 shows why — there are in fact two solutions, but they are both the same!

With a symbolic solver it's not enough simply to implement the equation manipulation rules. The solver needs some strategy to guide the solution process and apply the rules in the right order and in the right way. This is the hardest part to implement, and the area in which symbolic solvers are most likely to fail.

We won't go into the strategy in much detail here, but in general a good overall aim is to isolate any one variable on one side of one equation so that it can be substituted in all the other equations, effectively reducing the number of variables by one. If all goes well, after repeating this process several times, a single equation in one variable is left, and hopefully this is solvable directly, and its solution can then help get solutions for the other remaining variables. This may not always work out as planned — for example, there's a well known mathematical result that there's no general solution method for polynomials of degree 5 or more (e.g. equations like x^5 +.. = ..).

Numerical methods are less likely to founder in this way, but often require some complex participation by the user

as a part of the solution process. For example, the user may have to provide a first guess for the solution, and if the guess is a bad one then the method may fail to arrive at a solution, or if there are multiple solutions it may only find the one nearest to the guess.

With a numerical method it is also sometimes necessary for the user to differentiate the equations by hand and then write a function that calculates the differential. This is a pity because it's not too difficult to implement a symbolic differentiation routine that could do the job automatically, but the programming languages commonly used to implement numerical methods cannot readily be used in this way. Firstly they are not very good at symbol manipulation in any case, but the main problem is that programs written in languages like C and Pascal are compiled before they are used, and cannot then create new compiled routines dynamically; they simply cannot be used in this way.

There is one special area of equation-solving, where a numerical method works particularly well. This is the Gaussian elimination technique, which can be applied to systems of linear equations. A linear equation can contain any number of unknowns but these can only be combined in a very simple way. There are no unknowns multiplied together and exponentiation, trigonometry or other awkward expressions are not allowed.

Fig 5 shows a typical set of simultaneous linear equations, with three unknowns: x, y and z. These equations could be solved symbolically, using the rules given in Fig 3, but Gaussian elimination formalises the process, so that the solution, if it exists, is found quickly, efficiently and accurately.

Because of the simple structure of linear equations they do need to be held in list structures and can easily be represented by arrays containing the essential coefficients. The unknowns don't need to be mentioned at all. For example, the equations in Fig 5 can be adequately represented by the array shown in Fig 6, on the understanding that each row represents an equation, with the first three columns in the array giving the coefficients of the x, y and z unknowns, and the last column giving the right-hand side values of each equation.

Gaussian elimination systematically manipulates this array representation until it uncovers the solution. Fig 7 shows roughly how it works in practice. All the

Pivoting on the x coefficient in the first equation, eliminate x from the the equations below...
[6   6 12 54]
[0 -1 -2 -8]
[0   1   0   2]
Pivoting on the y coefficient in the second equation, eliminate y from the equation below...
[6   6 12 54]
[0 -1 -2 -8]
[0   0 -2 -6]
The last equation now gives z = 3 immediately. Eliminating z from the equations above, and eliminating this equation from further consideration...
[6   6   0 18]
[0 -1   0 -2]
The last of the remaining equations now gives y = 2 immediately. Eliminating y from the equation above...
[6   0   0   6]
The last remining equation gives x = 1 immediately. The equations are solved

operations on the equations (or rather, rows in the array) are covered by one or other of the rules we mentioned earlier, but because linear equations are so highly structured the solution process

The equations have been rearranged, but their solution is the same. The array representation is:
[6 12   6 54]
[2   4   3 20]
[3   4   2 19]
As before, pivoting on the x coefficient in the first equation, eliminate x from the the equations below:
[6   6 12 54]
[0   0   1   2]
[0 -2 -1 -8]
Pivoting on the (second) z coefficient in the second equation is not now possible as it is zero...

```
Sub Gauss (N As Integer, A() As Single, xans() As Single)
'Do Gaussian elimination on a(1..N,1..N) where RHS is in a(1..N,N+1)
'Answer is given in xans(1..N)
Dim i As Integer
Dim j As Integer
Dim k As Integer
Dim mx As Integer
Dim t As Single

'Eliminate...
    For i = 1 To N
        mx = i
        For j = i + 1 To N
            If Abs(A(j, i)) > Abs(A(mx, i)) Then mx = j
        Next j
        For k = i To N + 1
            t = A(i, k): A(i, k) = A(mx, k): A(mx, k) = t
        Next k
        For j = i + 1 To N
            For k = N + 1 To i Step -1
                A(j, k) = A(j, k) - A(i, k) * A(j, i) / A(i, i)
            Next k
        Next j
    Next i
'Substitute...
    For j = N To 1 Step -1
        t = 0#
        For k = j + 1 To N
            t = t + A(j, k) * xans(k)
        Next k
        xans(j) = (A(j, N + 1) - t) / A(j, j)
    Next j
End Sub
```

moves forward very methodically. Notice that at the third stage, when we are at the point of deriving the value of z, all the array values below the array diagonal are zero. This is the so-called "triangulated" form, from which the solution tumbles out, in a straightforward fashion as shown in the example.

There is only one major complication (see Fig 8) with the method, which we have so far glossed over by carefully constructing the problem in the first place. But suppose the second and third equations are swapped, and the order of variables is changed to x, z, y. The solution method is in danger of breaking down here, because when working on the second variable (z) the pivot element turns out to be zero, and it cannot be used to eliminate the elements below. There's a simple work-around for this: search for the most appropriate pivot element, looking down the column from the diagonal to the bottom and swap the positions of the equations so that the best pivot element is in the frame and

can then be used. If all the potential pivot elements are zero then there is no solution to the equations.

So much for the theory. The code to perform the Gaussian elimination is given in Fig 9. It can work on any number of variables/equations, although the solution process inevitably slows down as the problems get bigger. This is a result of the execution time being proportional to the cube of the array size (notice the three nested loops in the routine).

PCW Contacts
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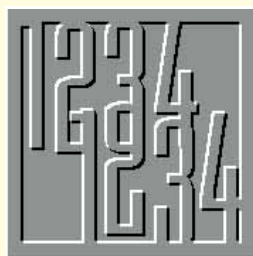
Base Solution

The Smarandache Function revisited, plus a reader's miscellany, by **Mike Mudge**.

Regular readers of Numbers Count will be familiar with the definition of the Smarandache Function. But it is reproduced here in recognition of the widespread interest that it has attracted.

The Smarandache Function, $S(n)$, is defined for positive integers, n, as the smallest integer such that $S(n)!$ is divisible by n.

Note: $n!$, read as factorial n, denotes the product of all positive integers up to and including n: further $0!=1$ by definition.

Problem A
Due to Charles Ashbacher, Cedar Rapids, IA 52401, USA.

For what triplets n, $n+1$, $n+2$ does the Smarandache function satisfy the Fibonacci recurrence:
$S(n)+S(n+1)=S(n+2)$.
Charles has found the solutions:
$n=9,119,4900,26243,32110,64008,368138$ and 415662.
His comment: "I am unable to discern a pattern in these numbers that would lead to proof that there's an infinite family of solutions." Perhaps another reader can?

Problem B
Due to I M Radu, Mathematical Spectrum, vol 27, no 2.

Show that, except for a finite set of numbers, there exists at least one prime number between $S(n)$ and $S(n+1)$. Among the finite set of numbers referred to above are:
$224-225$, $2057-2058$, $265225-265226$ and $843637-843638…$

Factors of the last two pairs of numbers incude prime pairs:
$(103,101)$ & $(151,149)$
respectively… does this provide the clue in the search for additional values?

Problem C
Due to A Stuparu, Valcea, Romania.

Consider numbers written in Smarandache Prime Base or Smarandache Square Base: how many are prime, how many are perfect powers? (In particular, perfect squares and perfect cubes.) e.g. 101 in Smarandache Prime Base $1,2,3,5,7,11…$ is equal to $1.3+0.2+1.1=4_1$ and is therefore not prime in The Smarandache Prime Base, but is prime in the decimal base.

Note: Academic Press will publish *The Encyclopedia of Integer Sequences* by N.J.A.Sloane and S. Plouffe in 1995; a disk with the sequences will also be available.

Feedback — positive and negative

● Prime Pairs: i.e. $n\pm1$ which are both prime, have attracted much attention recently. Tony Forbes of Surrey, using a 33MHz 486 microprocessor, upgraded to 100MHz, programmed in a combination of Yuji Kida's UBASIC and PC assembler to discover a pair of the order of 10^{4662} (20th July 1995) — a result worthy of publication in the "learned journals"! — he has also made a study of prime k-tuplet patterns up to $k=14$, details from M.M.

● Email Addresses. I would like to thank George Sassoon for the following: "A list of email addresses of people interested in computational number theory compiled by Andrew Odlyzko is available on amo@research.att.com or from George at New Farm, Tytherington, Warminster, Wiltshire, BA12 7AA. Tel: 01985-840205."

● Factorisation of "LARGE" Integers. Paul C Leyland of Aylesbury wishes *PCW* readers to know (4th June 1995) that the Cunningham files are available for anonymous ftp at ftp.ox.ac.uk in directory/pub/math/cunningham. His email address is pcl@oucs.ox.ac.uk and he would be pleased to hear from other people interested in factoring. Sam Wagstaff's address is ssw@cs.pudue.edu.

LIP multiprecision package written in C and supporting arithmetic on integers of arbitrary size, written by Arjen Lenstra, is available at no cost for non-commercial use from ftp.ox.ac.uk in the /pub/math/freelip directory in source code. But, Paul warns: "An hour's thought will often make more progress than a month's computation."

Complete or partial responses to these Smarandache problems, along with work on prime k-tuplets and related problems may be sent to Mike Mudge, 22 Gors Fach, Pwll-Trap, St Clears, Carmarthen, Dyfed. Tel: 01994 231121, to arrive by 1st January 1996. Any complete or partial solutions received will be judged using suitable subjective criteria and a prize of a £25 book token or equivalent overseas voucher, will be awarded by Mike Mudge to the best solution arriving by the closing date.

● Stop press! A communication from Roger Tirtia of Waremme, Belgium requests a proof (assuming it to be correct) of the result that: all integers that are not the sum of less than four squares are given by the formula, $2^{2n}(8k+7)$ where $n,k = 0,1,2,3…$ Can anyone help?

● Review of *Numbers Count* 143, March 1995, Beginners Lesson One, (GCD) Wang Tiles and Dr Reg Silvapulle's problem.

The latter problem was solved most elegantly, using Fermat's method of descent and the well known formula for representing a Pythagorean Triple as $2k(r^2+s^2)$, $2k(r^2-s^2)$ & $4krs$, by Michael Behrend of Cambridge. Details on request to MM. The introduction of a Beginners Start Here, with an investigation of Greatest Common Divisor of a set of positive integers produced a mixed response. Many found the whole idea too simple to be worthwhile… one respondent returned to the recursive Euclid's Algorithm as he had learnt it at school c.1920 and programmed it in Pascal as a Function.

The Wang Tiling Problem produced responses at many levels; worthy of mention is that of Fred Nooitgedacht of Apeldorn in The Netherlands. His interest began when he met "an old man in 1986, who had been trying to trace all 2,339 ways in which the 12 petominos can fill a 10 x 6 rectangle". He uses "backtracking" and invites mail at Pallietergaarde 219, 7329 HC Apeldorn, The Netherlands. Fred's second mailing solves the problem as posed. The prizewinner is Gustaaf Lahousse, of St Donatuslaan, 4B 1850, Grimbergen, Belgium.

Internet in an **instant**

Instant Internet simply plugs in to a Netware or PowerLAN network — configure your software and, as Stephen Rodda discovered, you're ready to go in no time at all. And, there's something interesting you can do with a Scotchbrite pad, too.

I have downloaded Windows 95 (build 490) from the Microsoft Network (MSN). Although MSN seemed to think that it would take 18 minutes per file (there were 19 of them), in actual fact the files took around 25 minutes each to download. Averaging it out, I took around ten and a half hours (file 19 is a fairly big one) to download the whole shebang. Having finished, I was impressed: it was very stable.

The Microsoft Network, on the other hand, is about as unstable as a pyramid on its tip. Due to this lack of stability it took me two late nights to download the software update. Now, I presume that because of this release being downloaded, the MSN is almost impossible to use. Its response times are a joke: it can take around three minutes just to open a few windows. Once you get there you find that very little has changed — sometimes it just hangs while trying to log in. If Microsoft is going to try to compete with the likes of CIX and Compuserve, then it is going to have to pull its socks up.

Instant Internet

I've had a play with Instant Internet (from Performance Technology): it simply plugs into a Netware or PowerLAN network to provide direct Internet access. The unit is housed in a standard computer case with keyboard and monitor connections.

The one I tested had a built-in network connection and modem, although a bridge version (for a permanent Internet connection) exists with two network interface cards. This acts as a networking router. Physically, the installation is simple: plug the box into a telephone point, the LAN

and the mains, and you're ready to go. Software configuration is less simple, but thanks to the comprehensive list of British and European services it's easy to connect to any Internet supplier's point of presence. It allows distributed Internet access for up to 50 concurrent users, without the hassle of having to set up TCP/IP for each workstation on the LAN.

If you are going to have that number of people using it at the same time, the supplied 28Kb 8-baud modem would probably be woefully inadequate, although for my own smaller LAN it was quite good enough. In this case, you would probably want to use a dedicated Internet feed from your supplier.

For those who know about Internet connections, you will see that this is a considerable amount of work saved. For others, I shall describe the work that would normally be needed. First, you would have to get a currently unused Internet address range from the authorities (to allow you to have a complete domain where your network allocation numbers won't interfere with anyone else), then you would have to convert the whole

*Setting up the Instant Internet unit from a remote PC*
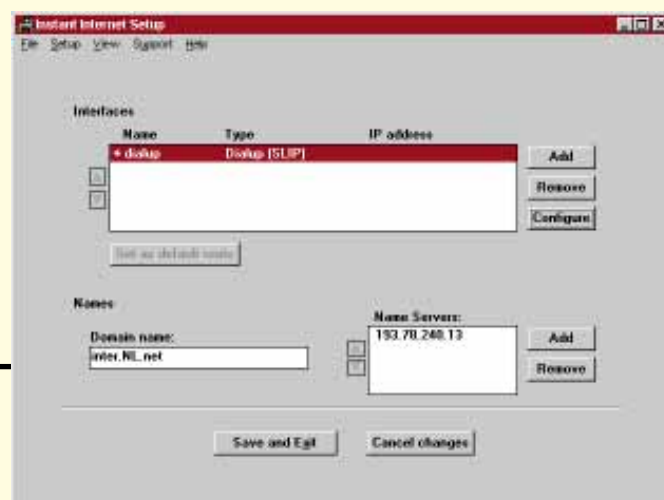
LAN to using TCP/IP protocols rather than IPX/SPX (in the case of Netware) over the LAN. This would entail changing the server's protocol stack as well as that in use on every workstation. Having done that, you would have to get and maintain a hosts file in order for the workstations to have somewhere for the Internet services to look up domain names — those names which follow the commercial version of "at" (i.e. @, such as cix.compulink.co.uk in the case of cix) in an Internet address.

Now all you have to do is connect. This could take up to half an hour per workstation, and perhaps an hour in the case of a server. Regarding the standard number of workstations (50) at which this unit is targeted, this could save about 26 man-hours. A name server would have to be running, which could take more time and hardware too.

I configured the server in about a minute. The program is well-designed and performs efficiently. The package comes with WinWeb and Eudora — an SMTP mail package. But for those of you who prefer, say, Netscape or Mosaic (since the unit supports the Winsock socket interface) you may use whichever software you desire which utilises Winsock sockets.

The whole operation was completed in less than no time. I took another minute to configure a second PC to attach through the Instant Internet unit. It was simple, and worked within minutes of plugging it in — I like hardware like that.

An Internet firewall is included straight out of the box. For those who don't know anything about the Internet; once you have a connection you immediately have the problem of packets which can go both ways. Of course, you will want to send and receive your own packets, but while you are connected (even through a telephone line) you immediately have the problem
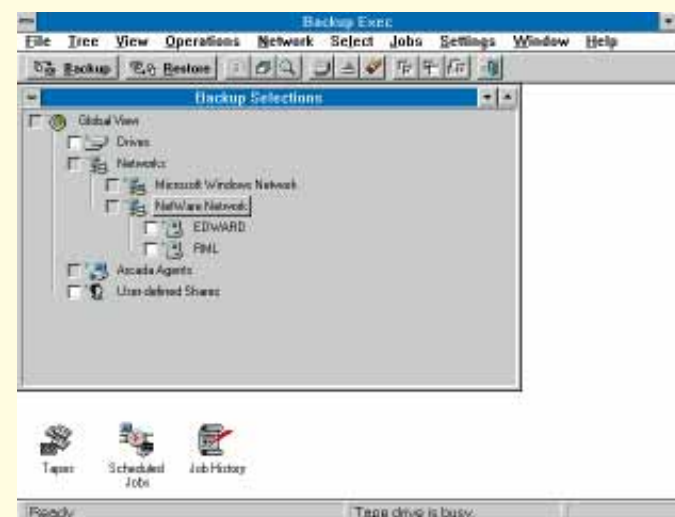
The Arcada Backup Exec saw the shared drive although not the Agent, which proclaimed itself as running

reasonably easy; all I had to do was share out the other machine's hard disk.

Now, my partner's getting into World Wide Web page design and he wanted to use Word 6 with the Web Author package from Quarterdeck, so I ended up walking from one end of the flat to the other (where his machine now is) to set up the recalcitrant backup agent. I certainly lost weight. I must have walked the distance at least twenty times.

Certainly, we know that these conditions, although they work, are not ideal: I wondered what others would do to enable the wretched thing to work. The advantage is that the agent type share is special and other users can't attach to the drive and slow the machine down. I even installed the version (not provided with Windows 95) but the one on the installation CD from Arcada. Despite this, I still find Arcada to be one of the better backup solutions.

that anyone else can access your machine, or in extreme cases your whole LAN. If you're running a dial-up link, they would have to target you from a dedicated Internet link and check every so often that you were or weren't on the Internet, as the case may be: in the case that you *had* connected to the Internet, then the snooping program could fire off a login sequence or manipulate packets directly.

Preventing snoopers

A firewall prevents all this simply by erecting an Internet barrier between the TCP/IP packets on your side of the network and those on the Internet side. On a small system where data might not be sensitive, this would be unnecessary: the chances that someone would be snooping on your Demon connection are highly remote. But where a large proportion of time is spent connected to the Internet, and the network is of a large or sensitive nature, then you should be aware of the necessity of using a firewall. Instant Internet accomplishes this feat because it just translates directly between TCP/IP and IPX/SPX. Since your machines have no complete Internet address, nobody outside can manipulate your data. The simplicity is impressive.

Arcada

I've eventually managed to get hold of the full version of Arcada Backup Exec for Windows NT, and although I'm still waiting for the various Backup Agents which allow the executive to talk to networked computers, I've tried (unsuccessfully as it turned out) to use the Windows 95 agent.

Although the installation file said that I had to have IPX/SPX networking, the only way I managed to get the thing to back up a remote Windows 95 machine was to use the file-sharing method. This was

Scotchbrite and suckers

I've been getting lots of support calls from my clients lately. Admittedly, we're in the middle of a heatwave as I write and most of these calls are due to the fact that their machines are overheating. So remember, get a vacuum cleaner and use it to take all the dust out of the fans in your server and workstations. It's a better bet (if you feel you are capable) to reverse the fan, so that it blows air into the machines, rather than sucking it through the floppy drives. Many's the floppy drive in a server which failed to load a disk simply because of the accumulated dust.

A good move would be to tape a Scotchbrite pan shiner over the fan intake. This will filter out most of the airborne detritus which would otherwise circulate over your hardware. So, all you'll have to do is replace the pan shiner (or wash it out, making sure you dry it thoroughly) to achieve effective filtration again.

Questions & Answers

Printer sharing under Netware

In a recent *Networks* column, in the "Questions & Answers" section, referring to memory problems you said: "Remember that under Netware, printer sharing to and from a Windows workstation can be problematic to say the least."

I am presently studying Novell Netware 3.12 and 4.1 to achieve the CNI certificate. I am using a simple network consisting of three computers: two clients and a server. I have tested printing with a dedicated print server and the PSERVER.NLM for a period of six months with Netware 3.12 and have encountered no difficulties whatsoever, either with Windows for Workgroups or with standard Windows 3.1.

As I am a novice Netware student, it would be a great help if you could explain the problems in Netware print sharing. Since Netware is widely used, I think it would be of interest to other readers of your very rewarding column.
Kalevi Nyman, Norrtälje, Sweden

Thanks for the compliment, Kalevi. Actually, what I was getting at in my reply to the letter which you read, was the fact that although using a Netware printer is simplicity itself (whether it is run from the file server, acting as a print server, or from a dedicated print server), it isn't the easiest thing in the world to service a print queue from a Windows workstation by loading RPRINTER on top of DOS and under Windows.

Fortunately, people can now escape this problem simply by upgrading to Windows 95, which contains a Novell-type print server. For those not lucky enough to be running under WIndows 95, there is a new version of RPRINTER which, although a little slow, will run under Windows 3.x.

SCSI drive replacement

I need to move a 1Gb SCSI drive out of a Netware 3.12 server in order to replace it with a 2Gb SCSI drive. I have enough memory to do this. The old 1Gb drive already has a new home, but I want to get the data off it as simply as possible. What method would you recommend — preferably the easiest way possible?
TonyG@cix

Back up: not once, not twice, but three times. I always recommend this many backups whenever you're going to do anything which might just possibly have an affect on your data.

Now, add the drive to the SCSI bus (say it's drive 1, with the original as drive 0). Using FDISK, partition some of it into a DOS partition to take all the Netware DOS files, and DOS itself. Remember that it is not possible at this time to make this partition active, since the drive is recognised as the secondary drive. Now format the partition with the /s switch to add the DOS system files, making sure that you have a copy of FDISK on the floppy. Now format a floppy disk with the /s switch so that you have a bootable floppy.

Start netware so that the server comes on line, and at the console, load the install module.

Partition the new disk so that you have a partition of exactly the same size as the old drive. Now, since you are using SCSI (which includes its own hot-fix area) create another partition which uses up

the rest of the drive space. Bear in mind that when you do this, you can decrease the hot-fix area, since SCSI already has one allocated. Now mirror the old drive and the first new Netware partition. Go away for as long as it takes to establish the mirror — at this point, lunch might be a good idea.

Once the mirroring has taken place, make sure there are no users connected, nor open files, and break the mirroring arrangement.

Now, down the server and remove the 1Gb disk, remembering for the sake of tidiness to reallocate the SCSI to device 0 on the new disk. Then boot the server with the floppy disk you prepared earlier. Run FDISK and mark the DOS partition on the new drive as active. Remove the floppy disk and reboot the server.

Your system will now start as normal. Once the server has started, all you have to do is use what's commonly known as drive spanning (actually partition spanning) to add the extra unallocated Netware partition on the new disk to the first, original partition. And bingo! — you now have a 2Gb Netware drive.

Wiring up a LAN

I've been asked to specify a network wiring system for quite a large LAN (probably about 30 users). How should I do it?
SimonT@Cix

Firstly, you need to consider where the desks are going to be in a couple of months' time, and the answer to that is: just about anywhere. So put in LAN cabling (Unshielded Twisted Pair since nobody's using thin ethernet for larger installations any more) and pluggable points behind where you think the plants, filing cabinets, coffee machine and such like are going, as well as behind the desk positions — even put one or two in the kitchen.

Make sure that you don't penny-pinch and connect only four of the cables in each connector. Do connect all eight because in future, you could use 100Mb/sec networking for no extra outlay in cabling over certain segments, if you subsequently discover data transfer to be slow. While you are wiring the network cabling, remember that you can get the telephone wiring installed simultaneously, by the same people.

If you're really circumspect, you might plump for an integrated wiring system so that a given cable could carry either telephone or data communication at any specified time. This means that you should neither run out of telephone nor data points since any connection can do either job.

Try to arrange for the same generous spread of mains outlets. And don't forget that the trend is no longer to plug a monitor into the system case: they tend nowadays to be plugged directly into the wall. Don't forget desk lights, printers, modems, possibly other external devices like tape drives and removable cartridge drives. I'd suppose that each desk should have a minimum of four or five power sockets available. And add to the specification from there. Remember too that the server will need a few extra sockets, and budget for a good UPS so that the server will work continuously.

Machines in sunlight can cause problems, too. Apart from the heating consideration and the bright light flooding out screen images, you may find that users with graphical user interfaces find their mice performing erratically. This is because the mice are optical and sunlight leaks through the cases, giving false signals to their optical detectors. Move the mouse out of the sunshine, or paint the inside of the case (black), or change the mouse. This should solve the problem.

Face facts

The look of your desktop can greatly enhance the enjoyment you get from using your machine.
Chris Cain shows how to give your Mac a facelift.

One of the best things about Windows 95 is how much better it makes the PC look and feel. But so as not to let us Mac users be outdone, especially by Microsoft, I'll show you how to give your Mac OS a facelift: there are hundreds of commercial, shareware and public-domain programs to brighten up your desktop. But first, let me bring you up to date with the latest developments.

The biggest recent event in the Mac world was the arrival of the first range of PowerPC-based PowerBooks. Comprising both full PowerBooks and PowerBook Duos, they offer the highest level of power and portability yet from Apple.

Specifications include either a 100MHz or a 117MHz 603e processor, making them faster than many desktop Macs, including the new 5200. Each comes with a minimum 8Mb of RAM, 500Mb hard disk, and either a 9.5in greyscale or a 10.4in colour screen, supporting 256 or thousands of colours, depending on the model. Lithium Ion battery technology provides

between three and five hours of use, and there's even AppleTalk-compliant infra-red communication built in.

For those who don't quite need the power of the 603e, a new 680LC40-based PowerBook, the 5300, has been unveiled. For a full review, see this month's *First Impressions* (page 61).

Sound Manager 3.1

Existing Mac users will be pleased to learn that the new version of Apple's Sound

Manager, incorporating native PowerPC code, has arrived. Sound Manager is that part of the Mac OS which deals with audio recording and playback in all its forms. The new version 3.1 provides better performance all round, and there are vast improvements when it is used with Power-Macs.

Sound Manager's first notable new feature is support for two additional audio-compression formats: IMA and µLaw (pronounced "mu-law"). The IMA format is based on a standard proposed by the Interactive Multimedia Association and can compress 16-bit sound with a ratio of 4:1. IMA is particularly good at compressing CD-quality music for integration into QuickTime movies.

The µLaw codec is an international standard for compressing voice-quality audio, typically 16-bit at 8kHz, with a 2:1 ratio. It's often used in telephony applications and on the Internet as the encoding format for .au sound files.

Perhaps the most significant change is the inclusion of more native PowerPC code. Previously, Sound Manager was written entirely in 68000 code and ran under the 680LC40 emulation on Power-Macs. This could drastically slow the machine down during a sound-intensive task, and the effect was especially noticeable in multimedia applications and games with music soundtracks that played through the action. With its improvements, the new version is between four and seven times more efficient, enabling applications to do much more while sound is playing or recording.

Thanks to a number of bug-fixes, this system extension is more robust too, and Mac OS alert sounds will no longer freeze the machine while it's playing — Sound Manager 3.1 supports asynchronous alert sounds.

I've been running a beta test version of Sound Manager 3.1 for the last three months on two different

PowerMacs. The difference between it and version 3.0 is noticeable, particularly on Marathon which seems to move more smoothly than before. I highly recommend it and you can download it from Apple's Web Servers.

Another impending new addition to the Mac OS is a native edition of SCSI Manager. I've been running a beta release of this too for a while now, and have enjoyed definite performance gains with it installed. This SCSI Manager, plus Sound Manager 3.1 and other system refinements, are likely to make up the next System 7.5 Update disk.

Finally, news just in reveals that there may be compatibility problems with some third-party Quark Xpress extensions running on a 9500. Due to the nature of the 604 and its use of cacheing, any extensions which use self-modifying code (a bad programming habit) may break when run on the new system. Apple UK says that during tests only three of some 40 additions caused problems and all used 68k code. However, if you rely heavily on such an extension and are thinking of upgrading, it may be wise to contact the manufacturer to check that it will run.

The right image

While Microsoft has been steadily improving the look and feel of Windows, it's fair to say that Apple has neglected the Mac's on-screen appearance. It's true that System 7.5 is one of the best-looking GUIs around, but it's nowhere near as customisable as the competition. All you get is a small selection of desktop patterns and the option to change the system font — there's no standard way to install a proper backdrop or change the way the windows look.

Apple is aware of this and will be addressing many points in the next release of the Mac OS (codenamed Copland). But there's no need to wait — several public domain, shareware and commercial utilities are available to help dress up your desktop.

The right background image can make all the difference to your desktop, be it a simple pattern or a work of fine art. One of the best ways to change it is to use the popular shareware package, Desktop Textures Suite. This comprises a Texture Installer and one or more data files filled with pretty patterns.

To install a new texture you double-click a data file, which loads the installer and allows you to browse though a collection of textures. When you find one you like, clicking "Install" sets it up as your
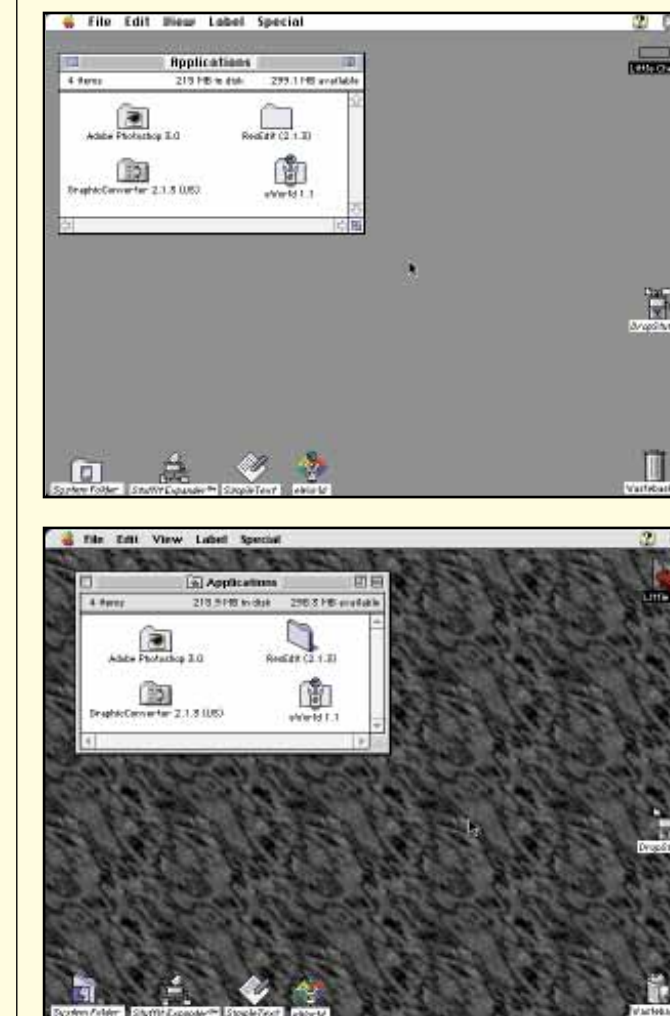
backdrop until you decide to change it. Newer versions of Desktop Textures feature a Texture Randomiser, which will change your background every time you restart.

For those who want a picture rather than a repeated pattern, Berkeley Systems, of After Dark fame, makes a product called Screen Posters. There are two versions currently available, Marvel and Star Trek, which will fill your screen with comic-book heroes or images from the Final Frontier. Screen Poster images are JPEG-compressed to provide maximum quality with the minimum of RAM requirements. Although the images are in full 24-bit colour, Screen Posters will apply dithering to make them presentable at lower bit depths. You can even use your own images by saving them as JPEG files and dropping them into the Screen Posters folder.

Other desktop pattern programs worth a look include BackSplash, an extension that places a PICT file in the background, and Before Dark.

An interesting piece of shareware for customising the look of the user interface is Greg's Buttons. Now on version 3.7.2, this often-updated Control Panel lets you change the colour and appearance of dialogue boxes, menus and windows. Options include a 3D bas-relief metallic look for buttons, and a choice of colours for window frames, menu bars and menu text items. Five minutes with Greg's Buttons can transform your system's appearance, but beware: going overboard with the colouring can produce truly horrible results.

The author of Greg's Buttons, Greg D. Landweber, has also recently released a new extension called Aaron (presumably named after Copland, the American composer). Dropping it into your System Folder and restarting will give you a chance to see what Copland will look like before it ships. Greg has taken all the new OS elements seen in preview screenshots, such as a 3D trashcan, new-look window frames and smart standing folder designs, and put

The Mac desktop — before and after

The standard Mac desktop (Mac) features a clean design, but its plain system icons and background are somewhat drab by today's standards. Using a few simple shareware programs and extensions you can add new life with a multi-coloured tectured backdrop, new icons for your hard disk, a 3D menu bar, windows and matching trashcan as seen in the screen below

Sound Manager 3.1 CPU Usage

Playback on 6100/60	Emulated 68k	Native PowerPC
8-bit, mono	5%	1.6%
8-bit, mono, w/sample rate conversion	12%	2.2%
16-bit, stereo	13%	1.9%
16-bit, stereo, w/sample rate conversion	26%	2.3%
16-bit, stereo, w/sample rate conversion, IMA	41%	6.6%

Utility of the Month

This month's award would have gone to Greg D. Landweber's wonderful Aaron extension: installing it has totally transformed the look of my desktop and it's amazing what 3D shaded buttons and windows can do. But as it's not really a utility, I've given the award to the Stuffit Expander from Aladdin Systems.

Downloadable from eWorld, Aladdin's Internet Home Page and any other good Mac bulletin board, Stuffit Expander can be used to decompress archived files in the popular Stuffit and Compact Pro formats. It will unencrypt Internet files that have been "encoded" using BinHex and MacBinary formats, and when combined with another product called DropStuff with Enhanced Expander (also available from the Internet) it will additionally cope with AppleLink, Zip, Arc, Gzip, Unix .Z compression and unencoded files. In short, it's the best drag-and-drop compliant decompression util available.

If you're keen to find these shareware programs and try them for yourself, the address of Aladdin's Web Page is http://www.aladdinsys.com.

Giving your Mac a makeover

Freshen up the look of your dialogue boxes, menus and windows with the shareware Greg's Buttons

Desktop Textures is one of the most popular ways to bring your desktop into the nineties

Popular replacement icons for your favourite programs include characters from Star Trek: The Next Generation, and The Simpsons

them into a small program. The result is a much improved interface. It's surprising what a modest alteration can do — check out the before and after screenshots *[page 309]* to see what a difference it makes.

Icon do that

Backdrop textures and colourful windows are important but they are only part of the visual desktop experience. Icons are another main desktop feature, and there are plenty of well-drawn ones to be found on bulletin boards and public-domain disks. Popular icon collections include characters from The Simpsons and Looney Tunes cartoons, and faces from old and new generations of Star Trek.

Adding a custom icon to a program or your desktop is easy. Once you've chosen the icon you want, select it and call up its information box using Command I or Get Info (from the Finder File Menu). Now highlight the picture of the icon in the box and copy it to the clipboard in the normal way. Bring up the Info box for the icon you want to replace, then paste the new one over the picture inside. Simple. Users who want to create their own, original icons can use a package such as Photoshop and paste in other icons in the same way. This is not always successful though — Apple's ResEdit is a much better bet.

Another way to bring the personal touch to your Mac is to assign sounds to functions, such as emptying the trash and ejecting a disk. If you like the idea, check out a little package called Kaboom, available from Softline.
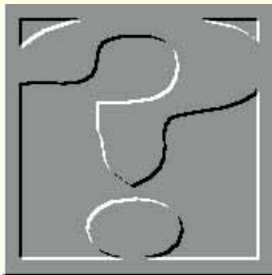
Any questions?

If you've got a PC problem or think you could help other readers out, contact Frank Leonhardt.

Getting the boot

There is one problem about which I get more calls than any other: the desperate soul on the other end of the line has been locked out of their hard disk for some reason or other. The machine won't boot. Their files are inaccessible and they are not very happy about it.

The problem is nearly always due to something in the machine's operating system having been changed (either deliberately or accidentally). So the machine's operating system, thus amended, is terminally confused.

A PC's operating system is normally stored on the hard disk (although it can be stored on a floppy). What generally happens is that the PC searches its floppy drive for a disk containing an operating system, and if it finds one it will run it. If the floppy drive is empty, it will attempt to run an operating system from the hard disk. This sequence can often be reversed by editing the BIOS configuration. The method for achieving this varies between machines, so you should check your computer's manual for details.

The first step in repairing a corrupted operating system on a hard disk is to boot a working operating system from a system floppy disk. This is often referred to as a boot floppy — it pays to have one handy.

The normal way to get hold of a boot floppy is to make one using the method appropriate for your operating system — and they are all different. For OS/2 (3.0) you should run the program "Create Utility Diskettes" which is found in the System Setup folder under the OS/2 System icon. Just follow the prompts and have a supply of blank disks ready.

For Windows NT users, creating a boot floppy disk is not that simple. Nevertheless, Windows NT has many features designed to make recovery easy. In the first instance there is a boot-up option to revert to a previously known working version of the system. If this fails, because the hard disk is corrupted, you will have to boot from the installation diskettes. Before re-installing everything you will be given the option to repair a damaged system in

several ways. I've never known this to fail, but you can improve your chances still further by making a recovery disk which contains important setup information. This is achieved using the RDISK.EXE utility which can be found in \WINNT3x\system32.

Windows 95 has a utility for creating a traditional boot floppy, but it is well hidden. From the Control Panel select the Install/Remove Programs icon. The far end tab is labelled "Startup Disk", and when selected you just follow the prompts.

Anyone still running plain old MSDOS (with or without Windows) will have to create a boot disk manually. This is how:
1. Insert a blank disk into drive A. It is important that it is drive A, because your machine will not be able to boot from B.
2. At the command prompt, type
`FORMAT A: /U /S`

If it complains about the /U parameter, omit it when you try again. The /U parameter only applies to recent versions of MSDOS. This process will format the floppy disk, erasing anything which may already be stored there. It will then transfer important system files to the new disk.
3. Using the DOS copy command, copy the following files to A:\. They are normally found in C:\DOS.
CHKDSK.EXE
EDIT.COM
QBASIC.EXE
DEBUG.EXE
UNFORMAT.COM
FDISK.EXE
FORMAT.COM
SYS.COM
XCOPY.EXE
UNDELETE.EXE

Older versions of MSDOS don't include some of these programs. If QBASIC.EXE does not exist, copy EDLIN.COM instead. Other missing files can be ignored. If there is space on your disk, copy SCANDISK.EXE too, if you have it.

Next, make a directory on drive A: and copy AUTOEXEC.BAT and CONFIG.SYS to it. The sequence to do this from DOS would be:
`MD A:\BACKUP`

`COPY C:\AUTOEXEC.BAT A:\BACKUP`
`COPY C:\CONFIG.SYS A:\BACKUP`

This collection of files isn't exhaustive, but it should be enough to get you started if the worst should happen.

Once you have created your boot disk, write-protect it and keep it in a safe place. If you find you are locked out of your hard disk, it will help either you or someone else to repair your system. If you haven't got a boot floppy to hand, an engineer will have to turn up with one, in person, which generally costs somewhat more than instructions over the phone.

VLB card doubts

"I have just upgraded my system with a new 486DX2-80 motherboard with 16Mb of RAM, replacing my original trusty 386SX with 12Mb of RAM and a Cyrix upgrade chip. Naturally, all my existing I/O expansion cards are the traditional 16-bit type but I decided, after a successful transformation, to change my standard 16-bit multi I/O card for an all-singing, all-dancing (so it claims) VLB multi I/O card (CMD chipset).

I ran Wintune 2.0 and the PCtools system consultant before and after. Imagine my surprise on finding that the data transfer rate is lower with the new 32-bit card than my old 16-bit card.

I have two WDCaviar drives on my system: the Master reports to be a Mode 3 drive, and the slave reports Mode 1.

Data transfer problems caused by a video card like this one could be down to driver software

Although the system feels faster (wishful thinking perhaps), the above reports differently. The readme file with the card claims that it selects the optimum transfer rates for both the master and slave drives, independently of each other.

I am naturally dubious about buying any other VLB cards for video and such like if there is to be no perceivable performance increase.

I would be interested to read your thoughts on this."
Barry Higginbottom
barryh@POST.Almac.Co.UK

If it's any consolation, your 16-bit ISA card was able to transfer data at a rate which was well above average, but it is difficult to see why a local-bus Enhanced IDE adaptor should be any slower. This probably has a lot to do with the driver software you are using.

Windows 3.11 32-bit disk access (which replaces the drivers which came with your cards anyway) is not able to take full advantage of Enhanced IDE, as yet. I'm sure that this is one of the features which will appear with Windows 95. If you are thinking of switching to Windows 95; wait and see what it can do.

There are many problems you may encounter running VLB cards with a processor speed in excess of 33MHz, and yours is running at 40MHz in real terms. Some VLB cards have jumpers to set a delay for high-speed access which can

Fonts found

In July's Computer Answers we published a letter from B.G.Joyce-iy1i9198@lmu.ac.uk, who was suffering from a mysterious loss of printer fonts when installing Word 6 for Windows.

Since then, several readers have contacted me, all suggesting the same solution. If you don't have a graphics-compatible printer connected to your system, Word won't allow you to use graphics fonts in your document, but this is easily cured by installing a graphics printer, or at least telling Windows that you have one.

Paul Fitzgibbon (Paul.Fitzgibbon@p11.f302.centron.com) had a different idea: apparently WIN.INI is limited in size. When Word installed it might have added too much and pushed WIN.INI over the limit, thus making its font definition lines inaccessible. The solution would be to remove unnecessary entries.

Thanks to all those who wrote, mailed, faxed or phoned.

improve matters dramatically. If this delay isn't enabled, the processor can spend ages fumbling around while it transfers data from the card.

With a PCI bus, an IDE adaptor has the option of transferring data through DMA. This is actually around 20 percent faster than the 11Mb/sec which can be achieved using the CPU to read data from an E-IDE VLB card.

Given unrestricted access to the

address space on a VESA local bus card at 33MHz, the CPU can transfer and manipulate data at four times the speed of an 8MHz ISA bus. In most instances this can only help, so don't be put off. VESA video boards can be considerably faster than ISA ones.

Play cache or check

"I have a 486DX2 66MHz PC with 16Mb of standard RAM. My machine also has a VL Bus and 128Kb of cache RAM. I would like to know whether it is worth buying another 128Kb to make a total of 256Kb, or even upgrading to 512Kb? Would system performance be improved significantly for the use of DOS-based games? (This is its primary use.) For example, some graphically intense programs appear to run slightly slower than I would have expected. Is this related to the size of the cache RAM? Or is it related to the speed and memory of my 1Mb VLB Cirrus Logic 5424 graphics card."
Andrew Little
100633,3441@compuserve.com

It isn't really possible to say whether extra cache RAM would help with your configuration or not. According to the academic theory on cache sizes, going from 128Kb to 256Kb should only make a marginal difference to the machine's performance.

However, some cache controllers like to have a block of cache for each bank of SIMMs, so having half your cache missing could be significant.

The graphics card you are using should not be causing any bottleneck.

The CPU itself is one feature which can make a huge difference to the performance of graphics-intensive games, and 3D simulations in particular. Regular readers will probably notice that this isn't my usual tack, as I normally stress the importance of fast peripherals before the processor for most applications. Games and graphics are the exception. You could always start saving up for a P6.

How do I get on the Web?

Lots of people want to know how to make a fortune by becoming Internet service providers. I never tell them of course, but it does help to be a networking expert; if you aren't one of these, you will have to hire someone who is because I'm not explaining it here, or over the phone. It also helps a lot to have started ten years ago.

A more reasonable request is for details on how to get your own personal World Wide Web page. There are two versions to this story. Firstly, it is actually free if you can persuade anyone with a machine permanently connected to the Internet to let you have a bit of space. Most pages belonging to individuals and non-profit organisations are found on space loaned by a college or university.

Secondly, if you have some commercial use in mind, or have a lot of data you want to make available, then you will probably have to pay for space on a bureau computer. There are wild stories about large Internet providers charging well in excess of £500 per annum for this service — unfortunately they are true. But there are others offering 5Mb of space at rates of around £25 a month or less. I don't dare list companies and prices here as anything to do with the Internet is, by nature, volatile. Just try shopping around.

Once you have your file area, it is actually very easy to publish pages: type whatever you want with a text editor using a special mark-up language, called HGML, to identify the special formatting you require. HGML, which is similar to SGML, is not difficult to use. If you prefer, there are several editors available which allow you to format your documents on-screen and will produce the HGML-format text file for you.

The final stage is to upload your file using FTP or some other file transfer mechanism and tell all your friends where to look.

PCW *Contacts*

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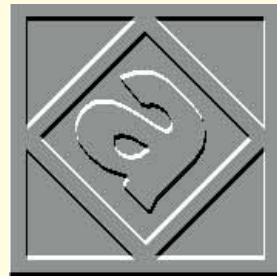
A **Word** in your ea**r**

The simple word processor is now more akin to a multifunctional app, so many novice users are put off exploring a program's really useful functions. Eleanor Turton-Hill comes to the rescue, focusing on particular features and shortcuts to help you get the most from Word 6.0.

Word processors have changed beyond all recognition during the past few years. They used to be simple, easy to understand programs with basic screens and a small selection of typefaces and layout functions. Now they're massive multifunctional applications which let you create and combine graphic images, tables and text.

In many ways, word processors are now easier to use than ever before. The interface, thanks to Windows, has made most common tasks far easier to grasp, and there's more online help in case things go wrong.

The major stumbling block for beginners, however, is the sheer proliferation of functions to be found in a modern word processor. Common procedures may be easier to use, but you'll find they're embedded in a massive quagmire of complex features and utilities. In short; word processors are now much, much, bigger. But to the uninitiated, this vastness can be so daunting that much of the application can remain unexplored.

The Windows word processor market is divided between three main packages: Microsoft Word for Windows, WordPerfect for Windows, and Lotus Ami Pro. By far the biggest seller is Word for Windows (currently at version 6.0).

This month, I've taken a look at a range of features in Word, which ought to come in handy no matter whether you use Word daily or are completely new to the package.

Customising the icon bars

One of the first things you'll need to do when you start Word is to set up your toolbars so that the functions you use most will be readily available.

It's annoying having any more than two toolbars at the top of your screen, as each one you add makes the working area progressively smaller. To get the ideal combination of buttons simply right-click (use the right-hand mouse button) anywhere on the toolbar at the top of the screen, and a

Shortcuts

Selecting text
- Double-click anywhere on a word to select it.
- Triple-click within a paragraph to select that paragraph.
- Place the cursor at the beginning of an area of text to be selected, hold down the Ctrl key and use the four arrow keys to highlight an area manually.
- Use Ctrl+Shift +End keys to highlight all text from the current point onwards.
- Use Ctrl+Shift+Home keys to highlight all text before the current point.
- Use Ctrl+A to select all the text in the document.
- To select a sentence, hold down the Ctrl key and click anywhere within that sentence.
- Hold down the Alt key and at the same time select an area of the screen using the mouse. This allows you to select irregular shapes, which is useful for deleting graphics from the screen.

Other shortcuts
- Capital letters — Place the cursor on any word and press the Shift and F3 keys. If you hold down the Shift key and keep pressing F3, you'll see the word toggle between three modes as shown below:
  (1) example
  (2) Example
  (3) EXAMPLE
- Place the cursor anywhere in a paragraph and use Ctrl+2 to create double-spaced lines.
- Use Ctrl+1 to turn a double-spaced paragraph back to single spacing.
- To add end-notes (appendices) to a document hold down the Alt and Ctrl keys, and press E. For footnotes, use Alt, Ctrl and F.

Getting to know Word

1 *Text enlarged using WordArt*

2 *Autotext saves you having to retype long names*

3 *Outline provides a ready-made structure for making notes*
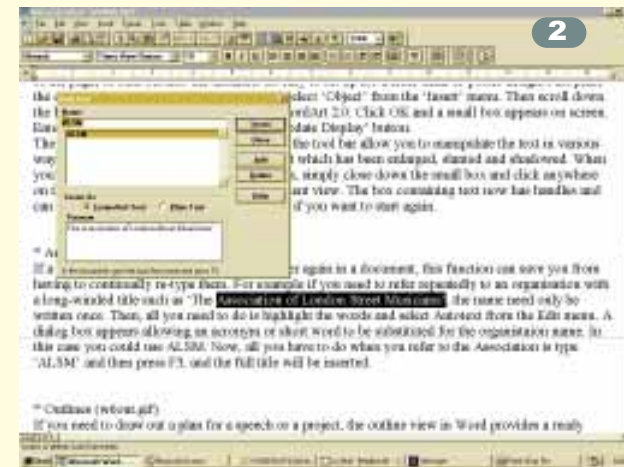
Creating letter-heads

One of the most common and useful word processor facilities is the ability to create templates. In Word, these are saved as files with a .dot extension. The most useful application of this is in the creation of document headers, which are used repeatedly when writing letters.

For a simple illustration of this, create a new document and type your address at the top left-hand side of the page. Go into the File menu and select Save As. In the Save File As Type box, select Document Template and enter a name such as "lethead1". The new template is then automatically placed in the winword directory as a .dot file, and the next time you create a new document, "lethead1" will appear as a choice template beneath the familiar Normal default.

Playing around with text

The WordArt feature (see Fig 1) allows you to play around with text so that it can be made to sit on its side, climb up the

edge of the page, or even run right off into the distance.

It's easy to set up for a letterhead or poster design: just place the cursor where you want the text to go and select Object from the Insert menu. Then scroll down the list of object types and select Microsoft WordArt 2.0. Click OK, and a small box appears on-screen. Enter your text in the box and click on the Update Display button.

The selection of icons on the left-hand side of the toolbar allows you to manipulate the text in various ways. Fig 1 shows text which has been enlarged, slanted and shadowed. When you've finished playing with the text functions, simply close down the small box and click anywhere on the screen to get back to the normal document view. The box containing text now has handles and can be resized across the page, or even deleted if you want to start again.

Autotext

If a certain group of words is to be repeatedly used in a document, the auto-text function (see Fig 2) can save you having to continually re-type them.

For example, if you need to refer repeatedly to an organisation with a long-winded title such as "The Association of London Street Musicians", the name need only be typed once. Then, all you need to do is highlight the words and select Auto-text from the Edit menu. A dialogue box appears, allowing either an acronym or short word to be substituted for the organisation's full name. In this case you could use ALSM. Now, all you have to do when you refer to the Association is type "ALSM", then press F3, and the full title will be inserted.

Outlines

If you need to draw up a plan for a speech or project, the outline view in Word (Fig 3) provides a ready-made structure for this.

Go into the View menu and select Outline. When you begin typing, the font defaults to Heading 1 — the largest of the three heading styles. You can toggle between them by holding down the Ctrl and Alt keys and pressing the number keys 1, 2, or 3. Each type of heading is indented from the margin to a different degree, as shown in Fig 3. **PCW**

menu appears. Select Customise and a dialogue box pops up displaying a list of available menus with their relevant button icons alongside. You can browse through the menu categories to find whichever buttons you need — just select the ones you want to use by clicking on them and dragging them over to your existing icon bar.

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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?
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....

....

.... POSTCODE ....

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ORDER REFERENCE NUMBER (IF QUOTED) ....
DISPATCH REFERENCE NUMBER ....

CUSTOMER DETAILS

NAME ....

COMPANY ....

ADDRESS ....

....

....

.... POSTCODE ....

DATE OF TELEPHONE ORDER .... / .... / ....

ORDERED BY: ☐ TELEPHONE ☐ FAX ☐ POST

ADVERT APPEARED IN PCW:
ISSUE DATE .... PAGE ....

QUANTITY	DETAILS OF ORDER	UNIT COST £	TOTAL £

METHOD OF PAYMENT

☐ PERSONAL CHEQUE ☐ PURCHASE ORDER ☐ CREDIT CARD

☐ C.O.D ☐ CHARGE CARD ☐ OTHER (SPECIFY) ....

CREDIT CARD COMPANY ....START DATE .... / .... / ....

CHARGE CARD COMPANY ....START DATE .... / .... / ....

CARD NUMBER   EXPIRY DATE .... / .... / ....

☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

SUB TOTAL _____

DISCOUNT _____

CARRIAGE _____

SURCHARGES _____

VAT _____

TOTAL _____

DELIVERY DETAILS

DELIVERED TO (ADDRESS)
(IF DIFFERENT FROM ABOVE) ....

....

.... POSTCODE ....

AGREED DELIVERY DATE .... / .... / ....

☐ TERMS OF WARRANTY ☐ MONEY BACK

☐ RETURNS POLICY ☐ COST OF EXTENDED WARRANTY

☐ HELPLINE

Details: ....
....

SIGNED .... DATE .... / .... / .... DAYTIME TELEPHONE NUMBER ....

chipchat

• New technology...

Bill Gates, Andy Grove, and Jerry Sanders (CEOs of Microsoft, Intel, and AMD) were in a high-powered business meeting. During the serious, tense discussions, a beeping noise is suddenly emitted from where Bill is sitting. Bill says: "Oh, that's my emergency beeper. Gentlemen, excuse me, I really need to take this call." So Bill lifts his wristwatch to his ear and begins talking into the end of his tie. Having completed the call, he notices the others are staring at him — Bill explains: "Oh, this is my new emergency communication system. I have an earpiece built into my watch and a microphone sewn into the end of my tie. That way, I can take a call anywhere." The others nod, and the meeting continues.

Five minutes later, the discussion is again interrupted when Andy starts beeping. "Oh, that's *my* emergency beeper" he says. "Excuse me, gentlemen, this must be an important call." Andy taps his earlobe and begins talking into thin air. When he completes the call, he notices the others staring at him and explains: "I also have an emergency communication system. But my earpiece is actually implanted in my earlobe, and the microphone is embedded in this fake tooth — isn't that neat?" The others nod, and the meeting continues.

Later still, the discussion is again interrupted when Jerry emits a thunderous fart. He looks up at the others staring at him and says, "Uhh, somebody get me a piece of paper… I'm receiving a fax."

• In the middle of the August heatwave, conversation in the *PCW* office turned to swimming, and features editor Chris Cain revealed that he'd never learned how to. "But it's just like riding a bike," said one of the subs. Chris looked slightly fazed before admitting that he can't ride a bike either.

• The normal reaction when the world's most overused buzzword "Information Superhighway" is mentioned, is to grimace. But there's a whole crowd of people out there who prefer to sit down with a pen and paper, or perhaps a computer, and work out every possible anagram from those 23 all too familiar letters. Roy Fear sent in this list of 18 to go with the Internet Top 10 from August's *Chipchat*:

Hi! What of imperious granny?
At your whimpering fashion
Whip a train, you fishmonger
As when I aim for your thing
Sham figure now in hairy pot
Harrow mouse — graph infinity!
With no umpiring of hearsay
Fumigation? Why hire parson?
O trip away, home furnishing!
Whip your man sore in a fight
I whisper of human gyration
Your wife harmonising path
So writhe in agony, fair hump
O forum! A shiny writing heap
Show Mary our infinite graph
I, Murphy, wrote on fish again
Further moaning is how I pay
Pure hogwash or infamy in it

• What if Dr. Seuss did technical writing?

Here's an easy game to play.
Here's an easy thing to say:

If a packet hits a pocket on a socket on a port,
And the bus is interrupted as a very last resort,
And the address of the memory makes your floppy disk abort,
Then the socket packet pocket has an error to report!

If your cursor finds a menu item followed by a dash,
And the double-clicking icon puts your window in the trash,
And your data is corrupted 'cos the index doesn't hash,
Then your situation's hopeless, and your system's gonna crash!

You can't say this?
What a shame sir!
We'll find you
Another game sir:

If the label on the cable on the table at your house,
Says the network is connected to the button on your mouse,
But your packets want to tunnel on another protocol,
That's repeatedly rejected by the printer down the hall,

And your screen is all distorted by the side effects of gauss
So your icons in the window are as wavy as a souse,
Then you may as well reboot and go out with a bang,
'Cos as sure as I'm a poet, the sucker's gonna hang!

When the copy of your floppy's getting sloppy on the disk,
And the microcode instructions cause unnecessary risc,
Then you have to flash your memory and you'll want to RAM your ROM.
Quickly turn off the computer and be sure to tell your mom!

• Intel recently informed the press of the many benefits of using a "Pentium Overdrive Processor to Increase Enjoyment of Games on Intel486 Processor-Based Systems". But jaded hacks were puzzled to see a slide entitled "Home Benefits". Could that be an Apple Macintosh in the picture running a Motorola Processor?

Gripes and gremlins

• In last month's group test of P90s we included a few wrong contact numbers. These should have read: Hi-Grade 0181 591 1586, Carrera 0171 830 0286, Compusys 01296 395531.
• Some readers, and particularly the people at Corel, were probably a bit perturbed by the verdict of Paul Begg's review of the Corel CD Office Companion (last month's *First Impressions*). It's not "a good, solid workhorse which has proved reliable under adverse conditions" as we reported, but "a worthwhile collection for home or business users". It costs £99 from Corel on 01703 814142.