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PERSONAL COMPUTER WORLD

October 1998
www.pcw.co.uk

Expert opinion you can trust

SPECIAL £2.25 ONLY

Smart buys

PCs Printers ISPs Latest user survey names most reliable brands and services
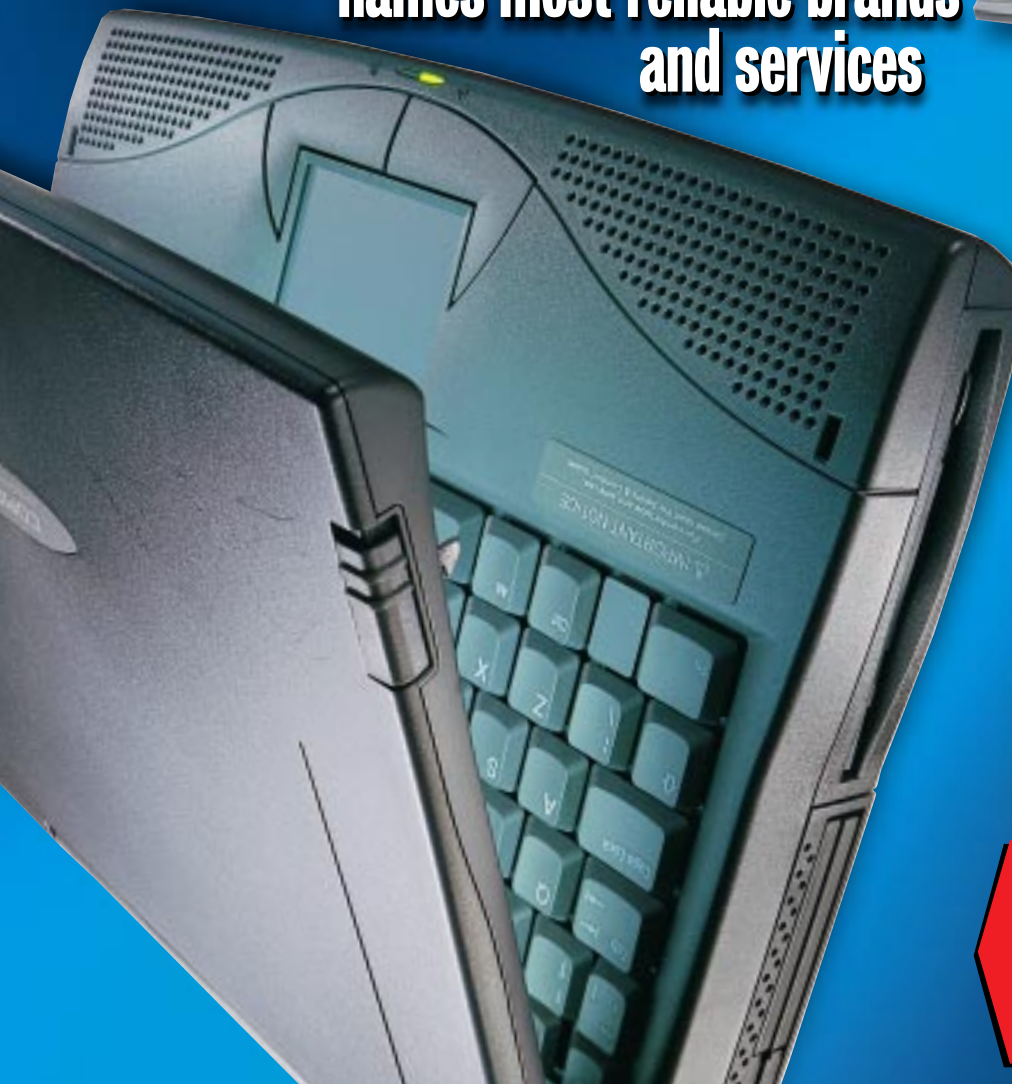
INTEL vs AMD
New 300MHz chips tested

Which Digital Camera?

Listen here!
Voice packages with brains

Quick on the draw
Designer software for every job

Three Full Programs:
- MYOB Accounting (RRP £199)
- Cubasis Audio Lite (Orig. value £149)
- Serif Mail Plus (RRP £29.95)

Dream Weaver 1.2 ■ Authorware
Surf Express ■ VET Anti-Virus

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9 770142 023984

PERSONAL COMPUTER WORLD

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VNU LABS — EUROPEAN

The car's the star — but IT takes a leading role, too
p166

AMD VS INTEL

The chip giants go head to head in the battle for your desktop
☞ **p174**

Users are the best judges of service and reliability in the industry.

At your service

The fastest PC in the world is no good if it breaks down or arrives late... great-value ISPs are useless if you can never get connected. What looks in theory like a great deal, may seriously let you down. *PCW* can advise you, but we can't call an ISP millions of times per month, nor order thousands of PCs to see how many are dead on arrival or whether they turn up at all. The best source of this information is you, and other users on the front-line. That's why, in our 20th Anniversary issue [May '98] we asked you to tell us about your PC, notebook, printer and ISP. What kind of service did your supplier deliver? Was your equipment living up to your expectations? Your response was tremendous, and we reveal the results of the industry's largest independent user survey of service and reliability on page 151.

As for smart buys, check out a new PC based around the new AMD K6-2 3D Now! processor. The name may be a mouthful, but as this month's group test shows, it's no slouch, particularly when you consider its low price. We pitched this new 300MHz processor against Intel's latest 300MHz Celeron, to see how they measure up [p174].

Your response was tremendous — we reveal the results of the industry's largest INDEPENDENT USER SURVEY of service and reliability

There's nothing quite like a digital camera to turn heads. Of course, you want one; but which model should you choose, and how do they work? On page 218 we've tested 15 of them, picked the best, and gone into the finer details for those who want to their casual snaps to look seriously good.

How do you like our **brand new look**? We've redesigned *PCW* to make it easier for you to find your way around and get to the information you're looking for. It's your magazine, and we'd appreciate knowing what you think of the new format, so please email me on newlook@pcw.co.uk with your thoughts.

Gordon Laing, Editor

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next month

450MHz PENTIUM II PCs
If you need a **powerful workstation**, we have ten perfect solutions, all based around Intel's new 450MHz PII.

3D GRAPHICS CARDS
For PC-blasting **3D games** performance, we line up 12 of the best cards.

DATABASES
Ideal packages to **store and retrieve** all your most valuable data.

ALSO NEXT MONTH:
Microsoft Office 2000 preview, and building a **web server** for small business.

WELCOME TO THE OCTOBER 1998 PERSONAL COMPUTER WORLD CD-ROM

October COVER DISC

APPLICATIONS   GAMES   LIBRARY   INTERNET

Whether you're browsing in a shop or hurriedly opening this new-look issue of *Personal Computer World* at home, you are probably dying to find out more about the three full-version applications advertised on this month's cover! Well, they're all here: full versions of of MYOB, a small business accounting suite; CUBASIS AUDIO LITE, a digital multitrack audio recorder and sequencer; and SERIF MAIL PLUS, for creating and sending fun emails. On top of that, there are seven more featured games and applications demos, and over 60 other applications in the Software Library. So read on and find out more about the contents of one very full PCW CD-ROM!

Cubasis Audio Lite full version

Have you ever fancied having a recording studio on your desktop? Well now you can, with Cubasis Audio Lite, from Steinberg. Users of Cubase will be familiar with the interface of the popular MIDI sequencer, but now you can add real sounds such as vocals or acoustic instruments. Using the full version on this month's disc, and with adequate resources, you can mix up to four tracks of simultaneous audio alongside music data that has been created from a MIDI instrument. Just lay down your drums and keyboard tracks on your computer and then record vocals onto the audio tracks. You will have access to all the different instruments in your sound card or external sound module, combined with the spontaneity of real-world sounds. To get the most out of this application, check out our three-page workshop (starting on page 242) in the *Hands On* section of this issue.

PCW DETAILS

Operating system
Windows 3.1 or higher
Limitations
Full version
Sales contact
0181 970 1909
Technical support
0181 207 1792 between 10:00am & 1:00pm, and 2:00pm & 5:00pm (on Wednesday's there's a 2:00pm start)

Technical information to help you use the CD

✔ **System Requirements**
You will need a PC running Windows 3.1 or Windows 95. Please check individual products for specific system requirements. For best results, run the CD on a Pentium PC with at least 16Mb of memory.

✔ **How to use the CD-ROM**
Quit existing applications (if you have 16Mb or more of memory, you don't have to do this, but you will still get better performance if not too many other applications are running). Put the disc into your CD drive.
Win 95 — If you've got Windows 95, the *PCW* interactive loader will appear on your screen. If your CD doesn't autoload, go to Start/Run and type in <CD Drive>:\pcw.exe
Win 3.1 — From Windows Program Manager choose File/Run, then type in <CD Drive>:\pcw.exe and press enter.

✔ **CD-ROM Problems**
If you have problems with individual products, please check in the magazine or on the CD for individual company support contact details.
If you experience general problems with the CD, the technical helpline is open on weekdays from 10:30am to 12:30pm and 1.30pm to 4:30pm. Telephone 01274 736990.
If you experience problems with the CD-ROM (such as a message reading "Cannot read from drive D:") return the disc with a covering note showing your name and address and clearly marked "PCW CD OCTOBER 98" to:
TIB plc
TIB House
11, Edward Street
Bradford
BD4 7BH

A replacement disc will be sent to you by post.

✔ **Getting your software onto our PCW CD-ROM**
Personal Computer World is keen to promote quality software and would like to hear from you if you are interested in having your product included on a future cover disc. For cover-mounted disc enquiries please telephone Afshan Nasim on 0171 316 9592 or email afshan_nasim @vnu.co.uk.

✔ **Software Limitations**
Unless otherwise stated, all the software contained on the CD is for demonstration purposes only. The guidelines we use for describing the limitations of software are as follows:

Freeware
A fully-operational

Dreamweaver

Macromedia's Dreamweaver is a great visual tool for creating professional web sites. It is particularly useful in the creation of pages that use Dynamic HTML, but may be used in a multi-browser environment. It offers visual web-page layout and provides a convenient HTML source editor. You can create web sites that look great and run smoothly on all browsers. Features include conditional hyperlinks, integrated Image Editor and colour-coded HTML.
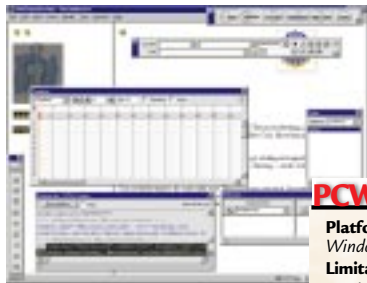
PCW DETAILS
Platform
Windows 95
Limitations
30-day trial
Sales contact
0181 358 5857
Technical support
None

MYOB 6.0 full version

● *Check out our workshop in the* Hands On *section (p246) of PCW.* MYOB 6.0 combines a range of small-business accounting functions with a set of contact and management tools. A straightforward interface allows users with no previous accounting knowledge to maintain extensive and detailed records. MYOB has won awards internationally, in no small part due to its "customisability" which allows records to conform to differing taxation, accounting and business practices. Output is via a range of reports, invoice types, statements and cheques. Detailed budgets and job estimates can be prepared. Accounting data can be exported to, and imported from, other programs. All financial analysis tools are available so you can produce financial performance and budget data and graphs. Stored details of customers and suppliers offer built-in contact management, and there is a "To-Do List" and mail-merge facility. Users are entitled to one free technical support call if they register the product.
● **PCW Special Offers in conjunction with MYOB:**
1. A full set of MYOB 6.0 manuals for £30
2. A year's technical support for £75
3. Upgrade to Version 7.5 (+ full set of manuals) for £99 (Normally £195)
4. Upgrade to Premier (+ full set of manuals) £395 (Normally £495)
The above pricing excludes £6 carriage charge and VAT.
Contact: Best!Ware (UK) 01752 201901 (fax 01752 894833), email sales@myob.co.uk, web site www.myob.co.uk

PCW DETAILS
Operating system
Windows 3.1 or later
Limitations
Full version
Sales contact
01752 201901
Technical support
01752 201901 (subject to registration)

Authorware

Multimedia authors will know Authorware as a well-established tool, used by many corporations, educational institutions and government organisations to produce dynamic, interactive, successful learning applications. Designed to allow subject experts and non-programmers to create interactive courseware, its icon-based, drag-and-drop interface employs a simple flowchart convention that anyone can understand.

Straightforward to use, it readily connects with the web and runs native on all important platforms. By incorporating Shockwave files, including Director 6 movies, Flash animations, and audio, fast playback can be achieved across intranets.

PCW DETAILS
Platform
Windows 95
Limitations
30-day trial
Sales contact
0181 358 5857
Technical support
None

product which can be used for no cost.

Shareware
This type of software is supplied in a fully working form that allows the user to evaluate all its features. The licensing conditions of this kind of software would normally require you to register it for a fee, if you intend to use it after a specified trial period has ended.

Time Limited Demo
"Time Limited" software products contain the same functionality as the commercial version but will not run after a certain date, nor after a specified period of time has elapsed since its installation onto a computer.

Function Limited Demo
This type of software has no time restriction, but certain features will have been removed. For example, you may not be able to save anything created by using the program. Or, in the case of a game, it may contain only one level.

Evaluation
Although all the features in this form of software are active and there is no time restriction, there is a limit to the "range" of the program, which is set against the scope of a purchased licence. For instance, a demo of a database program may be set up to store only 100 records in order to evaluate its functionality. On the other hand, if it were to be purchased, it would then be sold with different prices: for example, a 1000-record licence and a 10,000-record licence.
Full Version

The software contained on the disc is the full commercial product. This means that it is currently available, or has been previously available, for purchase from retail suppliers.

CD-ROM | **HELPLINE** | **01274 736990**

Serif MailPlus full version

Serif MailPlus will enable you to produce fun, creative, personalised emails with your own graphics without being a graphic artist. It is the perfect way to email your family and friends. The program is designed to work with all popular email software and enables you to combine different message layouts with your own personal text to create a unique look. The point-and-click interface makes it simple to start creating graphic email right away, and built-in intelligence means Serif MailPlus handles the spacing, formatting and colour balancing. Emails are delivered to the recipient using the popular GIF file format so that they are displayed either in the email window or in a supported program.

Personal Computer World Special Upgrade Offer
Serif is able to offer all *PCW* readers specially discounted prices on additional content packs, which would increase the number of supplied design templates; from 13 to a potential 170.
Serif's MailPlus Professional Edition (MSRP of £29.95 inc VAT) offers an extra 100 templates. *PCW* readers can upgrade to this version for only £14.95 (inc VAT).

Alternatively, purchase both MailPlus Professional *and* the MailPlus Business Contents Pack for only £24.95 (inc VAT). The MSRP of the Business Contents Pack is £19.95 (incl VAT), which means a great saving of £24.95 when purchasing the full 170 extra design templates.
Upgrades also include a specially-reduced shipping charge of only £3 for guaranteed delivery.

To receive your upgrades, call the **Freephone Sales Hotline on 0800 3767070.**

PCW DETAILS

Platform
Windows 95
Limitations
Full version
Sales contact
0800 376 7070
Technical support
None
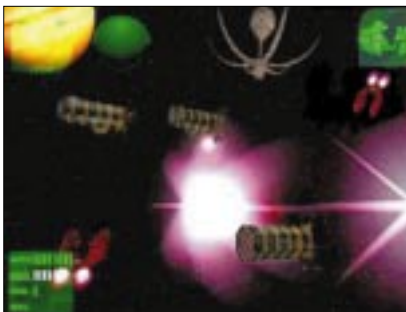
Xenocracy

Xenocracy is a space flight combat game set within an accurately represented Solar System. You must balance the interests of Earth, Mercury, Mars and Venus as they divide the resources of the Solar System. The game is a mix of action and strategy that emphasises tactical flying skills against your hyper-intelligent opponents. Graphically it features large, well-populated 3D mission environments, multiple camera real-time perspectives, and an extensive range information features about the strategic situation in a Solar System at war.

PCW DETAILS

Operating system
Windows 95
Limitations *Limited levels. Cut-down features*
Sales contact
01865 264 817
Technical support
support@grolier.co.uk

S.C.A.R.S

The year is 3000 AD. The world is controlled by nine supercomputers which have developed intelligence greater than that of their creators, as well as extremes of human emotions including *boredom*. They overcome their apathy by racing, and their drive for victory compels them to build supercars that mimic the Earth's most fearsome creatures and then pulverise opponents on variously treacherous courses.
The game features a powerful 3D graphics engine, real-time lighting effects and four modes of play.

PCW DETAILS

Platform
Windows 95
Limitations *Limited tracks, cars and race duration*
Sales contact
0181 944 9300
Technical support
0181 944 9000

BHunter

In BHunter you are one of a number of bounty hunters in a city set some time in the future, taking over the work that the police gave up on long ago. You must attempt to make your way to fame and fortune by hunting down the criminal elements in this world.

Features include VGA 3D accelerated graphics, along with support for all major 3D accelerators. There is multiplayer gameplay, a variety of different weapons, and real-life collisions with explosion blasts featuring advanced sound and doppler sound bending.

PCW DETAILS

Operating system
Windows 95
Limitations
Early levels demo
Sales contact
(Denmark) +45 8680 2700
Technical support
None

Max 2

PCW DETAILS

Operating system
Windows 95
Limitations
One early level
Sales contact
01628 423723
Technical support
europe@interplay.com

The enemies call themselves The Concord. They have governed the territory for years but only a small number of their species can provide direction to the overall population, and they are too rigid to accept change. You must monitor the situation and find ways to weaken their control. One of their species, called The Oomans, who are more adaptable, have joined the Concord. Together, the Oomans and the Concord are involved in a shared-DNA process that has great potential for upsetting future plans. Features include 3D parallax scrolling, fully-rendered worlds, a scenario editor and enhanced audio.

Starcraft: Brood War

Starcraft: Brood War continues the saga of galactic warfare as the Zerg, the Protoss and the Terrans struggle for their continued survival.

The shattered Zerg hive has been torn apart by fierce in-fighting, and the Protoss seek to reunite with their Dark Templar brethren and rebuild their homeworld, Aiur. Terran Emperor Mengsk I, having achieved his goal of total power over the human colonies, must now turn his attentions to the rising power of Kerrigan, Zerg Queen of Blades, the woman he betrayed, as well as a conspiracy within the ranks.

Three new campaigns are featured in the game, plus new weapons, new worlds, original cinematic scenes and 100 new multiplayer maps.

PCW DETAILS

Platform
Windows 95
Limitations
Restricted missions
Sales contact
0118 9209111
Technical support
None

Software Library }

Unless otherwise stated, new versions of featured software are not upgrades, but standalone installations. If you wish to install the latest version of a product onto your machine, please ensure that you first uninstall/remove the older version.

Essential Utilities

New Regulars:
● **GetRight 3.2**
(Windows 95/NT)
With GetRight you can resume on errors or partial requests while downloading files from the web or ftp sites. It allows scheduling and many other advanced downloading features. (30-day evaluation).

● **ThumbsPlus**
(Windows 95/NT)
ThumbsPlus is a graphic file viewer, locator and organiser that simplifies the process of finding and maintaining graphics, clipart files, fonts and animations. It displays a small thumbnail image of each file. You can use ThumbsPlus to browse, view, edit, crop, launch external editors and copy images to the clipboard. (30-day evaluation).

New This Month

● **Asteroid Impact**
(Win 3.1/95)
Enjoy seemingly endless levels of asteroid-blasting rock-smashing mayhem. This is massive and relentless obliteration on a grand scale — loads of fun! (Shareware).
● **Blitz 98 Draughts**
(Win 3.1/95)
BLITZ 98 is one of the world's strongest draughts-playing programs. You need to be a very good player to beat Blitz. (30-day evaluation).
● **Cricket Statistics**
(Win3.1/95)
Allows you to produce detailed averages for your cricket club with the minimum of effort. It also provides facilities to help you automate many of the tasks associated with the day-to-day running of a cricket club. (Shareware)
● **Critical Mass**
(Windows 95)
Critical Mass is an original, highly addictive game set in the future, where you are the commander of a squadron of spaceships. You will be sent on one of 30 different types of mission, ranging from protecting a convoy, to attacking an enemy starbase, to defending Earth. (Limited demo).
● **Diskeeper**
(Windows NT only)
Diskeeper is the first automatic defragmenter for Windows NT, restoring and maintaining Windows NT system speed and performance. Diskeeper defragments multiple disks automatically while the system is in use and is transparent to end-users. (Trial version).
● **Evolution Dance Station**
(Windows 95)
Evolution Dance Station is a realtime dance music production package which allows the user to mix their own tunes, live, using a 25-note keyboard to trigger high-quality audio dance loops. (Limited demo).
● **FineReader 4**
(Windows 95/NT)
FineReader is a superb optical character recognition system (OCR). It transforms a scanned image into text (i.e. into codes of letters, which your computer can recognise) to be used in any word processing package. (Time-limited demo).
● **Fractopia Screen Saver**
(Windows 95)
Fractopia Screen Saver lets you roll your own fractal screensavers, allowing you to delve beneath the surface of fractal images, discover the secrets within and convert your discoveries into animated screensavers that play when your computer is idle. (30-day shareware).
● **Mother of All Battles**
(Windows 95)
A strategy game for two to six human or computer players. The object of the game is to capture the world, starting from your home city. Each city can build units either of tanks, planes, bombers, paratroopers, aircraft carriers, destroyers, battleships, or submarines) in order to explore the world and defeat your enemies. (Limited demo).
● **NetGraphics Studio 2**
(Windows 95)
There is no easier way to make your web graphics smaller than with

CD-ROM   **HELPLINE**   **01274 736990**

NetGraphics Studio2 which includes automatic transparency generation on vector art, interactive image resizing and compression, batch processing and more. (Limited demo).

● **Omniquad Desktop Surveillance**
(Windows 95/NT)
Omniquad Desktop Surveillance breaks new grounds in the field of systems management and network security. It enables you to take full advantage of a system which is similar to a real CCTV camera operating across your network, but without the need for hardware! (Function-limited demo).

● **Omniquad Omnilook**
(Windows 95/NT)
Omnilook 97 is a multi-format image browser. The explorer-style interface displays combined thumbnail previews of images as you change folders. (30-day trial).

● **Omniquad Outlines**
(Windows 95/NT)
Omniquad Outlines is a management tool which enables you to define the boundaries and general rules for use of the computer and the internet. (30 day-trial).

● **Omniquad Set Me Up 98**
(Windows 95/NT)
The aim of this application is to cover all the system set-up and customisation features that are either hidden or not directly available to the user. The application also offers several enhancements to the operating system features. (30-day trial).
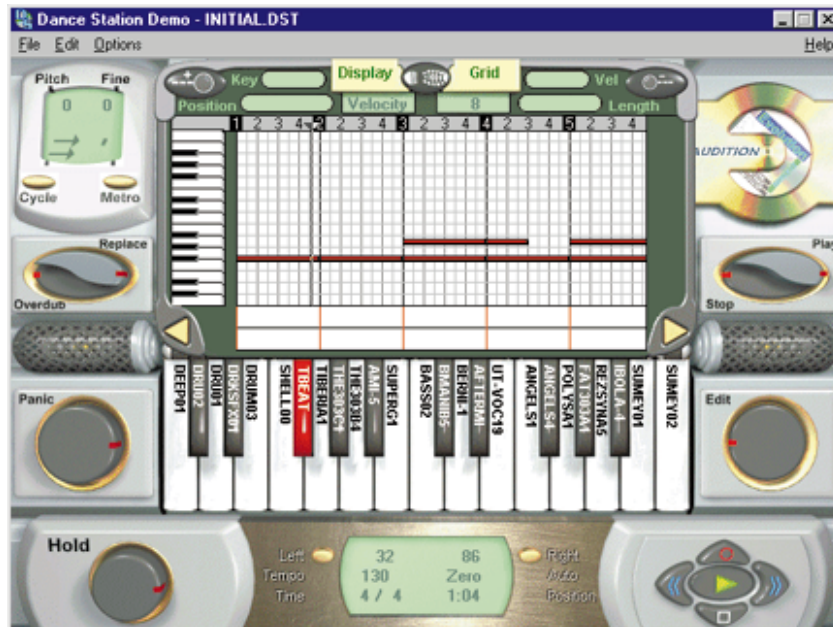
● **PhotoRecall Special Edition**
(Windows 95/NT)
PhotoRecall incorporates the latest imaging technology into a dynamic photo management system that can be used with digital cameras, scanners and the Internet. It builds virtual photo albums on PCs, while automatically managing all images in a central database. (Function-limited demo).

● **PowerUser Suite 95**
(Windows 95)
A software package which increases productivity by making Windows work the way you want. Designed with the serious Windows user in mind, this product represents a professional, one-stop, easy-to-use set of utilities, designed to save you time and effort in any Windows application. (Limited demo).

● **Rats!**
(Win95)
Kill all the rats before they have a chance to mate and overrun the maze.

To kill a rat, pick up the objects which appear at random in the right-hand side of the window by clicking the mouse on them and placing them in the maze. (Function-limited demo).

● **repliGATOR**
(Windows 95/NT)
repliGATOR is a standalone program which takes existing digital images and changes them, with easy-to-use graphical effects, into new images. It is just what you need for creating great new web images. (Function-limited demo).

● **Snakey**
(Windows 95/NT)
Snakey is a multi-user Tron-like game for up to 16 players (one server and 15 clients). (Freeware).

● **SoftCopier**
(Windows 95/NT)
SoftCopier, used in conjunction with a scanner, is a simple-to-use yet powerful software photocopy solution. It contains more functions than most photocopiers, and will revolutionise the

way you copy your documents. (Time-limited demo).

● **SpaceMan**
(Windows 95/NT)
SpaceMan 98 is an application that can help you find out which files and folders are using up most of your hard disk space. It additionally contains facilities to help find files that

▲ **GET KICKIN' — MIX YOUR OWN TUNES, LIVE, WITH THE EVOLUTION DANCE STATION REALTIME DANCE MUSIC PRODUCTION PACKAGE**

can be deleted to make more space available. (30-day trial).

● **Surf Express**
(Windows 95/NT)
Surf Express speeds up your internet browsing by using the most intelligent

web-cacheing technology available. It identifies the web pages you visit repeatedly and stores them on your hard drive. Then, while you browse other pages, Surf Express will regularly check stored pages for updates. (7-day trial).

● **Tax 98**
(Windows 95)
Tax 98 is a software program designed specifically to ease you through the process of completing your 1998 Tax Return. The standard Tax Return form SA100, issued by the Inland Revenue, can be completed with Tax 98. (Function-limited demo).

● **VET Anti-Virus**
(Win3.1/95/NT)
VET Anti-Virus is a fully-featured anti-virus solution for your PC, paving the way for a permanent pain-free virus upgrade solution. (Unregistered full version).

SPECIAL NOTICE — HANDS ON OS/2 JDK 1.1.6

On the cover disc this month, we have provided, courtesy of IBM, the latest Netscape (NETS202.EXE), the latest Feature Installer (FIRUNPKG.ZIP), the Java Runtime package with Unicode Fonts (JAVAINUF.ZIP) and the 1.1.6 JDK Development Package (JAVAIN-TK.ZIP).

Be sure to read the README.1ST file for installation instructions as it is relevant to the order in which you install the packages. You need only install the Java runtime package (JAVAINUF.ZIP) to execute Java applets and applications. The Development toolkit is required if you wish to develop your own Java code.

The latest version of the Netscape Navigator for OS/2 is a much smaller package as it no longer includes its own Java runtime. Therefore you need to install Netscape Navigator for OS/2 and the Java runtime package. The Code is copyrighted, distributed with permission of the copyright owner, and may only be used in accordance with the license agreement included therein:

OS/2 and Warp are trademarks of IBM Corp. Java is a trademark of Sun Microsystems Inc., and Netscape is a trademark of Netscape Communications.

CD-ROM **HELPLINE** **01274 736990**

PCW CD OnLine

Access the internet direct from the opening screen!

Would you like to find out more about the software contained on our *PCW* CD-ROM? Would you like to gain direct access to the companies which created the games, utilities and applications that appear on this month's free cover disc?

If you click on the web link banner at the top of the main screen you can run your browser and access *PCW* CD OnLine direct from the disc.

CD OnLine is an extension of the normal CD, giving you up-to-date access to sites and information that relate to the actual content on this month's cover disc. You can access our *Personal Computer World* web site, plus Vnunet.com and Jobworld.co.uk, too.

In addition, there is an up-to-date technical information page which relates to the CD-ROM, and a preview of what is coming up on next month's free cover-mounted CD! And, if you would like a regular copy of *PCW* and our CD delivered to your home, you can contact our subscriptions department and subscribe via email while you're online.
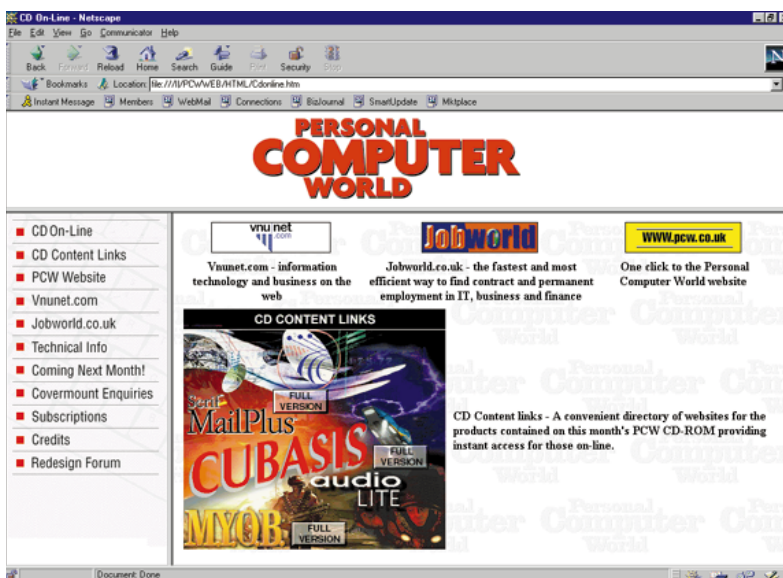
AOL Trial

Easy-to-use internet online service FREE this month with 50 hours' online time!

AOL channels cover everything from the latest News & Sport to Entertainment & Travel. Internet access is easy — go directly to web pages from your AOL menu bar.

AOL offers 33.6K access speeds nationwide and has Microsoft Internet Explorer 3.0 integrated as its main browser.

- 50 hours online!
- One month's AOL membership!
- Five email addresses per account!
- Free technical support!
- 10Mb of web space!
- 100 percent local call access!
- Run the software from the main screen or from the Software Library ISP section.

PCW DETAILS

Platform
Windows 95 and 3.1
Limitations
One month free membership, 50 free online hours
Sales contact
0800 376 5432

JOBWORLD

Jobworld.co.uk is a free service which provides you with access to thousands of new IT, business and finance vacancies every day. All you have to do is browse the site by job sector or search on a specific set of job skills or requirements. The Jobworld Email Alert service offers further refinements by sending only the details that match the job-seeker's preferences, allowing the recipient to control exactly what information is sent and when. Jobworld also offers links to job sites overseas, a guide to IT contracting, and comprehensive lists of jobs from the top recruitment agencies in the UK.

Jobworld.co.uk — be the first to know!

VNUNET

Vnunet.com offers speed of delivery, accuracy and a breadth of coverage from five market-leading weeklies: *Computing, Accountancy Age, PC Dealer, Network News* and *PC Week*, generating up to 50 stories every day of the working week. With correspondents in Europe, the US and Asia contributing daily to the VNU Newswire, a round-the-clock news service is available exclusively at vnunet.com. More detailed information is available from a collection of in-depth articles covering news, analysis and product reviews, from VNU's stable of monthly publications including *Personal Computer World* and *Management Consultancy*, plus some of the best editorial material from VNU's portfolio of 15 business and consumer publications.

Intel Celeron
This is the old cacheless version. The new 300a and 333 devices have 128Kb cache and are much faster.
Intel 01793 403000

AMD K6-2 3D
Available in 333MHz and 300MHz versions. AMD has slashed prices to undercut Intel.
AMD 01483 740440

Cyrix MII
Also has 333MHz and 300MHz versions. Looks a more solid bet since Cyrix was bought by NatSemi.
Cyrix 01793 417777

Master plan

Imagine a program that will run through a PC hard disk, making all code Y2K compliant without changing program sizes, checksums, or functions.

That's what Millennium Master, from MFX, is said to do. We won't believe it until we've tried it. If you can't wait for our verdict, it is being sold by POW.
Call 01202 716726

PROCESSORS

Intel races downmarket

Intel has launched two fast **Celeron processors and a price war** in a bid to regain the initiative in the growing market for low-cost PCs. The first 266MHz and 300MHz Celerons had no cache, and our group test [page 174], which pits them against AMD's K6-2 3D, confirms criticism of their speed. The new Celeron 300a and 333 (clock rates match their names) boast 128Kb of L2 cache. Comparison with the K6-2 is hard because they use a different socket; but early tests in our VNU Labs indicate that they are faster.

Intel slashed the bulk price of the old Celeron 300 by 30 percent to $112 and the 266 by 19 percent to $80. New Celeron prices were not available as we went to press but there were rumours of more price cuts to come. In response, AMD cut the K6-2/333 price massively from $369 to $237, and the K6-2/300 from $281 to $157 (the 266 will be dropped). A spokeswoman said: "These

prices could fall further if Intel makes further cuts." Meanwhile, Cyrix launched a 333MHz version of its MII and almost immediately cut the bulk price from $180 to $162; the price of an MII 300 fell from $135 to $82. Perhaps more worrying for Intel are signs that buyers no longer distrust non-Intel PC chips. A US survey found that more than one in two US firms would consider buying PCs using other makes. IBM lent credibility to AMD

by using the K6-2 in all but the most expensive of its Aptiva E home range (*above*). Brand manager Alec Welland said K6-2 prices enabled IBM to offer a full-spec internet-ready multimedia PC for just £799.

Intel also risks missing the emerging appliance market. Stan Shih, head of Taiwanese giant Acer, was in London to evangelise his XC reference designs based on PC chips. The latest news was that he was signing up Cyrix to power them.

FUTURES

IBM chip breakthrough

IBM claims to have had a breakthrough in **insulating individual transistors** within processors, making them far more efficient. It will lead to chips that need only a third of the power for a given clock speed — or run up to 20 percent faster for a given power drain, IBM says. The silicon-on-insulator (SOI) process needs only minimal changes to plants and gives the ability to make processors clocking 1GHz. SOI will be used in IBM's existing products, including the

PowerPC chip. Earlier this year, IBM claimed a similar efficiency gain with a breakthrough in the use of low-resistance copper "interconnect". But an internal Intel briefing found SOI wanting, *reports Mike Magee of VNU Newswire*. It says SOI can actually cut performance on fast chips, depending on the circuit configuration. The document also says power reduction is negligible at high speeds.

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More information can be found at www.chips.ibm.com

Overdrive kills the Pro

The Pentium Pro has been dropped, but a new PII Overdrive provides users with an upgrade path. The $599 chip fits into the Pro's Socket 8, pushing 150MHz and 180MHz Pro PCs to 300MHz, and 166MHz and 200MHz to 333MHz. It may prove faster than a standard PII as its internal cache runs twice as fast.

▒▶ **PARANOIA FUEL**
See anything strange about these cables? That nodule in the keyboard lead stores the first 1000 keys you press... enough to capture your password. Vendor Microspy calls it a "surveillance tool for authorised professionals". It can be fitted in seconds and taken off as quickly, for its secrets to be accessed. For the best of reasons, naturally.
Microspy 01908 607007
www.microspy.com

▒▶ **PCs AT TESCO'S**
Tesco is selling discounted Fujitsu PCs at New Malden, Surrey, in a pilot scheme which will be extended to other stores if necessary.
See also Tesco Net, p36.

▒▶ **KIND SCREENS**
Iiyama says its six latest Vision Master displays ease eye strain by offering the best available refresh rates.
Iiyama 01438 314417

New free access deal

Another company is offering free internet access. Unlike the ad-funded service at www.x-stream.com, Telinco's new **Home Connect** is financed by phone calls. Telinco, which gets up to 3p a minute for every call passed on to BT, offers national calls for up to 35 percent cheaper. If you pay a £20 start-up fee and spend more than £35 per quarter on Telinco calls, you get your net time for the cost of the local call, plus 5Mb of web space, a freephone number which works like a chargecard, and a number which lets people ring you wherever you are. ISP Demon, owned by Scottish Telecom, is adding services to attract users (*see p36*) but is not likely to go free. Marketing manager Ade Brownlow said: "Our users are more concerned with quality of service."

Home Connect 0800 542 4343

Psion unveils fast Series 3

Psion has unveiled a new fast version of its Series 3 palmtop. The 3mx uses a 28MHz version of the NEC-made 80c86 chip used on the original — a **fourfold boost in speed**. The new model includes the same suite of organiser programs and the body has been restyled. It will cost £269, competitive with the glut of rivals hitting the market but not undercutting them. Many, like the PalmPilot, bundle PC connectivity, but Psion's PsiWin 2.0 suite costs £49 extra with cable. Spokesman Steve Pang said this was so that existing users do not have to buy the program again if they upgrade. "Many people who buy a Psion don't own a PC," he said.

Psion 0990 143050
www.psion.com

New PCW help hotline

PCW is launching a help hotline that you can ring if you have any problems with a PC or peripheral. If one of our 300 lines is engaged you can leave your number with our answering service and we will call you back. Sadly we cannot provide this service for free. Calls will be charged at £1.50 per minute. For complex problems you can ring back later for a solution. Or you can buy a £12.95 voucher, which lets you talk to the hotline until your problem is solved. The helpline conforms to standards set by ICSTIS, the regulatory body for telephone services. If you don't think we have solved your problem satisfactorily, we will refund the cost of your call.

The number to call is:

0906 466 4465

PCs across world lose sleep as IT goes ET mad

IT luminaries are pouring millions into a **search for alien life** — and you, too, are being asked to help. Gordon Moore, William Hewlett, Paul Allen and Sandy Lerner (founders respectively of Intel, HP, Microsoft and Cisco) have each put money into the Search for Extra-Terrestrial Intelligence Institute (SETI). And late this year you will be able to download a program for intelligence-testing data collected by the world's biggest radio telescope at Aricicibo, Puerto Rico. The idea is that PCs can crunch the data as a background task or while users are asleep. Users download about a quarter megabyte of data, which takes about two days to process. Any suspicious signs are reported back for further investigation.

More than 115,000 people have already signed up for the SETI@home scheme based at the University of California. SETI <www.seti.org> hopes to complete five detailed analyses of the entire sky within two years.

VNU NEWSWIRE

"Extra-terrestrial searching? Sounds like a desperate way to try to increase your market"

■ Jini is not the first scheme to ease the use of devices on networks, although few can offer its global sweep. Other plans include:

NEST
Novell Embedded Systems Technology was meant to facilitate device interaction but did not gain widespread acceptance. Now Novell is touting a front-end called Net Top which, it says, could be used either with Jini or its own Groupwise product

JETSEND
This free Hewlett-Packard technology enables a camera, say, to talk directly to a network printer with no need for special drivers. Canon, Lexmark and Xerox are said to have adopted the technology but have yet to incorporate it in products.

BLUETOOTH
This new initiative, backed by the likes of Nokia, IBM and Ericsson, provides for devices of all types to interact via spread-spectrum radio (see *PCW*, August). It could complement Jini, rather than rival it.

MCOM
This covers a number of Microsoft projects, codenamed Millennium, aimed at simplifying networking.

briefing
Jini spells easy netting

Plug a radio into the mains, plug a device into a net. It'll be much the same thing using new Java trickery. Or so Sun says. Clive Akass reports.

A Java-based technology called Jini will make signing on to a network as easy as plugging in a phone, according to developer Sun. The idea is to allow you plug into an office, home or hotel network anywhere in the world to take advantage of local services such as printing, fax, or internet access. Sun calls this **"spontaneous networking"**, doing away with the need for driver installations and tricky configuration. It relies on a core of just 45Kb of code which can be embedded into devices such as electronic cameras or organisers.

Jini uses the concept of a network "citizen" which can be a person, a device, an application or a data set. Each citizen, or group of citizens, is represented on the network by a Java Virtual Machine, which can run on any platform. Jini creates a community, or federation, of these virtual machines but is not a network operating system as such: it sits above other operating systems. A citizen joins the community by announcing itself and advertising its services (*see below*). A digital camera, for instance, might say: "I am a camera. Anyone want to use me?" A printer on the same network might take note and offer to print any pictures. An archive disk might offer to store them. Sun envisages a Jini-enabled hotel guest, for instance, being able to link up to head office from his room and to use the hotel's printers or fax machines.

Sun says Jini source code will be available to developers under a "Jini public licence", on similar terms to those of Netscape's Mozilla and Linux. It believes this open-source model encourages development by providing anyone with the means to push the technology forward (*see page 42*).

Details at java.sun.com/jini/index.html

How Jini looks out of the bottle
HOW IT WORKS

A Jini community can include machines using any processor or operating system, as long as they can run a Java Virtual Machine. Features of the Jini layer are:
■ A newcomer to the community sends a 512-byte **Discovery** packet. This is picked up by the **Lookup** module, which registers available services and acts as a gateway to them. This module passes the newcomer a communication interface. The visitor has now joined the community.
■ Services are **leased** for a certain time. Leases have to be renegotiated when they expire, ensuring that devices are removed from **Lookup** when unplugged.
■ Jini provides an
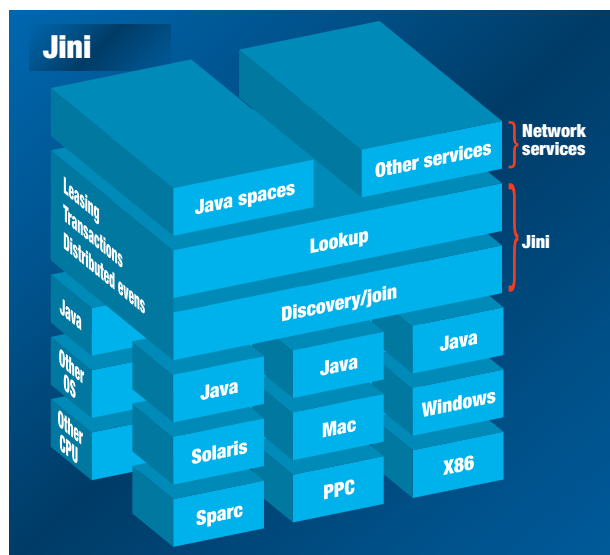
application programming interface to ensure that distributed events occur in the order intended; it also provides a manager for **distributed transactions**.

■ Network services include **JavaSpaces**, which act as a kind of global postbox so that service providers and recipients do not need to keep track of each other.

Socket FUD holds back flat screens

DAB audio browser for motorists

This Viewsonic VP150 shows how flat-screen prices are creeping down to mass-market level — fuelling the dispute about interface standards (*see right*). The 15in screen, offering up to 1024 x 768 resolution non-interlaced, costs around £775 (ex VAT). But prices are expected to fall.
MMD(distributor)01734 313232

▐▶ **DESIGNER LABELS**
The £22 (inc VAT) Press -It is designed to apply labels neatly to CDs and comes with software for designing them.
Rocky Mountain Traders 0171 631 0707

▐▶ **CHEAP LIBRETTO**
Morgan is selling an early model of Toshiba's Libretto mini-notebook, using a 75MHz AMD 586 processor, for just £399 (ex VAT).
0121 456 5565

▐▶ **TELETEXT ON TAP**
Pace is selling an £89 (inc VAT) PC TV card with access to up to 125 channels, either standard, cable or satellite. It also streams Teletext.
Pace 0990 561001

Confusion over a digital interface could slow the spread of **flat-panel colour displays** to the desktop. Traditional CRT monitors take an analogue signal, so a standard for a digital link has been slow to emerge. LCD screens are digital, and to drive one from a normal graphics port involves a lossy, expensive twin conversion to analogue and back again. Last year the video standards body VESA introduced the Plug and Display (P&D) standard. It used a 30-pin connector with both analogue and digital display paths, and 1394 and USB serial links.

The aim was to have a single standard connector for all display types. But a group of vendors, led by Compaq, said the P&P standard was too expensive when only a digital link was needed. They formed the Digital Flat Panel working group which came up with a simpler 20-pin link which has

been used in two Compaq Presarios. To complicate matters further, the Japanese Display Interface Standards for Monitors group has come up with yet more proposals, including Sony's 14-pin Gigabit Video Interface. DFP and P&D links both use PanelLink transmitter and receiver chips (*pictured*) from Silicon Image. Rae Cho, its business development manager, said the rival links were electrically identical and the cheaper DFP version made more sense for big-selling PCs like the Presario. "It is a case of market segmentation," he said. But Bob Raikes, managing editor of *Display Monitor*, said the issue was generating a lot of FUD (Fear, Uncertainly and Doubt). "My advice is to treat everything as proprietary at the moment."
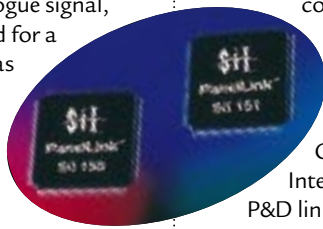
Silicon Image www.siimage.com
DFP group www.dfp-group.org
VESA www.vesa.org

An audio browser for motorists will be born of a marriage of **Digital Audio Broadcasting (DAB)** and GSM phone technology, predicts a UK company. DAB offers CD-quality sound and is set to be Britain's main radio system within a decade. But the car was the driving force, so to speak, behind its development because DAB promises interference-free reception and an end to the need to re-tune your radio. DAB (governed by the World DAB Forum) uses forward error correction like DVB (*see p40*) and can carry web data. DAB radios can have mini web screens but there is no return channel and in-car displays are unsafe. But Nick Johnson, of TTP Communications, says a combined GSM/DAB device can be built for only marginally more than the cost of a cellphone. And GSM can give DAB a return channel. TTP envisages a Tell Me More button which you can press when you want more information about something you hear on the radio; perhaps a topic under discussion or a weather or traffic report. "You could also have forward and backward buttons, just like a browser," Johnson said.
TTP 01763 266266
www.ttpcom.com
World DAB Forum www.worlddab.org

Take a letter, Miss Recorder

A UK firm is selling a device which it claims lets any continuous speech recognition product take input from a tape, creating a **dictation system**. Dragon Naturally Speaking (not the cheaper personal edition) includes a facility for transcribing from

a Sony Minidisc. But you can't use just any recorder because there are problems with noise and voltage levels, said Stephen Savage, sales director of Parish Maze. He claims his Mobi-Dict interface, costing about £50, will take input from a "wide variety" of recorders, though slightly different versions may be needed for different brands. Parish Maze has

promised to send us one to try out, so watch this space.
■ Endeavour Technologies is selling Lernout and Hauspie's entry-level Speakwrite for £19.99, including mike and word processor. A £39.99 professional edition lets you dictate into any Windows product.

Endeavour 01932 827324
Parish Maze 0141 221 6230

NetWare 5.0 embraces the net to ward off NT

Novell will launch **NetWare 5.0 on 20th September**, bringing its flagship operating system into the age of the intranet and internet. The release comes at a time when NetWare is losing market share to Windows NT – though it still runs two in

three local nets, and sales are rising in a swelling market. "We sold more seats last year than ever before," claims market development manager, Derek Venter.

The big change in 5.0 is a move to IP from Novell's IPX, so NetWare will be running internet protocol native for the first time. IntranetWare, the IP-enabled Netware 4.0, was an interim solution. Netware 5.0 also packs a Java Virtual Machine, the Console One Java GUI, and a five-user licence of the Oracle 8 database. Novell has been careful to make the upgrade path as

easy as possible. NetWare 5.0 needs 500Mb of disk space fully loaded, so many will need a new or upgraded server to run it. However, Venter says upgrades from NetWare 4.0 can be done in stages. A new server can provide access to NetWare 5.0 services while tried and tested NetWare 4.0 remain in service . Novell chief Eric Schmidt (*left*) says NetWare is years ahead of rivals with its directory services and will benefit from the delayed launch of NT 5.0. A beta of NetWare 5.0 can be downloaded from www.novell.com.

GRAPHICS ## Direct X marks spot – with sound

Microsoft released **DirectX 6**, the latest version of its multimedia application programming interface (API), at its **Meltdown 98 conference** of games and hardware developers. It also previewed some DirectX 7 features. Microsoft claims DirectX 6 can improve performance by up to 40 percent in supported applications. It offers features like multitexturing and texture compression which, with appropriate hardware, can boost both speed and image quality.

A new component is DirectMusic, which allows music to change with context — perhaps the actions of a game player. The developer can include multiple soundtracks and audio effects to reflect a particular reaction or situation.
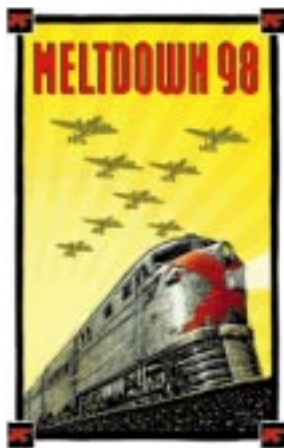
Direct3D has been revamped following criticism of its lack of features and programming difficulty, and DirectSound has been revamped to handle the predicted PC surround-sound revolution, with support for various audio codecs.

At press time, Microsoft had not announced the full list of features to be included in the forthcoming DirectX 7. But it has said that it will support the next generation of graphics accelerators with dedicated geometry processors. Also, Team Direct is expected to refine Direct3D so that it provides better performance using fewer processor cycles.

AJITH RAM

If anyone can, Kahn can

If I didn't know better, I'd say Philippe Kahn was a cat. The founder of Borland and other ventures certainly has more lives than one. For months he was touting "wearable computers" like his REX PC card; recently he began talking up what he calls the personal network.

Now Motorola has bought his Starfish company for about $200 million because it wants TrueSync, a piece of software that lets you synchronise data from any device (such as Motorola's pagers and smart cellphones).

Borland made Kahn's name as a visionary. Now it looks as if he has made his mark again.

Intel, Sony, IBM, Compaq, Tut, Lucent, Intelogis and at least 10 other companies are all touting home-networking products. Lucent's Home Star Network is wired into a house as it is built. CAT 5 wiring goes to every room and a "control box" can serve as a broadband link. It costs about $1500 per house.

Intelogis piggybacks its signal on the mains. The snag is that rooms have to be wired on a single loop. The Home RF Networking Group is working on a 2.4GHz spread-spectrum wireless system that will deliver up to 1.3Mbit/sec. VESA espouses the use of 1394. But front-runner for a standard is a proposal by the Home Phoneline Networking Alliance <www.homepna.org>, founded by 3COM, AMD, AT&T Wireless, Compaq, Epigram, H-P, IBM, Intel, Lucent, Rockwell Semiconductor and Tut Systems.

This standard should be finalised this month and aims to deliver an initial 1Mbit/sec over a standard phone line, and up to 10Mbit/sec within 18 months.

Tim Bajarin
letter from Silicon Valley

Only £199 gets you a PC

ICL is to sell reconditioned ex-company PCs from as little £199, but analysts believe the idea is dead in the water. The **Star (Second Time Around) service** aims to emulate Vauxhall's Network Q scheme for selling secondhand cars, by selling through 300 reputable dealers across Britain. The revamped machines will be from brand leaders including Compaq, IBM and Hewlett-Packard. Each will be wiped of data, refurbished, resprayed, relicensed and fitted with a new keyboard and mouse. All systems sold will come with a ninety-day warranty and dealers will provide telephone support and an extended warranty if required. Prices, which are to be set by ICL, will start at around £199 for a 486 system, and rise to £350 for a Pentium. The company says that they will be ideal for students,

homes and small businesses which do not need a fast system. Of 1.8 million PCs sold last year, more than half were replacements. "There may be a niche market for small, cost-conscious businesses which do not need all the bells and whistles," said Pete Day, an analyst for market research company Inteco. "But consumers in the UK can be talked up, they buy high-spec machines, and they want the latest and the biggest. It's a nice idea, but no way."

ICL is confident that the idea will catch on, thanks to European Union legislation expected next year, which will tighten the rules on the disposal of old computer equipment.

JAN HOWELLS, VNU NEWSWIRE

Star Hotline 01925 435431

Lefthanders of the world, unite! Saitek will release the first fully programmable PC joystick for left- or right-handed players this autumn. Not only is the Cyborg 3D Stick completely customisable, but it also features Ratio Digital technology, which uses an internal processor to speed gameplay. (Price to be announced.)

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Saitek 01454 855 050 www.saitek.com

The registered charity ComputerAid! is offering a free PC recycling scheme, allowing schools and charities in the developing world to benefit from UK businesses' unwanted leftovers.

For more information, call 0171 281 0091

Let's get serious, gamers

Dan Technology is hoping for a cut of the entertainment market with what it modestly calls "the world's most serious games PC". The Dan GameStation includes a DVD drive, 8Mb AGP video card with built-in TV, 3D video accelerator, a 17in monitor and two Microsoft Sidewinder joypads, among other goodies. Prices start from £1,648 (ex VAT).

Dan 0181 830 1100 www.dan.co.uk

Year 2000 round-up

The two warring millennium bug action groups have kissed and made up. Robin Guernier (*pictured, right*), director of the private-sector initiative Taskforce 2000, said that his group and the government-led Action 2000 had reached an agreement to "mutually support each other". The feud started after Taskforce 2000 had its funding removed by the DTI when Action 2000 was formed last autumn.

Action 2000 is asking British businesses to promise to take positive, rather than legal, action over Y2K. Both Sainsbury's and Unilever have signed Pledge 2000, a six-point document that includes promises to share information, help other firms in their supply chains, and avoid resorting to legal action wherever possible.

Insurance companies are being criticised for trying to duck out of paying for millennium-bug damage. Many say they've been forced to introduce millennium exclusions into their policies. Critics say they'll still end up having to pay out, but only after a lengthy and expensive legal fight.

Financial house Merrill Lynch is playing down Y2K fears, saying it will have little impact on the economy. It says there may be "glitches" but companies will cope. Analysts said the company might just be trying to minimise the fears of its shareholders.

Quarterdeck is being sued by one of its US customers over an alleged millennium bug. Against Gravity Apparel Inc. says the company continued to sell Procomm Plus 4.0 even though it knew it would be useless after 1999. It requires a $30 upgrade to be bug-free.

0845 601 2000, www.bug2000.co.uk

Email rogue code scare

Two new security scares erupted last month. Researchers in Finland claimed to have found a way to run **rogue code from passive email**, and a group called the **Cult of the Dead Cow (CDC)** claimed 35,000 copies of a Trojan called Back Orifice (BO) had been downloaded from its site in less than ten days. A Trojan is rogue code disguised as a kind of utility, or packaged as an ActiveX control. Once activated it sets up a control gateway, giving a remote hacker the run of your machine across the internet (or a local net). It will run under Windows 95 or 98. BO author Sir Systic said it was written to expose security holes in Microsoft software.
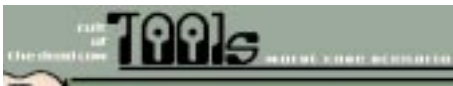
Microsoft has never denied that its operating systems are open to this type of attack. Users are advised to accept executables only from known sources, or those offering an "authenticode" certificate. More insidious is the email threat. Plain email cannot carry viruses; attachments can, but they have to be activated by the user. But the Finns say that an attachment with an unusually long name can crash some email programs and rogue code within the name will be executed without user intervention.

Vulnerable programs are said to include Outlook 98 (but not 97), Outlook Express (PC, Solaris and Mac versions) and Netscape Communicator 4.x. Netscape and Microsoft are likely to have posted patches on their sites by the time you read this.

(ADDITIONAL REPORTING BY DOMINIQUE DECKMYN)

RELIEF

Reader Brendan Griffin, of Eire, was tricked into launching the Back Orifice Trojan but wrote to tell us of a simple defence, based on the fact that it dumps its own configuration utility. Call up a DOS window and type boconfig boserve.exe. This lets you, among other options, choose a password, "then run the Trojan again and this will wipe the previous version." The hacker will thus not know the password to get into your PC. Trend Micro has posted a free fix at www.antivirus.com.

New transducers revolutionise speakers

Imagine being able to carry around a sound system with the capability of 3cu.ft loudspeakers, **listening to great sounds anywhere**. That's what Tony Hooley (*pictured, right*) claims to have developed, and his company, 1...Limited, is talking to the world's leading hi-fi companies about potential partnerships. Hooley says his are the first true digital speakers (USB speakers from Philips and Microsoft pack a digital-to-analogue converter). "All these hi-fi companies have agreed that what we have developed is the way to build digital loudspeakers," says Hooley, who has harnessed leading researchers in Birmingham, Paris, Australia and, shortly, San Francisco.

Hooley, an astronomer and Cambridge physicist, claims to have built the first solid-state hard-disk cacheing system, originally for Apple IIs, in pre-PC days. He said his breakthrough came around four years ago. For 20 years, anyone designing digital systems had thought in terms of binary data. But an on-off digital stream can also represent unary, or one-based data, which has the

characteristics of a tally system; a 1 counts as a 1 irrespective of position. "Our ideas began crystalising around unary concepts...with which we can do additional, fancy things with how speakers produce sound." The new speakers use an array of 256 piezo-electric transducers, each 10mm in diameter and 20mm deep; each can move up to 20mm.

"The key inventive step was realising that binary didn't work and how to make transducers suitable for unary," said Hooley, who spent the whole of 1997 with his team working on an innovative transducer format. "What we do know is that no-one else has worked on this. Everyone who has been to our labs, except one major Japanese company developing a different technology, said they knew digital speakers would come but they [didn't know] how to go about it." Hooley says that the transducers reduce distortion by a factor of ten compared with conventional speakers, use a fraction of their electrical power for a given sound level, and need to be a fraction the size.

"We can run loud, high-quality hi-fi speakers off a rechargeable battery. We foresee loudspeakers which are completely portable... [receiving data] via spread-spectrum wireless." First products could be on the market in two years. Hooley predicts that his transducers will be produced in their billions, with power amplifiers, digital-to-analogue converters and loudspeaker cables made redundant. They will also mean an end to the use of a PC's sound system, which cannot do justice to the machine's ability to process high-quality 20-bit digital audio. "As the sound info from a PC is...digital, this can be applied directly to the digital speaker which uses our transducers, with no amplifier needed."
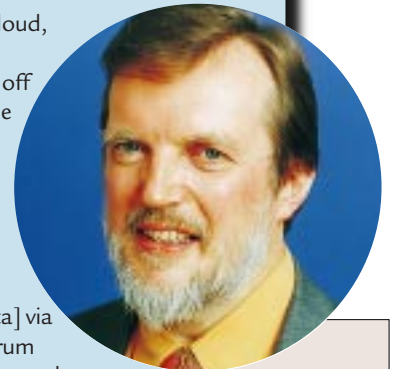
TONY HOOLEY CLAIMS TO HAVE DEVELOPED A WAY TO BUILD DIGITAL SPEAKERS

Caroline Swift **continues her reports from** *Silicon Fen*

news

short stories

▶ MIND GAMES
Uri Geller is giving the public the chance to see into his living room — without the benefit of psychic powers. For the next year, you can visit the UriCam <www.urigeller.com/uricam/index.html> at 11am and 11pm on the eleventh day of each month to try to guess what the "wizard of weird" is visualising. Prizes, including a Citroën Saxo, are on offer for the closest guess.

▶ BRAND-NAME BRIGANDS BELAYED
A new court ruling will stop internet "pirates" from registering famous brand names such as Harrods or Virgin, and then selling them back for a profit. In July, the UK Court of Appeal ruled that the company One in a Million, which had registered names such as burgerking.co.uk, was infringing on company trademark. The ruling brings UK law into line with US regulations.

▶ EXCITING FREE EMAIL
Excite is offering a free email service for UK users as part of its plan to increase localised content. By registering at www.excite.co.uk, you can get your own personalised email address. The service is similar to Hotmail and will soon be extended to Germany and France, and Excite plans to personalise the service further in coming months.

▶ SELLING POINT
If you're hoping to sell your car or pick up a used PC, try www.preloved.com. Preloved is a free, 500-category, UK advertising service.

net news
ISPs face competition from high street names

A battle is shaping up between the high street and traditional **internet service providers (ISPs)** to win new customers. In July, Tesco announced that it would be setting up as an ISP under the banner of TescoNet. Meanwhile, the Nationwide Building Society was expected to start offering a service later this summer. Demon Internet immediately announced that it would be offering extra value for its customers, in an attempt to ward off the new competition. But Tesco is confident that customers will be drawn to its brand name and is promising "low cost, ease of use, and excellent customer support".

The service, which will be provided through British Telecom (BT) for £8.99 per month, includes unlimited internet access, five email addresses, 5Mb of web space and local call charging. Customers who sign up for a year will be charged for only 11 months. Tesco's Information Technology director, Ian O'Reilly, said: "Our experience has shown

that the new wave of internet users are looking for a name they can trust. Tesco aims to offer an innovative service that will enable the novice, as well as the experienced web user, to make the very most of the internet."

Shortly after Tesco's announcement, Demon Internet revealed a package of extra goodies for its customers, including extra web space, a fax-to-email service, dedicated games servers and a three-month trial with BT's content site, Line One. It insists, however, that it is not unduly worried about high street competition, calling them "virtual ISPs".

Ade Brownlow, product marketing manager at Demon, says that although users might be drawn to a high street brand name at first, they're likely to switch to a traditional ISP when they get to know what they want from the internet.

The Nationwide is confident that the move from high street to cyberspace is the right one to take. "We have eight million customers. We already provide internet banking and have a web site. If you've got a large customer base it makes logical sense," said a spokesman.

SUSAN PEDERSON
(ADDITIONAL REPORTING BY VNU NEWSWIRE)

AOL 4.0 'Number one' ISP goes for gold

In the same week that it claimed it had become the number one ISP in the UK, AOL released the gold version of AOL 4.0. Praised for its more intuitive interface, AOL 4.0 features a spelling and grammar checker as well as a new address book, allowing users to check mailboxes or multiple accounts without logging off. AOL said that it had 450,000 members at the end of July.

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More information:
AOL 0800 279 1234, www.aol.co.uk

news

net news

RealNetworks kicks the WMP

Like Sun and Netscape before it, RealNetworks is accusing Microsoft of abusing its position. But many industry commentators, vendors and testers think there's no case to answer.

The row between Real Networks and Microsoft over their video streaming software could have far-reaching implications for how multimedia files are handled by competitive products. In July, RealNetworks slammed Microsoft, claiming that the new Windows Media Player (WMP) "breaks" its own Real Player software. It then called for a formal code of practice to be adopted that would give consumers a consistent experience for deciding which software should handle particular file formats.

RealNetworks CEO, Rob Glaser, told a Senate Judiciary Committee hearing on competition in the IT industry that when the WMP is installed on a PC running its new beta Real System G2, the Microsoft product registers itself as the default player for Real System content. It is unable to play any content created for Real System 5.0 or G2, however. RealNetworks also claims that the WMP replaces Real Player 4.0 as the default player for Real System content when it is installed on the same PC. Glaser's accusations were

◄**REALNETWORKS' ROB GLASER WANTS A NEW APPROACH TO HANDLING FILE FORMATS**

supported by a number of vendors, as well as the Software Publishers' Association (SPA), all of whom condemned the practice of automatically resetting user-preferences for a certain file type when a competitive application is installed. Digital Bitcasting claimed that it had suffered the same problems with its own media player, saying that "Microsoft's products go in and run roughshod over the data types".

Ken Walsh, president of the SPA, said that applications should never interfere with competing vendors' software and should always ask the

user for permission to change the default file viewing values. In a surprising twist, however, many vendors, journalists and testing labs rallied to support Microsoft, saying that the problem lies not with the WMP but with a bug in Real Networks' software. Larry Seltzer, ZD Virtual Labs' technical director, said: "Microsoft is right. It's completely unjustifiable for RealNetworks to say that Microsoft has changed something that broke the G2 player."

The Association for Competitive Technology also called for Glaser to withdraw his testimony, saying: "While it made for dramatic testimony, it raises the possibility that RealNetworks sought to exploit the Senate hearings to advance its own competitive interests at the expense of the truth." But RealNetworks is standing behind its statements, saying that claims of a bug are "technically inaccurate".

SUSAN PEDERSON

'Ask, Tell and Help' — a new initiative

RealNetworks has announced a set of principles to help customers decide what kind of software should handle their files. It is called "Ask, Tell & Help: Fair Practices and Conventions for handling file formats in the Era of the Internet".

Over 20 internet companies have pledged their support including Netscape, Novell, Sun Microsystems and Digital Bitcasting. If the principles

are adopted as standard, software will have to ask for permission to become the default viewer for certain file types. It will also have to point out any limitations that it might have in reading certain file types and inform the user of competitive products that might do a better job. The companies behind the initiative say that it will safeguard consumer choice and ensure the best end-user experience possible by

►**IS REALNETWORKS GETTING A RAW DEAL FROM MICROSOFT?**

providing a "vendor-neutral environment". Critics think that it will only serve to confuse inexperienced customers by providing too many options and needlessly complicating installation procedures. But it remains

to be seen whether the pressure for fair competition will ultimately outweigh the need for user-friendly computing.

net analysis special
Broadcast news

Are portal services the answer to satellite companies' dreams of big bucks? Clive Akass locks on to Convergence1, from Eutelsat, which promises twice the speed of ISDN at half the cost.

News that US Web TV makers have cut production for lack of demand is the latest sign of a curious phoney war. Everyone is preparing to battle for the billions to be made when computing, the net and broadcasting hit full synergy; but nobody knows quite how and when it will happen. Meanwhile, they plot, and fly kites (like Web TV based on outdated analogue technology) and pour billions into hunches — like the portal companies (*see opposite*). And the digital TV consortia focus on flogging set-top boxes for rival services, ignoring the millions of PCs that have the flexibility to explore their full potential.

An exception is Eutelsat, part-owned by BT and already broadcasting digital TV on many of its 350 channels. These are mainly foreign and minority channels but include many free ones in English. Eutelsat has hosted the DirecPC turbo-internet service for more than a year (*see*

Satellites and xDSL land links will cause a big shift in the way the net is used

Newsprint, May '97) and is now piloting, with internet service provider Easynet, a similar service called Convergence1.

As with DirecPC this requires a standard net connection for the up link, with a satellite and dish aerial providing a fast down channel. It differs in being restricted to an Easynet uplink, and in using open technology which any

manufacturer is free to supply. I tried it out using an Adaptec 1030 DVB card which is equipped only for data transfer: any MPEG processing has to be done in software. A new version this autumn will link to an STB board to enable hardware decompression for TV reception.

Convergence1 was still slightly buggy. The satellite connection reverted without warning to a land link and download speeds varied wildly, partly depending on how many pilot users shared a 2Mbit downlink. The bottleneck at these speeds is as likely to be at source as in the delivery. So there is an advantage in mirroring popular web sites on Easynet servers which can deliver direct to the satellite. Easynet is currently offering more of a portal model, with a variety of fast on-site services (*see screenshot, left*) though many of these are not yet fully operational. One that does work is that of Software Warehouse, which sells software online. In three test downloads spread over an evening, I averaged 113Kbit/sec, 178Kbit/sec and 248Kbit/sec. Easynet's technical guru, Justin Fielder, reckons upwards of 400Kbit/sec is possible in the early hours. Even at these speeds, downloads can take several minutes, during which time you are paying to keep a land line open. Yet DVB uses forward error correction which provides enough redundancy in the data stream to give a good chance of reconstructing lost bits and pieces (a 2Mbit channel, though, means 2Mbit of your data — the redundancy is not counted). So why not simply call for a file to be dumped by satellite, and forget about the continual handshaking over the phone? This might be possible using a carousel system, broadcasting a sequence of files at regular intervals. Any data missed first time round can thus be picked up during further broadcasts. Fielder doubts, as things are, if this could scale to

many users. Satellites also lend themselves to IP Multicasting, which sends a single file or data stream to many addresses with minimum use of bandwidth. Of course, the satellite's most efficient mode is that of one-to-anyone broadcasting. Clearly, satellites and always-on xDSL land links will cause a big shift in the way the internet is used: from pull to push, from unicast to multicast and broadcast. Newspapers, music, videos and software packages may be ordered by day and dumped at night on sleeping channels. These systems are still embryonic but the hardware is already in place. Fielder says: "Software companies have yet to catch up with satellite technology"; so, perhaps, have content providers and users.

If Convergence1 does go commercial, Fielder reckons charges will be based on "twice the speed of ISDN at half the cost". By which he means each user will be able to reckon on at least 128Kbit/sec bandwidth, twice that of a single ISDN channel. And there will be no per-megabyte charge, as with DirecPC. But satellite companies are not the only players in the field. A new company called Goldmine is set to announce plans for a broadband portal service using cable.
● *See the PCW web site for a hyperlinked version of this article, with pointers to further information (and another card supplier).*

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Easynet: 0171 681 4444
www.convergence1.com

SKY HIGH: EUTELSAT'S CONTROL CENTRE ▼

net analysis special
Band of gold

One part of the high-tech sector is thriving while the rest suffers. And as bandwidth gets bigger, portal companies are especially hot property. Tim Bajarin eyes up who's netting the big money.

With the rash of layoffs hitting Silicon Valley recently, you would have thought that the high-tech sector was on the downslide. In this technology segment at least, there seems to be no relief in sight. However, the internet sector is making up for job losses at equipment makers, with companies like Yahoo!, Lycos, Infoseek, and Software.net taking on staff.

The portal companies are especially hot property. Yahoo! in particular is going through the roof: it may not have earned much, but its valuation is almost $9bn. Recently, Disney purchased 40 percent of Infoseek, and Excite and Lycos are rumoured to have big-time partners lined up. So, what's driving everybody to invest? The answer lies in your TV set. Big media thinkers believe that these portal sites will become the next broadcasting medium, supplanting TV giants like NBC, CBS and ABC. The reason is that they are laying the groundwork for a two-way interactive approach that today's one-way TV companies cannot supply even if they go digital. Which is why Disney, which owns ABC, has bought into Infoseek. It will use this "net channel" to deliver Disney and ABC content, with interactivity. No-one expects mainstream TV broadcasting to fade away in the near future, but the writing is on the wall. So I consider Yahoo!'s $9bn valuation to be low. So does Wall Street, as financial analysts expect portal stocks to rise even higher. Also booming are commerce-related sites such as bookseller Amazon.com, and Barnes and Noble.com. Books are easy to choose online and cost up to 40 percent less than from the local store. Microsoft's top high-tech guru, Nathan Mhyrvold, reportedly spends about $5000 a month at Amazon.com. Companies like Amazon.com and Software.net have

Portal sites will serve as the front door to video, audio, information and commerce

created virtual businesses. They lack brick-and-mortar sites which can cost $1m just to get started, but they have a sophisticated operation to handle the web site, order entry and order fulfilment. More importantly, their "stock" of one million books does not reside under a single roof. Instead, the books sit at publishers' sites and multiple warehouses, and are sent to customers using a simple electronic order fulfilment process.

Egghead Software has closed all its retail stores and opted for a similar approach, and music vendors are following suit. They can offer sample sound clips to tempt buyers. In fact, Amazon.com is starting to sell music and could soon offer movies.

We are already seeing the real-estate market move in this direction, as well as consumer electronics stores like Circuit City and The Good Guys, which have used their web presence to extend their local businesses to the entire world. This same model is now starting to be applied to the radio business, and national web-based radio is on the horizon. As bandwidth increases, the delivery of TV and video will also start streaming over the net, reflecting the concept of virtual businesses. It's no wonder, then, that portal sites like Yahoo! and Infoseek are such hot properties. They will serve as the front door to video, audio, broad and narrow information, and commerce. They are destined to become the broadcasting giants of the next century.

analysis

The young pretender

Linux, the underdog free operating system, has been enjoying a recent surge of popularity: even Microsoft seems to be taking it seriously. Susan Pederson wonders whether it can last.

When Danish programmer Linus Torvalds created the first version of the Linux operating system in 1991, he had no idea how much interest it would eventually generate. In fact, he liked to joke that it was the operating system for one person — himself. But it all started to change this summer when several top-tier vendors announced their support for the former "hobbyist clone" of the Unix operating system.

In July, Oracle announced that it would be porting version 8.1 of its database to Linux, while database software company Informix says it will also move its software to the system. Linux has also been demonstrated on a system running four of Intel's new Xeon

processors, and a version has been promised for Intel's upcoming 64-bit Merced architecture. These announcements have prompted a flood of predictions that Linux is fast becoming a force to be reckoned with.

Like other freeware products, Linux is something of an upstart in an industry that thrives on moneymaking and *de facto* standards. Developed and maintained by a group of unpaid enthusiast programmers working across the internet and co-ordinated by Torvalds, the Unix kernel is downloadable for free and comes with a General Public Licence. This means that anyone can change the source code as long as they submit alterations back to the group. Netscape recently did the same thing and is now offering the source code to some of its software for free via the internet.

Torvalds says that Linux still needs some work and is not ready to tackle either the low-end novice-user market or the high-end commercial server arena. But this has not stopped NASA

'…the levels of support given to us by the Linux community are exceptional'

developing a Linux-based massively parallel system. Torvalds also believes that Linux is an important weapon for smaller companies trying to compete against giant corporations like Microsoft. He's even predicted that Linux will become the dominant Unix server operating system within three years. Linux is certainly gaining support from an increasing number of vendors. It has been reported that Computer Associates, Interbase and Software AG are all working on Linux database ports. Netscape has also promised to port its Directory and Messaging servers to the platform this year, with the rest of its products following in about 18 months' time. And Corel has ported WordPerfect to Linux, too.

Other vendors are even more vehement in their support of the free source-code model. John Brittain Adams, managing director of Chameleon Computers, says that his company has decided to stop selling all Microsoft products by the end of the year, instead focusing on sales of Netwinder and Cobalt computers. "It's due to the total lack of support that Microsoft has given us," says Adams. "We've decided that the levels of support given to us by the Linux community are exceptional." Adams believes that Linux will evolve so quickly that major vendors (including Microsoft) will be powerless to fight it.

"I can confidently predict that within 14 years, open source code software will eliminate the dominant software companies of the moment," says Adams. He even goes so far as to say that if Microsoft wants to survive, it will have to start porting to Linux. And Microsoft seems to be taking the challenge seriously: in April, it was accused by Caldera of putting pressure on a PC maker not to license Open Linux.

But Linux faces many challenges. Its critics say that it is not sufficiently user-friendly and claim that technical support is lacking. These pitfalls may make many potential customers think twice before abandoning their NT systems. Analyst IDC estimates that Linux currently has 6.3 percent of the server market, but it's likely that many of the operating systems are being used by internet service providers — very experienced users who are looking for a cheap alternative to Windows NT.

It's possible that the flurry of third-party support this summer was little more than marketing hype. The sudden announcement of major database vendors' support for Linux came at the height of the holiday season, a period when product launches are scarce and the industry needs a talking point to tide it over until the autumn. Despite Linux's obvious merits, the timing is just a little too convenient for comfort.

news

analysis
Office politics

Tim Nott considers the Office 2000 beta, explaining how Microsoft hopes to use HTML to enhance the digital nervous system of large corporations by playing a hand of proprietary aces.

It could only happen in the software industry. Microsoft flew in journalists from around the world to Seattle, and spent two and a half days showing them the next release of Office on the condition that the assembled hacks swore not to tell a soul for four weeks.

There is method in this seeming madness, though. Microsoft wanted to give reviewers a head start without stealing the thunder from the official Beta One release date. By the time you read this, the wraps will be off and 20,000 beta-testers will have their hands on the product. To confuse issues, the beta version is titled Office 9, the Reviewer's Workshop was entitled Office 2000, and it is expected to appear in "early 1999".

There's a lot that's new (and we'll report in a future issue of *PCW*) but the big question is that of file formats. It has been reported, a little misleadingly,

that HTML is to become the native language of the Office components. This is not the case. The .DOC, .XLS and .PPT binary file formats remain unchanged and retain their status. The Access binary file format has changed but only to enable Unicode support which provides the vital "two-byte character" support for oriental languages. So, where does this HTML thing come in, and what's it all about? In a nutshell, it's all to do with "leveraging the web paradigm" to enhance the "digital nervous system" of large corporations. To get a perspective on this, it helps to know that 75 percent of Office sales are made to corporates. Now think intranets. The advantage of putting a document on a company web site rather than emailing binary files is self-evident, with simple, speedy distribution and faster feedback.

What's made this difficult in the past is first, the conversion to HTML: previous editions of Office can "Save As…" HTML; but even Microsoft admits this wasn't well implemented. Second, there's the problem of transferring the HTML files to the intranet web site. These factors conspire to limit web publishing to intranerds or departmental webmasters, creating a bottleneck that negates the advantages of intranet distribution. The first of the three aces in

Seventy-five percent of Office sales are made to corporates

the Microsoft hand is "round tripping" between binary and HTML formats. If, say, you save a Word document containing drawing objects to HTML, then these will be converted to GIFs for display in a browser. However, the original drawings will be preserved in the HTML file as XML (Extensible Markup Language) objects, as will other "invisible" attributes such as document properties. Load the HTML file back into Word, and all the original objects and formatting return.

Then comes the integration of web folders, either on a company intranet or the worldwide web, into the file system. The user can load from or save to any web server for which they have permission. As with the HTML "round tripping" the process is transparent to the end-user and as easy as accessing folders on their own hard disk.

So far, so good, and this technology is not proprietary; it will work in conjunction with non-Microsoft browsers. But this is essentially static HTML. The documents don't "do" anything when viewed in a browser, but have to be loaded into the authoring application to be editable.

With Internet Explorer 5, though, Microsoft plays its final, proprietary ace. In-place "Discussions" can be attached to a document so that others can make newsgroup-style threaded comments, either in IE5 or in the originating application.

It gets even more clever with the Office Web components. With these installed on the server, and Office 2000 and IE5 installed on the client, the user can manipulate data in a spreadsheet without leaving the browser. Facilities include online form-filling (e.g. for expenses claims) and detailed manipulation of data held on the server, such as using Excel-style charts or pivot tables.

net law

EC gives its blessing to domain name reforms

The European Commission has pledged its support for the US government's proposals to reform the internet name and address system. In June, the US Commerce Department suggested that a new international non-profit-making corporation should be set up to manage internet domains.

According to a European Commission statement, "The EU, the US, and the international community agree now that all pending decisions on internet governance should be referred to the new private sector self-regulatory [body] that is to be created in the next few months."
The EC had criticised earlier

proposals by the Clinton administration, saying that it failed to take a global approach. At the end of July, the European Commission praised the new plan for a balanced, internationally-constituted membership and board for the non-profit making corporation.
It was also delighted at assigning a central role to the World Intellectual Property Organisation in resolving trademark disputes involving internet names. Finally, the Commission urged the internet community to participate in the proposals, saying that the question of the membership and structure of the new corporation should be addressed with the utmost urgency. The US

government's proposal turns over many of the most controversial decisions on the internet's future management to a yet-to-be-formed international board of 15 members.
   The board will decide how worldwide web addresses are managed and work out how it will resolve cyberspace trademark disputes. The European Commission, the executive body of the 15-nation European Union, viewed the 30th September deadline proposed by the Clinton administration as "extremely tight" but said it was prepared to help meet that date. The board planned to meet in Singapore in August.
JAN HOWELLS,
VNU NEWSWIRE

short stories

BONE UP ON CHINA Find out whether you're a rat or a pig at www.chinatown-online.co.uk, a guide to Chinese communities around the world. Chinatown Online has details of restaurants, education listings and services, including information on Chinese history, business and travel. You can learn how to spell your name in Chinese characters, check your horoscope and try the virtual fortune cookie.

RED BRICK NET Oxford University will offer adult education courses in local history and computing over the internet next spring. Students, from anywhere in the world, will communicate with their tutors via voice conferencing, email and internet chat groups. The university says future courses will include medicine and software engineering but it has no plans to provide online degree courses.

LAST CHANCE FOR BEST 'SCHOOLS SITE' The search for the best schools web site is almost over. Acorn and Argo are offering schools the chance to win £1000-worth of educational software and hardware: all they have to do is show that their web site is the most effective, imaginative and interactive. Entries should be sent to schoolscomp@argonet.co.uk and must be submitted no later than 25th September.

Yell Top 10 web sites

CyberTranscriber is not only one of the most useful applications for the internet that we've come across in a long time, it's also one of the cleverest. This internet-based dictation transcription service will help you free yourself from the tyranny of the keyboard and the mockery of your more nimble-fingered colleagues. Simply phone in your dictation, and it's sent back to you the next day as an email

attachment. There's no voice training required, it's astoundingly accurate, and it's much cheaper than a secretary. It even coped admirably with a Canadian accent. We don't know how they do it, but boy, do we like it.

1. Beano www.beano.co.uk
2. The Body Shop www.thebodyshop.co.uk
3. Circlemakers www.circlemakers.org
4. CyberTranscriber www.cybertranscriber.com
5. Fisherman's Friend www.fishermansfriend.org
6. Give as You Earn www.giveasyouearn.org
7. RSPCA www.rspca.org.uk
8. Scotland Online www.scotland.net
9. Screens www.screensonline.co.uk
10. Zapit www.zapit.co.uk

news

GAMES

Fight WWII in the air with MS Flight Simulator

Flight-sim lovers are in for a big treat with the next version of Microsoft's popular DIY pilot program. The new edition of Flight Simulator will be a **World War II historical air combat** simulation, including eight realistically-modelled aircraft. Players will experience real-world navigation based on historical information and atlas data. You'll be able to choose from a variety of aerial combat scenarios, aircraft,

▲**AGE OF EMPIRES II DELAYED UNTIL SPRING**
▼**AUTUMN LAUNCH FOR THE NEW WWII EDITION OF THE MICROSOFT FLIGHT SIMULATOR**

missions and combat areas. It's due to be released in the autumn.

Coming soon from Codemasters is **Colin McRae Rally** (the only official game of the champion rally driver). Players will roar around the track at speeds of up to 160mph and compete in gruelling international rally championships consisting of 48 individual stages in eight countries. The game features four 4-wheel and four 2-wheel drive rally cars, with a further four bonus cars. Visit www.colinmcrae.com.

Sierra Studios' epic game of city building in the Roman era, Caesar II, has been so successful that it is planning to release a sequel. Available in October, **Caesar III** will allow players to build and maintain Roman cities, develop armies, defend their territory and earn promotion, ultimately to the rank of Caesar.

And more news on the development of another strategy game, Microsoft's **Age of Empires II**. The release date has been put back to spring 1999, but if it's anything like the original version, it should be

worth the wait. Age of Empires II spans a thousand years of human history, allowing players to control the destiny of humankind from the fall of Rome through to the Middle Ages. Starting with minimal resources, players are challenged to build their nations into great cultures. There are several ways to win, including conquering enemy civilisations, accumulating wealth by extensive trading and diplomacy, building and defending wonders of the world, or protecting a king or queen.

ETELKA CLARK

Ghoulish games

Flesh Feast is a new action-strategy game. Players must kill hideous corpses that have come to life to prey on humans — not a game for the squeamish! Watch out for a review in Screenplay, soon.

Sad singletons can rejoice, now that Japanese technology has mastered the art of seduction.

When girl beeps boy

There are few sadder places than a singles' bar. A singles' salad bar, maybe. But one doesn't come across those very often. "Can I tempt you with a small lettuce, my dear?" isn't really as enticing as "How about a white wine spritzer, darlin'?" Unless you're trying to pull a caterpillar or an aphid. Even there, though, the whole thing smacks terribly of desperation. One of the reasons I muse thus was that I found myself in a Maida Vale "meat market" last week, courtesy of a newspaper that needed to photograph me manifestly failing to pull. I've never found this to be a problem, so they got lots of convincing shots. How different it might have been, however, had I had access to the latest in courtship technology: the Lovegety.

Possibly you've heard of one of these. Invented in — where else? — Japan, a Lovegety is basically an adolescent Tamagotchi, aimed at "men wanting to meet women and women wanting to meet men". About the size of a medium egg, the thing comes in male and female versions, and is programmable. Currently, there are just three modes**:** Talk, Karaoke, and Get2. As I understand it, these correspond to: "Can we have a conversation?", "How about we make sweet music together?" and "I am absolutely gagging for it". When two oppositely-sexed Lovegetys set to compatible mode come within 15 feet of one another, they beep and flash a green light. Thereafter, their respective owners let nature takes its course. Of course, when, later this year, Lovegetys eventually reach the UK, the problem faced by whoever first buys one will be the same as that faced, presumably, by the first person who bought a fax machine: it's of limited use until a second person buys one. But if Japan is anything to go by, it shouldn't take too long for sales to take off. Then, as Lovegetys become increasingly popular, I can see them having a considerable impact on our lives.

At the moment, dating is a rather inexact science, like finding a decent plumber or a reputable car mechanic. But to know, with a single "Beep!", that you are within just a few feet of a potential soulmate will be an enormous confidence booster. Even people who routinely buy internet magazines will be in with at least a chance, however slim. Naturally, the technology needs to be refined somewhat before it becomes really useful; but this, I'm told, is already in the pipeline. The range, for instance, is being increased to 100 feet, and the three basic modes are being supplemented by a number of others. Pretty soon, you should be able to buy a Lovegety into which you can tick off all sorts of variables, rather like one of those Dateline questionnaires. So, for example, a be-singled man will instruct his male Lovegety to home in on a female Lovegety: (a) into clubbing; (b) likes keeping fit; and (c) has an understanding attitude to beer guts. For her part, the woman will be able to specify a male Lovegety who is (a) a strong, romantic type; (b) a non-smoker; and (c) has own hair and teeth. Proximity is all that's then needed. And even if the man and woman themselves don't "click", they can at least leave their compatible Lovegetys alone together in a drawer and let them get on with it.

Thanks to the Lovegety, marriage bureaux and introduction agencies will go out of business. Who needs to pay upwards of £1000 for a pair-off when a

> **For example, a be-singled man will instruct his LOVEGETY TO HOME IN ON a female Lovegety who is into clubbing, likes keeping fit and has an understanding attitude to beer guts.**

$29.95 device can do exactly the same job? The singles' bar will be rendered redundant, too. What's the point in gathering together in the one location to advertise the fact that you're sad and available when you can do it absolutely anywhere, such as the top deck of a bus or on the Tube?

And all those dreary blues ballads — "Mah woman gone done me wrong" and other, similar caterwauling — will be consigned to the dustbin of history. Technology will ensure that man will no longer be able to get himself into such a ridiculous situation in the first place.

I can see this thing completely transforming male/female relationships. Provided the batteries don't go flat too quickly.

Mike.hewitt@mjh1.demon.co.uk

Many of the claims made for Windows 98 have proved to be inaccurate, says Barry Fox.

Sex, lies and videotape

Microsoft launched Windows 98 on 25th June with a big party and a welter of sycophantic publicity. Microsoft's Windows product manager, David Weeks, brushed aside my concerns about upgrade crashes and incompatibility with Windows 95 drivers as being one-off anomalies, unique to me. When Channel 4 news ran a story highlighting the problems, Anne Mitchard, marketing manager in the personal systems group, gave the classic excuse that I and others who had experienced problems with the upgrade from 95 to 98 were "untypical users" because we are "constantly trying non-released code and having lots of prototype hardware".

If Anne Mitchard had read what I write in *PCW* she would have known that I have a strict policy of never using beta software. This was further entrenched when beta copies of Beta 98 were given out at one of Anne Mitchard's own briefings. It crashed my PC so disastrously that I had to reformat the hard disc. Since then I have used no beta software, so it is thanks to Anne Mitchard that I can say for sure that when the final retail version of Windows 98 upgrade crashed my PC, there was no non-released code on it and no prototype hardware. Even when Windows 98 is safely running, your troubles may only be starting. If Windows 95 does not recognise a modem, it treats it as a generic "standard". Windows 98 does the same, but goes on to interrogate it. If there are any error messages, Dial Up Networking refuses to dial.

Microsoft claims that Windows 98 makes the use of ISDN more efficient. But the setup procedures provide no visible support. A Racal terminal adaptor that worked under Windows 95 does not work under Windows 98. Adaptec's Direct CD, which Philips bundles with CD recorders sold under its own and many other names, including Hewlett-Packard, works perfectly under Windows 95 but crashes Windows 98 into a "system halted" blue screen error message. The user then has to know enough to run Windows 98 in safe mode and uninstall the Direct CD software. Both Philips and Adaptec blame Microsoft. A new version of Direct CD, 2.0A, may work with Windows 98. But only if the PC has a recent BIOS.

Dixons marked the launch of Windows 98 with a massive promotion. Large in-store placards promised "cinema-quality full-motion video" and "multichannel digital surround audio" from DVD. There was a special offer to "Save over £20 when you buy the Windows 98 upgrade and Creative Labs DVD drive for £178". Under the slogan "Use your PC as a video player", PC World's Discover Windows 98 giveaway brochure promised that "because Windows 98 supports DVD, you will be able to play the latest DVD movies on your PC as if you were watching them on a video player....You can do it all from Windows 98!" The bundle of Windows 98 upgrade and Creative DVD-ROM drive can "play movies...with movie quality footage plus multi-channel AC3/Dolby audio off a single DVD". PC World also sells "the latest movies" on DVD discs. But to play DVD-movies from the Creative DVD-ROM drive, you also need to install an MPEG-2 decoder board. The store I visited had no boards available for customers who might have discovered that they needed them. I asked PC World's press office, and obtained an astonishing admission. "The brochure copy you refer to was....checked by Microsoft

I have asked the Advertising Standards Authority to investigate how Dixons and Microsoft could build an advertising campaign on A FEATURE OF WINDOWS 98 THAT DOES NOT EXIST.

before it was reproduced. Dixons Group had been led to believe by Microsoft that Windows 98 would include MPEG 2 decoding capabilities. However, following publication of the brochure and the offer we were informed by Microsoft that Windows 98 did not support DVD movie discs on its own and that it would be neccessary to purchase an MPEG 2 decoder. PC World dispatched a note to all technical centres explaining the situation. We are grateful that you have brought this matter to our attention and are currently arranging for notices in all our stores which will clarify this issue for our customers." I have asked the Advertising Standards Authority to investigate how Dixons and Microsoft could build an advertising campaign on a feature of Windows 98 that does not exist.

100131.201@compuserve.com

So, the paperless office will save trees, will it? Don't make me laugh, says Brian Clegg.

Not out of the woods yet

I was wandering down the glass-covered street at the heart of a high-tech modern headquarters building the other day when I saw someone I recognised. I asked "Dave", as I shall call him (because it's his name) what he was up to. He replied: "Electronic document management", to which I said, "Oh yes, the paperless office". The outcome of this witty exchange was hollow laughter on both sides. This wasn't brought on by sunstroke. Ask anyone involved in what used to be called Office Automation about the paperless office, and you'll probably get the same reaction.

The paperless office is a sensible concept — do away with the paper flying around the office. No more post to open, just electronic documents, whizzing around the net. It's fast, it's efficient, and best of all in this eco-friendly world, it gives trees a break. The trouble is, the paperless office is like one of those po-faced black-and-white television programmes that imagined life in the 1990s. You know, when we'd have robots doing the housework and we'd all fly helicopters and read newspapers printed on metal foil. It wasn't just the earnest science presenters getting things wrong. You only have to look at that classic film *2001* — set just three years from now — to see a PanAm (remember PanAm?) shuttle en route to the space station and big-screen videophones as the norm.

Business computing has been dogged by chimera like the paperless office. In the 1940s, Thomas Watson Sr, the man behind IBM, commissioned a report into the business potential of the new electronic computer. It concluded that the demand from the entire US market would amount to little more than a handful of machines. The paperless office was based on a similarly dubious prediction. As two key technologies began to emerge — scanning to reproduce a paper document in electronic form, and email to move electronic documents around a company — the cry went up that paper was dead. We should have known better.

In fact, the electronic office proved exceedingly proficient at generating paper. Laser printers and fast photocopiers could push more onto the printed page in less time. Improved layout capabilities meant that documents were drafted several times to get them looking right. Lengthy dumps were made to paper, "just in case". As email grew in popularity, some people began to print their mail to read it in comfort. The ability to produce pretty graphs meant that every report had to have half-a-dozen more pages. And, of course, the flow of paper from outside the company showed no sign of slowing down. Like many failed predictions, the error was mostly in timing. New technology initially generates more work, not less. And the changes rarely happen all at once. The trouble with the "paperless" label is that it's all or nothing. Reality is more incremental. Now, as aspects of the electronic office become more common, some of the benefits are appearing. Take external post. The grand vision pushed this through a central facility which would open it, scan it and send it on to the recipient in electronic form. Not surprisingly, this didn't catch on: it's expensive and difficult. Imagine being the poor scanner operative who had to deal with Reader's Digest prize draw applications. Yet fail to scan *everything,* and the scanner becomes a censor.

> **In fact, the electronic office proved exceedingly PROFICIENT AT GENERATING paper. Laser printers and fast photocopiers could push more onto the page in less time and documents were printed several times to get them looking right**

That picture of the world is unreal, but incoming mail has changed. When the paperless office was first envisaged, email was purely in-house. Now internet mail gives worldwide reach. Half the press releases I get come by email, and the proportion is rising all the time.

The same goes for internal documents. We are increasingly seeing simple administration — expense claims or overtime forms — performed electronically. Intranets and other internal information networks are reducing the need to churn out thousand-page reports. We've ended up with the semi-skimmed milk of the paperless world. It might be reduced paper rather than paper-free, but it's a step in the right direction.

Brian@cul.co.uk

Intimate acts and true confessions may be what the internet is all about, says Paul Smith.

This time it's personal

I've always been embarrassingly entranced by disk defragmenters. Ever since I had my first copy of Norton Utilities, I've found myself mesmerised by the sight of each little cluster being read, written and verified to its new home. The only thing that saves me from despair in this desperate pastime is the knowledge — well, more of a hope, really — that I'm not the only one who does this. So, given, let's say, some propensity to mindless time wasting, why do I get so wearied by the interminable sluggishness of the internet? Why call it 56K when it's 42K? Why advertise ISDN as "only £99" when it costs over £50 a month? Well, I am nothing if not a great rationaliser. Watch this: it's important to monitor the progress of your defragmenter closely to make sure that the estimated time is accurate. Not bad, eh?

And I've got a good one for this whole web business too. The internet is a medium manically in search of its own justification. As with all new technologies, we only know how to look at it from the viewpoint of existing technologies. TV was first conceived as radio with pictures; networks as floppy-disk replacements. It is the same with the internet. DARPAnet and Janet were just WANs. But new technology, by definition, changes the whole landscape; otherwise it's not new. We're pretty sure that the internet is a lot more important than another network, but we still don't know how. However, the last couple of months have given us some clues.

We've seen the birth of Sean, George Michael in chatty mood, and Oscar and his "Our First Time" site. The birth received a lot of attention — the first to be relayed live on the internet. Promoted by an American health cable station, it made waves because of its innate privacy. In contrast, George Michael hosted an online chat wherein he promised to answer frankly any questions put to him, and to clear up any issues that might come out of it. Finally, there was the story of another very private event made public — that of Mike and Diane, two 18-year-old virgins who pledged to lose their virginity on the internet. Live. What these three events promised was a way of communicating the personal to the masses. They portend new ways of sharing experiences that even television cannot hope to challenge. In the end, of course, all three were tempered by a very modern cynicism. Sean was indeed born live on the internet, but the birth was seen by only a few, the site <www.ahn.com> having been swamped and the organisers woefully ineffective in dealing with the demand. You can still view the event now, but what you'll witness is rather dull, hours of talk being followed by a few minutes of furtive, shaky cam images of doctors' backs and then a little Sean. Hardly edifying.

For pure cynicism, Our First Time <www.ourfirsttime.com> takes some beating. Oscar and his team so horrified his original web host, the Internet Entertainment Group <www.ieg.com> that it chucked him off. IEG is not a place of the most righteous propriety, hosting sites such as Manhole, Pussy.Com and Buttsville, so its organisers would have to be pretty shocked to blanch at a couple of virgins. But IEG discovered that Oscar was out to con. Go to the site now, jump to the Big Day and you'll find nothing but a page of script, telling how Mike and Diane decide not to do it after all, because Mike can't fit a condom. Very helpful.

> **What these three events promised was a way of COMMUNICATING THE PERSONAL TO THE MASSES. They portend new ways of sharing experiences that even TV can't challenge.**

George Michael went online for the first time to talk about, you know, stuff. He started off by scotching any attempts to talk about That Toilet. But he did talk, candidly and wittily, about his life. I learnt more about him from that short chat than I did from all the Wham retrospectives in the world. It turns out that he's a bright, honest, self-effacing person.

The net, it seems, is slowly finding its voice. Not one voice, of course, but a multitude of voices, some callous and exploitative, some personal and engaging. And why not? That buzzword, narrowcasting, could be what the net is all about, after all: let anyone shout at the whole planet and find their audience, wherever they are. Maybe I'll hang on the line just a little bit longer.

www.paulsmith.com

Learning curve

Although there a few excellent bargains available for educational software – for example, Microsoft's Visual Studio for only £116 (inc VAT) – there are a few problems with these wonderful offers.

1. If you're going to college/university this year, you won't be able to buy your software until you're actually there and attending. This gives you no opportunity to check it out before you need to use it.

PCW replies > A great idea which we'll look into. In the meantime, John, you'll be pleased to learn that you'll be returning to university with a brand-new Taxan 17in monitor!

2. Very little, if any, paperwork comes with the edu-pack software, so you need to pay for the books to go with the software, too. Why not just include them?

3. Tracking down these edu bargains is like looking for the Grail itself. Microsoft is the best at advertising its edu software, but even it only offers five options. Corel offers edu packs, but the selection is, let's say, poor.

For the sake of all us poor student types, can we see a feature on the complete selection of edu software available? Oh, go on!

JOHN SKINNER john.skinner@saqnet.co.uk

We hope you enjoy this special redesigned issue, but it's your magazine and we'd appreciate your comments. Please email us on newlook@pcw.co.uk with your thoughts — we'd really like to know what you think.

Hate Mail

I am writing to say how I agree completely with R Moyes' comments on delivery costs (*PCW* August). My own experience was, if anything, worse. I was required to pay £8 plus VAT to have delivered a memory board costing just £10. To add insult to injury, the service was vastly less convenient than first-class or registered post, which would have cost a fraction of this figure. The company would not simply post the item through my letter box; it required a signature. It would only deliver during "normal office hours" and not on a Saturday. Both my wife and I work full time, which means that to have the item delivered at home, I would have to take a day off work. It looks like my only alternative is to drive half way across London on a Saturday morning to collect the parcel from the Courier's depot, which is open only between 8am and 10.30am. In contrast, by first-class mail the parcel would have been on the mat the day after ordering. Even with registered post, I could have collected the parcel from the nearby sorting office on a weekday or all of Saturday morning. Why do some mail-order firms insist on providing a service that is so inconsiderate to their customers' needs?

STEPHEN CLIFTON 114062.1222@compuserve.com

BE A CYBER GRASS

Following your article on Net Fraud (*PCW* August) I thought your readers would like to know the web address for the official Scotland Yard Guidelines, to preserve evidence after a cyber intrusion. It's at www.csfi.demon.co.uk. The link is on the front page.

HARRY LASCELLES
hlascelles@bigfoot.com

FADE TO GREY

Nowhere in September's colour inkjet group test, or any others that I have seen, has there been a discussion or review of image fade with different types and makes of printer. My old HP 550C produced very good colour on its glossy paper, but the prints were unusable anywhere near sunlight, with the cyan ink fading within a matter of days, and turning a blue sky in a poster to bright magenta! My routine when investigating a new printer is to mask off part of a sample print from the different manufacturers, put them in a sunny, south-facing window, and check the masked section against the unmasked section every day for a fortnight.

MIKE IANNANTUONI
100526.71@compuserve.com

PCW replies > A cunning plan indeed, which was almost implemented in our last group test. Until, that is, we realised that the PCW office simply doesn't get any sunshine! Perhaps Mike has some spare windows we could use.

Facing up to Overclocking

Increasing attention is being given to overclocking, but without any real mention being made of the downsides. Firstly, not everyone can or should overclock their system. Overclocking by definition means that your system is running at a speed it is not designed for, and thus is more likely to fail. Some chips are better for overclocking than others. One of the main factors I have found in this is the heat produced by the overclocked chip. An overclocked chip will almost certainly run faster than a non-overclocked chip, and so it is imperative that adequate cooling is given to the system.

The best chips for overclocking are from Intel, but most produced over the past 18 months have had the clock multipliers locked at a particular level. The only way to get around this is to increase the bus speed, but this can cause havoc with PCI devices, particularly with the 83MHz settings offered by many boards.

However, the most important thing is that overclocking a chip will almost certainly invalidate any warranty. For this reason you should always be conservative when overclocking, increasing the speed slowly and ensuring the system runs stable.

Overclocking should only be attempted by people who feel comfortable with PCs at a technical level. It should not be attempted by people unsure about changing jumpers on a motherboard or settings in the BIOS. It is not the panacea which some hold it to be — there are potential problems — but dealt with sensibly, overclocking does lead to more bang for your buck. Just remember, cooling, cooling, cooling. (For the record: K6 200 running at 75x3 (225MHz) flawlessly for 12 months.)

JOHN CALLAGHAN jkc102@york.ac.uk

Gordon Laing replies > *For the record: Intel P200 running at 83x3 (250MHz) flawlessly for about 20 minutes. It was a dramatic, albeit short-lived, improvement!*

…letters

WE WHO PAY TO WAIT

I recently had the misfortune to have to phone four different companies for technical advice. Each one used an automatic routing facility: you know the type of thing — press 1 for sales, press 2 for technical assistance, and so on. I pressed the specified button, sometimes getting a human telling me I would be placed on a queue and be forced to listen to some music, and sometimes getting a ringing tone that was never answered.

One company had a simple answer machine instructing me to replace my phone and try again later, because all their technicians were busy. This was particularly frustrating: why not just give the engaged tone? I would much prefer to get an engaged tone when there is nobody free to answer the phone, or perhaps a machine that would take my number so the company could call me back. Another palliative would be for the system to tell you the length of the queue every 30 seconds or so, then you can decide if it's worth hanging on or trying again later.

When there are sufficient people to run the system, it works very well; otherwise it engenders a great deal of resentment and can do nothing to improve real customer satisfaction.

GARY WOODING
binswood@zetnet.co.uk

IS SOCKET 7 DEAD?

Intel would like us to believe that the only way forward is with its Slot 1 Pentium II CPUs. The new AMD K6-2 with 3D Now!, however, currently offers up to 333MHz CPUs, designed to fit on the latest-generation Super-Socket 7 mainboards. These boards certainly rival even PII BX-based systems. And yes, you get an AGP, similar configuration of PCI/ISA slots, and it accepts the latest 100MHz SDRAM modules. Consider the Photon 100 AGP mainboard from California Graphics <www.Calgraph.com>: the advantages of a 5.5 multiplier clock speed immediately speaks volumes as to the advantages over Pentium II. For once, it looks like it is possible to invest in upgradeable PC systems — not outdated ones from the time of purchase.

RICHARD BEWLEY
Richard.Bewley@cableinet.co.uk

PCW replies > See this month's PC Group test [p174] to see how the new AMD processor fares. The K6-2 has a new instruction set called 3D Now!, which accelerates 3D functions in the same way that the MMX instructions were supposed to enhance general multimedia performance (although ended up most benefitting image processing). None of this is of any use, however, if no-one writes software which specifically makes calls to these new instructions. nVidia has written optimised drivers for its Riva 128 graphics chipset, although most exciting of all is support from the forthcoming Microsoft DirectX 6. Games written for DirectX 6 should make use of 3D Now!, which could give AMD the upper hand until Intel's Katmai instruction set arrives.

The Funny Side of Suicide

What a great read the September issue was. I couldn't believe Barry Fox's article: what a damning tale about Windows 98. Then I read Paul Smith's page — the same thing again! I couldn't stop laughing! If the *PCW* experts are having these problems, what hope is there for the rest of us?

Has Windows 98 been released just a teeny bit too early or is it just over-reaching itself slightly? Luckily, I'm a confirmed Mac user, so I don't have all the fun and excitement of suicidal OS installations. But I do like to read about the adventures of those intrepid many that do!

CHRIS WORRELL
chrisdw@atlas.co.uk

PCW replies > Good news to Chris and all other Apple addicts: the Hands On Mac column returns in this very issue on page 304, and it's even joined by a new 16-bit column for those command-line interface fans.

WINDOWS 98 – GET YOUR CARDS OUT

I have an invaluable tip that might assist users who are encountering serious trouble upgrading to Windows 98: remove all non-plug 'n' play ISA cards.

I do not claim that this procedure will work for everyone, but I would like to share with you my experience of PC hell when I took the plunge of upgrading to Windows 98. The set-up reported that Windows 98 required a substantial amount of base memory to start installation. Then, a thought suddenly hit me.
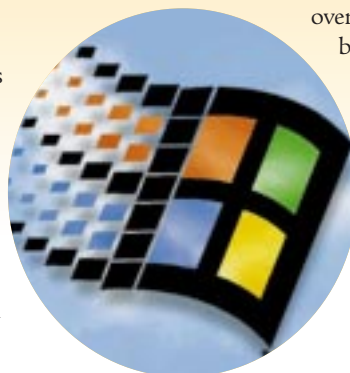
The Turtle Beach Fiji sound card, which I had installed over a year ago, consumed the first upper block of base memory. Removing the offending sound card solved the problem, and set-up progressed without a hitch.

I am now the happy owner of an operating system that consumes 300Mb of hard-disk space, requires a minimum 32Mb of RAM, works 40 percent slower, and has appalling defrag and scandisk routines which take an eternity to run on my PC.

Progress: don't you just love it.

B.J.SAMELAK
B.J.Samelak@btinternet.com

gadgets

compiled by David Fearon

◁ A whiter shade of pale

Everyone's calling it Apple's great white hope, but it looks transparent to us. The iMac isn't just a concept machine; it'll be available to buy from September. It has a 233MHz G3 processor, but the controversial bit is that it doesn't have a floppy-disk drive, so you'll need to either attach a USB storage device to one of the two ports, or hook it up to a network, if you want to get any files off it. Looks pretty though, and the price will certainly raise some eyebrows. Full review next month.

Price £999 (£850 ex VAT)
Contact Apple
0870 6006010
www.apple.com

Purple haze ▷

It's purple, it's green, it's cuddly and it's got electronic insides. It's Microsoft Barney, one of a new range of "ActiMates" for your sprog. Barney has sensors in his eyes and switches in his hands, feet and toes. He's got a vocabulary of 4000 words and cries "peek-a-boo" when you cover his eyes. Not only that, but he sings songs when you squeeze his foot, and does oodles of other cutsey-pie things, too.

Price £99.95 (£85 ex VAT)
Contact Microsoft 0345 002000
www.microsoft.com

▽ Boxes that go bing

If you've got Windows 98 and USB ports on your PC, you don't even need a sound card to enjoy the 80 Watts of pure gaming joy afforded by the Microsoft Sound System 80's subwoofer and satellite set-up. It's still got bog-standard analogue inputs, though. The speakers will be available in the autumn.

Price Around £180 (£153 ex VAT) **Contact**
Microsoft 0345 002000
www.microsoft.com

△ Power to the people

A definite candidate for most bizarre product of the year is the PinUPS uninterruptible power supply from Advance Galatrek. Styled by Pininfarina and based upon — wait for it — the Ferrari F50, this is a device for the technogeek who really does have everything. A UPS, in case you didn't know, protects against power surges and supplies emergency juice from a large internal battery if the mains fail completely. So obviously, it's essential that it looks good.

Price From £159 (£135 ex VAT)
Contact Advance Galatrek 0800 269394

Purple haze (reprise)

Not content with removable storage, Iomega is branching into video capture. Pretty sensible when you think about it, since lots of storage is just what you need when you're messing about with digital video. The Buz consists of a proper internal Ultra Wide SCSI card, plus the purple breakout box for video ins and outs. We don't know why it's called the Buz, but at least it's better than Fuz.

Price **£189 (£161 ex VAT)**
Contact **Iomega 0800 973194**
www.iomega.com

Lumberjacks queue here

Following in the footsteps of the Husky "kick it, drop it and go surfing on it" notebook in last month's *PCW*, we have the RT-200. It's not quite as durable as the Husky, since it's got a hard drive and standard ports with rubber caps on them. But we've seen the test report and can confirm that it'll withstand a 40G, 11-millisecond, terminal-peak shock pulse. Oh, and it works in the rain, too.

Price **From £3524 (£2999 ex VAT)**
Contact **Notable 0161 455 7600**

Executive dreams

Here's the sexy Siemens Nixdorf Scenic Mobile 800. The metallic sheen on the case is due to the fact that it's made of magnesium alloy. The keyboard is detachable and has an infra-red link, so you can type for hours in your hotel room in perfect comfort. The battery in the keyboard is automatically recharged when it's reattached, so no worries there. See next month's full review.

Price **£5286 (£4499 ex VAT)** **Contact** **Siemens Nixdorf**
01252 555312 www.
siemensnixdorf.co.uk

Telly mad

We're not quite sure if this is a good or a bad idea — ACi's MD-1000 turns your £2000 notebook into a portable telly. There's no denying it could be fun – at least for a while. And when *EastEnders* has finished, you can use its video capture ability for something a little more serious.

Price **£293 (£249 ex VAT)**
Contact **ACi 0181 357 1116 www.aciweb.co.uk**

reviews

There's good news this month for speed junkies, whether you're a home user on a budget or an IT manager looking to upgrade an overstressed server. **Three new processor lines** make their début in these pages: the 450MHz Pentium II and new, faster Celeron with onboard cache for desktop PCs, plus a mighty quad Pentium II Xeon server system that we preview. **LCD flatpanel displays** are really starting to make their mark, and prices are tumbling. So if you're considering taking the LCD plunge we have a mini round-up of three gorgeous 15in displays from Mitsubishi, Nokia and Taxan. On the software front, **web designers will be interested** in Macromedia's Flash version 3, as well as Herera's NetGraphics Studio 2. For the serious developers in the audience, Microsoft's vast Visual Studio 6 package gets the once-over. From this issue onwards we'll be featuring **software for PDAs and palmtops.** Money for the Psion Series 5 gets the ball rolling, and we'll have more Psion software as well as packages for Windows CE and other handheld operating systems in the coming months.

VNU European Labs

VNU Labs tests all kinds of hardware and software, from PCs to modems to databases. All our tests simulate real-world use and for the most part are based around industry-standard applications such as Word, Excel, PageMaker and Paradox. Our current PC tests for both Windows 95 and NT are the SYSmark tests from BAPCo. In all our performance graphs, larger bars mean better scores.

Contents

Ratings

★★★★★ **Buy while stocks last**
★★★★ **Great buy**
★★★ **Good buy**
★★ **Shop around**
★ **Not recommended**

Evesham Micros
Vale Platinum PII 450

Hold on to your hats – it's the fastest ever Pentium II.

This system from Evesham Micros contains one of the first 450MHz processors to roll off the production line. We're now almost halfway to the predicted 1GHz speeds that will be reached soon after the millennium. One GigaHertz, by the way, equals one thousand million cycles per second — a pretty mind-boggling figure. The new processor speed isn't the result of any particularly new technological developments, but stems from incremental improvements in production techniques, mixed with a little marketing strategy on Intel's part. The chip contains the Deschutes core that all Pentium IIs from 333MHz upwards utilise. This has proved to be extremely capable of high speeds to those who've risked overclocking them past their rated setting.

The system supplied to us by Evesham came in an impressively large tower case, as befits the processor's initial target market of power users who'll want to fit extra devices. Its height allows for four free front-panel 5.25in drive bays, plus three internal 3.5in cages. A 300W power supply lurks at the rear, which should give sufficient power even if all the bays are occupied.

Slightly surprising given the processor and the size of the case is the fact that the system is not SCSI based, sporting an EIDE hard drive and DVD-ROM drive. The hard drive itself — one of the most important components for good overall system performance — is the brand-new model from Maxtor, the DiamondMax Plus. The drive has a capacity of 10Gb, together with a spindle speed of 7200rpm, and is one of the first EIDE drives to run at this speed. The faster the disk rotates, the higher the sustained data transfer rate will be, which bodes well for performance. The average latency, which is the time taken for the disk to rotate to a given position under the read/write heads, is also reduced.

The system was rushed to us in a hurry, so we can forgive the fact that the hard drive was not properly secured and arrived dangling by its cables inside the case. To Maxtor's credit, though, the drive still worked perfectly, even though it must have taken a few knocks on the way to our Labs.

On the graphics front, the system's AGP slot was occupied by an 8Mb ATi Xpert@Play: a fairly middle-range card for this kind of system, but the 3D Rage Pro chipset is a good performer. A decent monitor is essential, so we were encouraged by the choice of a Taxan Ergovision 975 19in unit. Taxan has a good reputation for high-quality displays, but this unit seemed to have fallen foul of the rush to get it to us, either at the quality control stage or from a bash received in transit. It was obviously duff, with a very fuzzy image even at 1024x768 — a resolution that any 19in monitor should be able to handle with ease.

Overall, the configuration of this system probably isn't one that many people would want to buy; a high-end case and processor doesn't quite gel with an EIDE hard drive and home-orientated graphics card. But as a test bed for the new processor it's certainly interesting, and the all-important performance of the system didn't disappoint. As you'd expect, the Platinum II 450 was the fastest system that *PCW* has seen to date, coming home with a SYSMark score of 420. This compares with a score of 383 for the Evesham Platinum 400MHz system (see September's group test). A worthwhile performance increase for the money? Possibly; but as usual the release of a new fastest chip will inevitably mean price cuts for all speeds below it. So unless you're utterly desperate for that last ounce of performance, it always makes more sense for the power user to go for the next step down — in this case, 400MHz — to avoid that premium on the bleeding-edge line.

DAVID FEARON

PLATINUM PII 450: THE FASTEST PII SYSTEM YET, BUT WITH AN IDIOSYNCRATIC SPEC

PCW DETAILS

★★★★

Price £2231 (£1899 ex VAT)
Contact Evesham 01386 769600
www.evesham.com
Good Points The fastest Pentium II yet.
Bad Points Slightly confused specification.
Conclusion A great showcase for the 450MHz processor, but not the right system for most people.

PERFORMANCE RESULTS

	0	100	200	300	400	
Platinum PII 450						420
Platinum PII 400						383
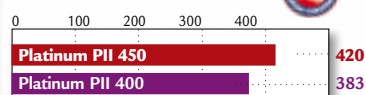
BAPCo Sysmark Windows 95 test scores

Mitsubishi/Nokia/Taxan
Good things come in threes

Who can resist flat-panel displays, with their fantastic images and cases around an inch thick? They're much cheaper than they used to be, so when Mitsubishi's 15in LXA520W, Nokia's 15.1in 500Xa and Taxan's 15.1in CrystalVision 670 all arrived at once, we just had to pitch them head to head.

The legacy of the analogue-driven display of cathode-ray tubes (CRTs) has been a major headache to the developers of flat-panel displays (FPDs). The PC's graphics circuitry, whether on a card or motherboard, converts the digital description of your operating system desktop into an analogue RGB signal. This signal, along with Horizontal and Vertical synchronising signals, is then transmitted to the FPD, whereupon the analogue data is converted back to digital in order to drive the transistors. This conversion of the signal from digital to analogue and back to digital degrades image quality unnecessarily.

The current advantage in using the RGB analogue interface lies in its established compatibility with just about every PC. However, for FPDs, this preposterous inefficiency has driven engineers to find a cheaper alternative — the Flat Panel Digital (or Display) Interface version 2 (FPDI-2), which is in

its final stages of development. This is based on a system called Low Voltage Differential Signalling (LVDS), which also incorporates compression of the video data in order to make more effective use of the available bandwidth.

Of course, to make use of a display that supports LVDS you'll need a new graphics card and drivers; availability of both from major vendors is imminent. You'll then be able to enjoy the benefits of clean, crisp image displays, due to digital signals' much higher resistance to external interference, and improved brightness and contrast. However, the reduced component count stemming from the lack of DAC/ADC circuitry and reduced noise suppression circuitry, which you'd quite rightly assume would result in lower unit costs, will initially be offset by the costs needed to get to this stage of development.

Coupled with the incompatibility of this design in the current market, for now we will just have to make do with the analogue interfaces present in the three flat-panel displays on review here. The term "native resolution" refers to the group of liquid crystal elements (one each

◄ THE MITSUBISHI LXA520W WILL FIT NEATLY ON ANY DESKTOP

for red, green and blue) that make up each picture element, or pixel. A native resolution of 800x600 pixels would therefore have that number of groups (480,000 in total). Depending on the method employed to emulate resolutions other than the native, some distortion of image may occur. Each of the panels on review had native resolutions of 1024 x 768 pixels. Switching from Windows to a full-screen DOS shell tests how each panel copes with sudden resolution changes. The Nokia snapped the image across its whole display almost immediately with no noticeable degradation, although it did lose some of the lower edge of the image. With the Mitsubishi, the touch of a "mode" button stretches the image across the whole display, but a movie clip running under DOS with a resolution of 1024 x 768 would only stretch across the upper portion of the screen, leaving the lower portion black and unused. The Taxan coped best with this test: with no synchronisation required, it stretched the DOS shell across its whole display perfectly, aligning with the bezel at all resolutions.

► THE NOKIA 500Xa HAS GREAT AUDIO AND IMPRESSIVE VIEWING ANGLES

Ever stood next to someone at a cash machine and been tempted to peak at their balance? Generally you can't, as the displays are deliberately manufactured with a restricted viewing angle so that you only see a blank screen. FPDs generate their image by polarising a fluorescent backlight through different angular twists of the liquid crystals. To view the display from an off-centre position, image-enhancement films slightly scatter the light transmitted

You can expect flicker-free, *clean, crisp displays* from all three models

through them. The effectiveness of the technology adopted is a key factor in choosing a display and tends to vary between manufacturers. The Taxan claimed viewing angles of ±80° horizontal and ±60° vertical, but we felt there was a loss in luminescence at much lower viewing angles. The Mitsubishi claimed ±70° horizontal and -60° to +40° vertical, but from our own perception you did begin to lose some of the display quality as you moved away. The Nokia achieved the full quality of its display through to the more modest claims of ±50° horizontal and ±60° vertical, and was still readable through to almost ±85° in either direction.

FPD colour is produced by accurately twisting each liquid crystal to 64 levels (or six bits) of polarisation of the white backlight through either a red, green or blue filter. This only produces a total of 18 bits, or 262,144 colours. To produce the 16.7 million colours of a true 24-bit display, intensity modulation is used to vary the intensity of pixels, emulating the full colour range. Mitsubishi, however,

did not adopt any method of intensity modulation for its display, so it could only support 18-bit colour.

All of the displays had onscreen display controls (OSDs), clearly laid out and very responsive. The Nokia and Taxan both came with an option to automatically configure the display using supplied LCD test cards. The Nokia would not always adjust itself correctly and the best we could achieve through manual adjustments took almost 10 minutes. The Taxan's auto button provided a display we couldn't improve upon and was the fastest to set up, taking less than two minutes. The Mitsubishi's lack of automatic optimisation was replaced with a stripped-down OSD, a test card and straightforward manual instructions. We achieved an optimised display in less than four minutes.

Some 17in CRTs with actual viewable diagonals of around 15.7in take up a good square metre of desk space, taking into account the need to swivel their huge bottoms around. Your average 15in FPD takes up less than half of this, and weighs maybe a tenth of the CRT; and remember, you get to use all of the image, so 15.1in really means 15.1in. The Taxan comes out on top here, having the smallest footprint, while the Mitsubishi runs a close second although it was slightly lighter. The Nokia weighed two kilograms more with an additional seven centimetres of depth.

The Mitsubishi and the Nokia could be tilted back by up to 35 degrees and forward by five, whereas the Taxan's back tilt was limited to thirty degrees and couldn't be tilted forward. The audio capabilities of the Taxan were limited by the omission of a microphone. The Nokia had superior audio capabilities with all the basics present and built-in speakers capable of providing a full spectrum of tones. The Mitsubishi was not an audio model. And finally, the Taxan was able to raise its head above the others with the unique display-switching button for flipping between two analogue signals, enabling the connection of two computers. For overall quality of display you can expect flicker-free, clean, crisp displays from all three models. However, the Nokia had mild instability that appeared as a wobbling effect, occasionally noticeable

on highly-defined characters but not frequent enough to cause major concern. The Mitsubishi appeared flawless until compared to the Taxan with its sharper, brighter image. The TFT panels

themselves were all manufactured elsewhere, with the Nokia panel and image-enhancement film manufactured by a joint effort between Philips and Hosidan, Nokia then taking responsibility for final assembly. Taxan's and Mitsubishi's panels are manufactured by Sharp, but their image enhancement films and optical filters, as well as the final assembly, is all down to Mitsubishi.

It's interesting that Mitsubishi has ended up manufacturing and assembling a superior, albeit more expensive product for one of its competitors. Still, Taxan being on the receiving end has supplied us with a product worthy of our highest recommendation.

IAN ROBSON

Tiny Home Value Plus
First look at Intel Mendocino

A Tiny PC with a big chip inside: Intel comes up with the cache this time.

When Intel launched the Pentium II in May last year, there was a great deal of debate about the reasons behind abandoning Socket 7 in favour of the Slot 1 form factor. A considerable body of opinion said that Intel was abusing its massive marketing clout to shift the production goalposts and cause mass take-up of Slot 1, consequently leaving rival CPU manufacturers and their Socket 7 designs at a dead end.

At the time, though, the PII was extremely expensive, leaving a gap into which the likes of AMD and Cyrix could move to market their high-performance but cheaper Socket 7 devices. But the situation didn't last long: within three or four months, at least in the UK, first and second-tier vendors were shifting Pentium II systems at ridiculously low prices. Intel didn't seem to pick up on this, and launched the Celeron, a cheap Pentium II without onboard Level 2 cache. The cache is a small amount of very fast RAM used to store frequently used instructions and data, as well as loading data speculatively in case it's needed, considerably speeding up most operations. Celeron was aimed at sub-$1000 PCs, but by the time it came to

market, UK vendors were offering real PII systems for around £800 anyway. There has never been a surfeit of confidence among the press or vendors about the worth of the Celeron. Most pundits dismissed the thing as being far too slow without ever setting eyes on one, condemning it as a cynical move on Intel's part to bludgeon Socket 7 to death. And so, enter Mendocino, Intel's codename for a new, higher-performance Celeron with 128Kb of onboard Level 2 cache. There is a big difference between this and the Level 2 cache on a normal Pentium II. The 512Kb cache on a standard PII is on a separate piece of silicon within that black module, running at only half the speed of the processor. The Mendocino's Level 2 cache is situated on the processor core (called the die) itself, and runs at the same clock speed. This makes the cache very much more effective.

The first Mendocino system to make it into *PCW* is from Tiny Computers. It's a 333MHz system housed in a rather large box designed with alluring curves. The case size means easy future upgrades with no structural inhibitions or messy cabling limiting access to the two spare DIMM slots or three spare PCI slots. The system has 64Mb of SDRAM, and the generous 8Gb hard disk will be equally useful for gamers requiring faster data access through full installations, or home workers' needs. The inclusion of a Rockwell chip-based modem is welcome, as is the Yamaha PCI sound card. Tiny scores points with its bundle of extras — a Microsoft Intellimouse, large speakers,
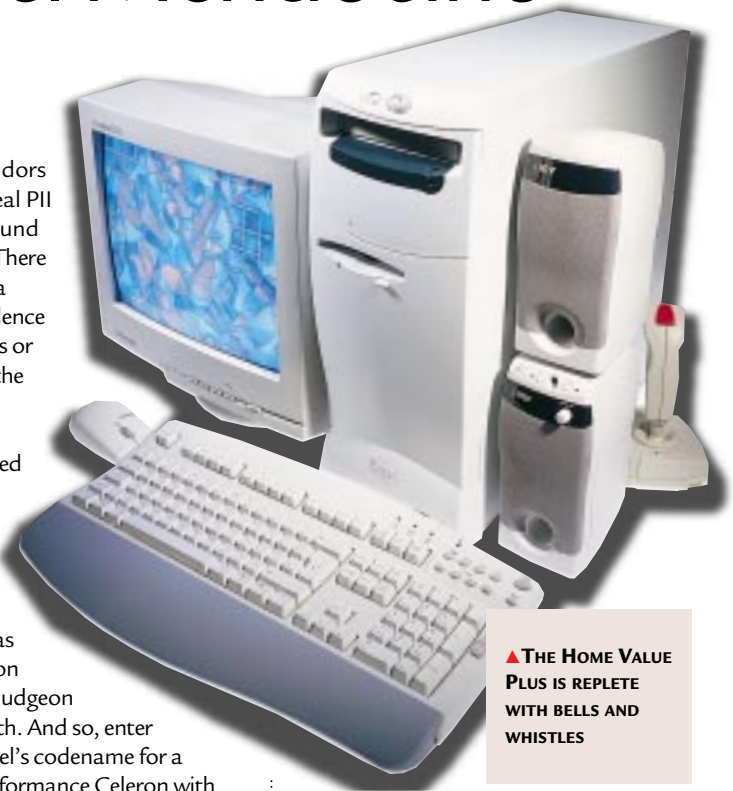
▲ THE HOME VALUE PLUS IS REPLETE WITH BELLS AND WHISTLES

reasonable-quality Quickshot joystick, tie-pin microphone, a large software bundle of games, reference and business titles, and the EasyTouch keyboard. Ergonomically slanted with a detachable wrist-rest, the keyboard's star feature is the hotkeys which allow control of the audio functions of the CD-ROM drive and the sound card's volume level.

With all those added extras, no doubt aimed at the first-time buyer seeing the system in one of Tiny's shop windows, it's good to see that one of the least glamorous but most important areas hasn't been overlooked: the 15in Panasonic monitor gives a crisp, stable picture at 800x600 resolution. With the 8Mb ATI Xpert98 graphics card, a 17in unit would have been ideal; but at this price, something has to give.

Compared with Tiny's Celeron 300MHz system (*reviewed last month*) there was a marked relative increase in 3D performance. But the Home Value Plus came into its own on the 2D application benchmark, the dramatic leap in performance proving the worth of the Level 2 cache beyond doubt.

IAN ROBSON

PCW DETAILS

★★★

Price £1056.32 (£899 ex VAT)
Contact Tiny Computers 0990 133097
www.tinycomp.com
Good Points *Very good performance from the Mendocino processor.*
Bad Points *Could do with a larger monitor.*
Conclusion *It looks as if Intel has redeemed itself with the Mendocino Celeron.*

PERFORMANCE RESULTS

	0	50	100	150	200	
Tiny Home Value 300						221
Tiny Home Value Plus						310
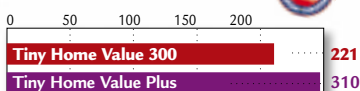
BAPCo Sysmark Windows 95 test scores

Intel Pentium II Xeon
New high-end processor

Intel serves up its server wonder-chip — a fast processor at a gourmet price.

Intel's Xeon, bridges the gap between Intel's current server workhorse, the Pentium Pro, and the much-vaunted/delayed 64-bit Merced. Xeon is designed both for high-end workstations and for servers running four or eight processors. The first chips in the Xeon family are two 400MHz versions, one with 512Kb of Level 2 cache and the other with 1Mb.

Underneath the covers, the Xeon is a version of the Pentium II optimised for running server applications and symmetric multi-processing where two or more processors are linked under Windows NT. The CPU core is the familiar Deschutes, used in the Pentium II as well as the Celeron processor (*see the Mendocino review on page 84*). Its big secret is that its large Level 2 cache runs at the same clock speed as the core; in previous generations, this ran at half the processor's speed. The cache comprises Intel-fabricated CSRAM (Custom Static RAM) chips, each CSRAM chip holding 512Kb, so the 1Mb version has a pair and a future 2Mb version will have four.

Intel has also introduced new Xeon-specific chipsets. The 440GX AGPset is for single- and dual-processor servers and workstations, while the 450NX PCIset is for systems based on four or more processors. The 440GX AGPset supports up to 2Gb physical RAM and AGP video. The 450NX PCIset supports up to 8Gb physical RAM and multiple 32-bit and 64-bit PCI buses. Unannounced Xeon-based chipsets will support next-generation Direct Rambus DRAM chips sometime in 1999, according to Intel.

The Xeon will command a price premium, as did its predecessor, the Pentium Pro. In volumes of 1000 units, the 512Kb cache version costs $1124 (around £700); the 1Mb cache version costs $2836 (around £1800). And as with the Pentium Pro, the prices are likely to stay artficially high in order to differentiate it from the standard Pentium II. In short, this processor is no Pentium II replacement, so don't worry that your new 400MHz desktop system has been made obsolete by the Xeon: the two product lines are quite separate.

The Xeon processor cartridge itself is large, roughly double the size of a standard Pentium II SEC cartridge. Its Slot 2 edge connector is about 10mm longer than the Pentium II/Slot 1, with an extra "keying" slot to prevent accidental insertion of a Pentium II. The cache RAM gives off as much heat as the CPU core, so the heat sink covers the entire cartridge. The file server Intel supplied to *PCW* isn't one that's available to buy *per se*: it's a preview and evaluation system that Intel supplies to its OEM clients. A fully-fledged floor-standing server, the case is around five or six times the volume of a normal full-tower case, with three lockable doors that give access to the storage, a central backlit LCD status display and a selection of error-condition LEDs. The system has 12 hot-swappable drive bays in all, so with a full deck of 18Gb drives you could easily have well over 200Gb of storage.

The ACPI-compliant motherboard is in two halves, mounted either side of a central spine wall of the server chassis. The left side holds the CPUs and RAM; the right side the I/O and expansion slots. The CPU side bristles with a formidable-looking matrix of four 400MHz Xeon processors mounted in a set of rails: jumper labels indicate that clock speeds as high as 500MHz are supported. Under the CPU array is 512Mb of ECC SDRAM, occupying eight of the 16 DIMM slots. No less than six 80mm fans cool this array of silicon, aided by a Styrofoam shroud, with a further three fans cooling the motherboard itself.

Look out for full reviews of publicly-available Xeon systems soon.

ROGER GANN

▲ XEON IS FOR WORKSTATIONS AND HIGH-END SERVERS — AND HIGH-END WALLETS

PCW DETAILS

★★★★

Price *n/a*
Contact *Intel* **www.intel.com**
Good Points *The fastest Intel server processor.*
Bad Points *Hugely expensive.*
Conclusion *For high-end enterprise setups only.*

Dotlink PowerTower 400SE
Mid-priced 400MHz Pentium II

It's a grand life — or at least, it is with this 400MHz PII PC that breaks the price barrier.

You don't get masses of software or an impressive performance with this budget PC, but it gets on with the job. What more can you expect for just over a grand? Budget PCs are big business and much has been made of the sub-$1000 systems on sale in the US. Compaq claims its best-selling consumer PCs are those costing less than $1000. It's not surprising, really: most people don't really need an all-singing all-dancing PC, and, more to the point, can't afford it.

Dotlink has broken a barrier with this PC too. The Power Tower 400SE costs under £1000, excluding VAT. With the emergence of machines like this, no-one can say that high-end systems are not affordable. The 400SE packs an economic punch; but is it up to the job? For the price, the specifications are undoubtedly impressive. At the hub of the midi tower is a motherboard sporting Intel's 440BX chipset, a Pentium II 400MHz processor, 64Mb SDRAM and a 5Gb UDMA EIDE hard drive. 64Mb is now the standard in a decently-specified PC. In this case, the 64Mb is on one DIMM (dual in-line memory module),
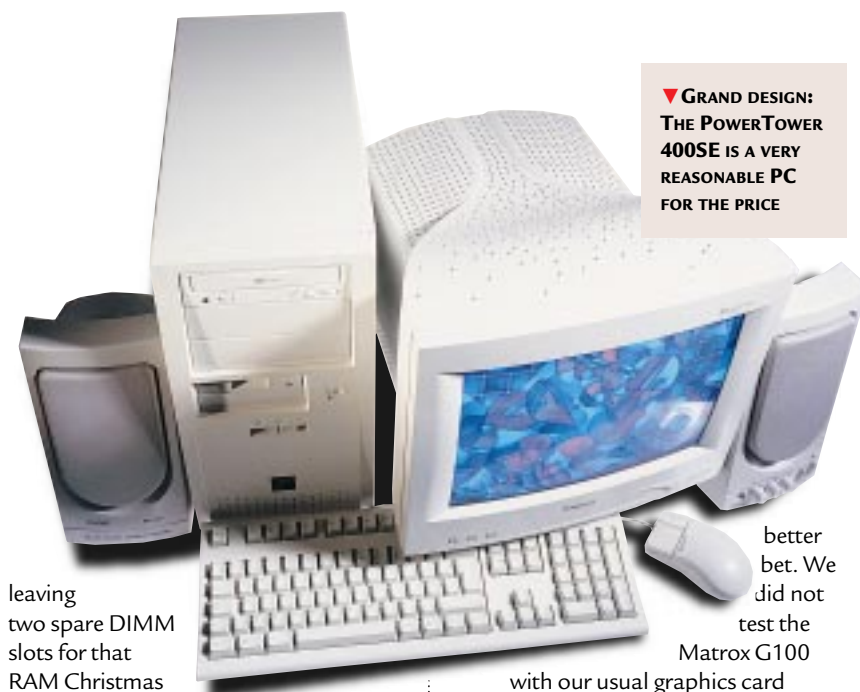
▼ **GRAND DESIGN: THE POWERTOWER 400SE IS A VERY REASONABLE PC FOR THE PRICE**

leaving two spare DIMM slots for that RAM Christmas present you will probably require in a year's time. The EIDE hard drive is standard fare too, but it would be a bit too much to ask to be supplied with a SCSI model at this price. As far as upgradability in other areas is concerned, there's enough space to be getting on with. With one free 3.5in and two free 5.25in front-loading bays you have the standard midi-tower room for reinforcements, and there's the standard two USB ports for your digital camera, scanner or other peripherals.

Inside the midi tower are three spare PCI slots and one spare ISA slot, plus a free shared slot. Looking around, the cabling is clipped together so you don't have to hack through it with a machete, although it is a little untidy. The build quality is fine, and the design is best described as standard. As for graphics, the Power Tower 400SE comes with an AGP Matrox Productiva G100 card. While it has 8Mb of onboard RAM, it is a 2D card only, so you will need a 3D accelerator if you want to play the games of today, or indeed if you want to deal with more cerebral graphics applications. There are plenty of 2D/3D cards out there at roughly the same price but with less memory, which may have been a

better bet. We did not test the Matrox G100 with our usual graphics card benchmark: the results would not have done the 2D card justice. Performance testing was as usual performed using BAPCo, and the results showed that the 400SE was neither hare nor snail. Desktop graphics scored impressively, but the overall SYSmark score was a little low for a 400MHz system.

The monitor is a Hansol Mazellan 501P 15in, with a 13.8in viewable diagonal. At its recommended resolution of 1024x768, the refresh rate is a steady 85Hz. The sound card is a basic SoundBlaster 16-compatible affair. These cards are still pretty much standard, but they are no longer the cards you would choose to buy if you were putting together an optimum system for yourself. Also included is a 56Kbps data/fax/voice modem, a vital component for a home-orientated PC.

On the software side, the Dotlink comes armed only with Windows 95 and Lotus SmartSuite 97. The three-year warranty is generous: one year parts and labour, two years labour only.

Overall, there's very little to criticise in the Power Tower 400SE. A 400MHz Pentium II for just over a grand is not to be sniffed at, even though the rest of the spec is a little basic.

JIM HARYOTT

PCW DETAILS

★★★★

Price £1174 (£999 ex VAT)
Contact Dotlink 0181 902 5802
No URL
Good Points *Fantastic price for a PII 400MHz machine which offers reasonable all-round specifications and a three-year warranty.*
Bad Points *2D graphics card. Not much software. Slightly disappointing performance.*
Conclusion *A great machine for the money, but it's certainly not perfect.*

PERFORMANCE RESULTS

0 100 200 300 400		
Dotlink PowerTower 400SE		364
Viglen C2 Plus 400		414
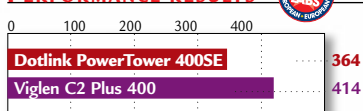
BAPCo Sysmark Windows 95 test scores

Toshiba Equium 7000S
Corporate desktop system

This slim Jim is one of a new range of easily-manageable PCs for the corporate user.

Toshiba is pushing for the corporate market with its Equium range, and has used the NLX form-factor design developed by Intel that boasts slim cases but accessible components. The main space-saving difference between the setup of a conventional desktop and one using the NLX form factor is the use of a riser board fixed at a right angle to the motherboard. The PCI or ISA cards that usually sit on the motherboard are instead seated on the riser board and extend over the motherboard. With the Equium, the idea is that the model is easily manageable: the motherboard should be easily and conveniently detachable, rolling out of the side of the PC.

The review model we were sent was set up with NT 4 (although some models have Windows 95 installed). The specification of the machine was decidedly mid-range, with 32Mb of SDRAM offered on a single DIMM slot, along with Intel's PII 266MHz processor with 440LX chipset, as well as an Ether connection with the SMC chip onboard, for LAN networking. The Equium 7000S is the slimmest model in the range, priced at £785 (ex VAT) with a 17in monitor. It had graphics onboard, using ATi's 3D Rage Pro chip, with only 2Mb of SGRAM out of a possible 6Mb installed on the motherboard. Onboard sound is courtesy of the Crystal sound chip. We could only get a maximum resolution of 800x600 in 16-bit colour, but 1024 x 768 was attainable by dropping the number of colours to 256.

We couldn't run the 3D Final Reality software benchmark test because of the NT OS, but then, this is not the configuration for you if you need to run high-performance 3D graphics. Neither is this the model for you if you aim to upgrade your PC regularly with audio and graphics cards.

With only one PCI and one shared PCI/EISA slot on the riser board, this PC will have a select appeal only. However, it could do well with IT managers wanting to bulk-buy PCs with which their colleagues can't tinker. In any case, there is limited expansion space available in the 7000S, so once you have upgraded to a more powerful graphics and sound card, all expansion space is used up.

The 7000D series is aimed at corporates which need more expansion space from their PCs, it is slightly larger than the S series, and most of the size difference is due to the larger riser board, with three PCI slots and one shared EISA slot. Both models are sold with the desktop system and monitor priced separately. The S series starts at £600, compared to the £665 starting price of the larger 7000D. A 15in Toshiba monitor costs £210, a 17in, £380. It is unusual for a company to price the system separately from the monitor, but presumably Toshiba is doing this with its Equium range to entice managers with annual IT budgets who want reasonably fast machines but don't want to change their existing monitors. We were keen to check the accessibility of the series. We weren't that impressed with the 7000S: there was a particularly flimsy catch to release the motherboard from the riser board, and detaching it was no easy task. The motherboard came out slowly and awkwardly, and re-attaching it was a case of push'n'pray — tricky because there is no way of knowing (until you turn the PC on, of course) whether you have connected it up properly to the riser board. We liked the sturdier motherboard-release design of the D range much better.

The 17in Toshiba monitor produced an impressively sharp picture, and with colours set at 256 it was able to offer refresh rates in excess of 85Hz.

The 7000S that we reviewed is not going to set the world alight, but at these reasonable prices Toshiba should do well with the Equium range.

PAUL TRUEMAN

▲ **THE EQUIUM 7000S IS A WELL-BUILT PIECE OF KIT FROM A REPUTABLE MANUFACTURER**

PCW DETAILS

★★★

Price *System reviewed £922.38 (£785 ex VAT); monitor £446.50 (£380 ex VAT)*
Contact *Toshiba 01932 828828*
www.toshiba.com
Good Points *A nice idea. Well-constructed, accessible machines.*
Bad Points *Some models in the range are more accessible than others.*
Conclusion *A solid performer backed by a reliable name.*

PERFORMANCE RESULTS

	0	50	100	150	200	
Toshba Equium 7000S						222
Intel Benchmark 266						261
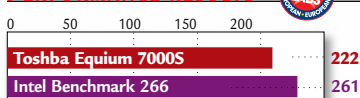
BAPCo Sysmark Windows NT test scores

Evolution Dance Station

Dance yourself dizzy with Evolution's keyboard, sampler and sequencing software.

Evolution's Dance Station has everything you need to produce dance music on your PC, including a velocity-sensitive, two-octave MIDI keyboard. The accompanying CD is crammed with over 1000 professionally-produced samples, so you can have decent tunes up and running in no time.

The keyboard takes its power from your sound card's joystick connector and offers a comprehensive range of control parameters, from program-change messages to a handy General MIDI reset button. The modulation wheel can be configured to send any MIDI control data, such as pan and volume, and there are ten selectable velocity curves. The action, or touch, of the keys is quite positive, and there's even a connector for a sustain pedal round the back. **The software integrates** a sampler and sequencer on a single screen. The LCD display shows the samples that are available, and you simply drag them onto the keyboard below to assign them to keys. Up to 25 samples can be played

▶**TOP DANCE TUNES ON YOUR PC STOP AT THIS STATION!**

and recorded in real-time from the MIDI keyboard. The quality and range of samples won't disappoint, starting with laid-back funky grooves at 100bpm, through to pacey hardcore loops at 160bpm. The samples are grouped into categories (drums, bass, synth, etc) and you can import additional wave files in various formats. The sequencer is intuitive and offers a piano-roll editor at the push of a button. From here, notes can be erased or tweaked to your heart's content.

STEVEN HELSTRIP

PCW DETAILS

★★★★★

Price *£79.99 (£68 ex VAT)*
Contact *Evolution 01525 372621*
www.evolution.co.uk
System Requirements *120MHz Pentium, 16Mb RAM, Windows 95, DirectX-compatible sound card.*
Good Points *Easy to use, great results.*
Bad Points *Hmmm... can't think of any.*
Conclusion *Probably the most fun you can have with 80 quid.*

RECOMMENDED
PERSONAL
COMPUTER
WORLD

Matrox Millennium G200

An AGP graphics card that will do wonders for your image in business or games.

The Millennium G200 boasts full AGP 2x compliance, with hardware acceleration for the whole range of 3D features like alpha blending, anti-aliasing and trilinear filtering. It offers superb 2D performance and software-based DVD playback. **We tested the standard** 8Mb version, but the board supports up to 16Mb. One of its prime features is its ability to provide 3D acceleration at full 32-bit colour depth: it always renders internally to 32 bits, then dithers down depending on the actual screen mode, thus improving quality. With a Final Reality score of 3.57, the Millennium G200 raced ahead of the ATI Rage Pro chipset, our previous Editor's Choice award winner. It also produced better results than newer entrants like Riva's 128ZX and Intel's i740. In fact, its 3D performance was only 10% below 3Dfx's Voodoo 2 — an impressive achievement for a combined 2D/3D card. Image quality is much better than with the Voodoo 2, with sharper lines and more vibrant colours. In 2D the card supports a whopping maximum desktop resolution of 1920x1200, with the legendary Matrox image quality. A few inexpensive add-on daughtercards will be introduced by Matrox in the

▶**THE G200 IS AN AGP-ONLY CARD**

coming months. These include a new version of the popular Rainbow Runner video-capture card and a separate hardware DVD decoder. Considering its low price, superior performance and high image quality, the Millennium G200 is a must-buy.

AJITH RAM

PCW DETAILS

★★★★

Price *£129 (£110 ex VAT)*
Contact *Matrox 01753 665544*
www.matrox.com
Good Points *Extremely fast, excellent quality.*
Bad Points *No hardware DVD playback.*
Conclusion *Great for business or games.*

RECOMMENDED
PERSONAL
COMPUTER
WORLD

Gateway Solo 2500-266SE
High-performance notebook

The mid-range business user on a budget will welcome this PII performer.

Notebooks using the mobile version of the Pentium II are still not quite as common in the market as those with standard Pentium MMX processors. However, an increasing number of notebook manufacturers, including Dell and IBM, are producing products containing Pentium II 233 and 266MHz processors aimed at the mid-range business market. With the entry of the Gateway Solo 2500 into this lucrative segment, the price cuts necessary to make the Pentium II processor commonplace in the notebook market are well under way. Despite its modest price tag, the Solo 2500 is no pushover in either features or performance.

The system comes in a multi-pocket leather case which is sturdy enough to protect it from bumps and scratches. Microsoft's Office 97 Small Business Edition comes pre-installed. A sleek AC power adapter and cable complete the package. Although the system we tested had Windows 95 installed, the retail version will ship with Windows 98. The unit is fitted with a generous 64Mb of RAM and a 4Gb hard drive.

The Solo 2500 is by no means a competitor to the likes of the Toshiba Libretto in terms of size. However, at 3kg, the case is small enough and light enough to be handled with comfort, with sufficient room for the large screen, wrist-rest, speakers and keyboard. The general build quality is well above average and the unit feels quite durable. The two front peripheral bays house the 20-speed CD-ROM and the floppy drives. A minor handicap is that the hard drive is fully enclosed inside the case and not easily removable like the IBM Thinkpad's — possibly a point to bear in mind if data security is important to you.

The Solo 2500 has the now ubiquitous twin-button touchpad. The pad itself, although large enough for comfortable use, proved rather unresponsive and erratic at times. The cursor often slows down for no particular reason and at least once stopped moving altogether. This was particularly noticeable after the system had been in use for a couple of hours. Problems of this nature are not confined just to Gateway's touchpads, though, and for long sessions that require a lot of pointing and clicking you could always plug a proper mouse into the PS/2 port. The wide wrist-rest is ideal for long typing sessions. The keyboard is responsive and has a pleasant feel, and the presence of the large Enter and Space keys enhances its usability.

But the most attractive feature of the Solo 2500 is its bright 13.3in TFT screen which supports a maximum resolution of 1024x768 pixels. Even at
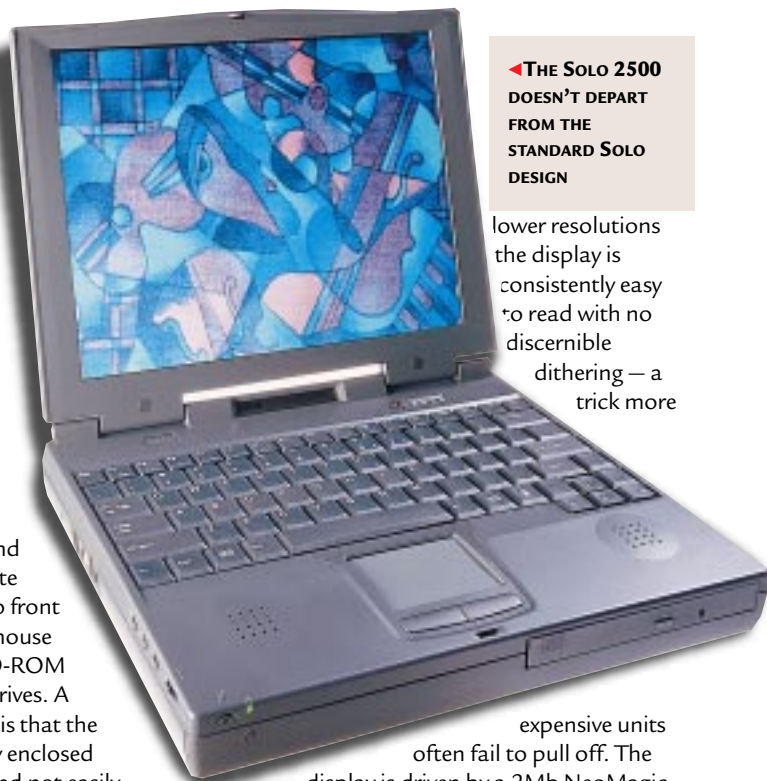
◀THE SOLO 2500 DOESN'T DEPART FROM THE STANDARD SOLO DESIGN

lower resolutions the display is consistently easy to read with no discernible dithering — a trick more expensive units often fail to pull off. The display is driven by a 2Mb NeoMagic MagicGraph 128XD graphics controller, allowing 16-bit colour depth at 1024x768 pixels.

The presence of a composite video output makes the Solo 2500 a good choice for presentations. The NeoMagic Magicwave 3DX sound chipset produces acceptable output through the twin speakers located at either side of the keyboard, but external speakers or headphones are more or less mandatory for any serious use of the system's audio.

The Solo has one parallel and two USB ports. Currently, use of the latter is limited by the dearth of USB accessories, particularly those aimed at laptops. But we can at last expect activity on the USB front now that Windows 98 is here. USB makes it much easier to use devices with both your desktop and notebook PCs, since many peripherals don't need external power supplies.

The Solo 2500 produced a SYSMark score of 210. Its high performance, along with its excellent display, features, weight and price, make it a good choice for the business user on a budget.

AJITH RAM

PCW DETAILS

★★★★

Price £2500 (£2129 ex VAT)
Contact 0800 552000
www.gateway.com
Good Points Excellent display, robust build.
Bad Points The touchpad becomes less responsive after extended use.
Conclusion A well-specified laptop at an attractive price.

PERFORMANCE RESULTS

	0	50	100	150	200	
Gateway Solo 2500-266SE						210
IBM ThinkPad 600						196
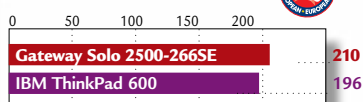
BAPCo Sysmark Windows 95 test scores

Compaq Armada 1570D
Entry-level notebook

A good-looking entry-level notebook, but Compaq really needs to ramp up the RAM.

Compaq's extensive range of notebooks reads like a Mafia novel with, at the last count, six Armada families. The Armada 1570D is tfrom the entry-level range. The basic spec is good, with a 200MHz Pentium MMX processor and a capacious 3.2Gb hard drive. Unfortunately, it has only 16Mb RAM, which these days just isn't enough; a slower processor and more memory would be preferable, since processor horsepower isn't important for standard notebook uses like word processing. What's needed is enough memory to avoid excessive swapfile usage that will eat into your batteries.

First impressions are of a remarkably sturdy machine, but the downside of this is its weight. The slight ears in the case, into which the stereo speakers are set, make good wrist-rests, but it does mean that your hands will be over the speakers most of the time, which is a shame since they produce above-average quality for a notebook. The overall design of the machine is really rather stylish, and although it's by no means super-slim, it manages to avoid the brick-like utilitarian looks of most other budget notebooks. It's also narrower than many of its competitors, giving the feel of a truly portable machine rather than a desktop replacement. Many people dislike touchpads; if you're one of them, the 1570D's offering won't convert you. It was oversensitive to accidental brushes and occasionally shot the cursor off to one side for no apparent reason. Gently tapping twice is supposed to produce a double-click, but the number of misinterpretations means you'll probably switch the feature off before long and use the buttons instead.

Good design touches include volume control buttons rather than an analogue control, which should be immune to wear, and four user-programmable keys above the main keyboard. Another real point in its favour, and one that shouldn't be underestimated, is the keyboard itself. Compaq has managed to avoid soggy plank syndrome by producing keys with superb bounce and responsiveness as well as a reasonable amount of travel. The 1570D also sports the Compaq hallmark of an integral mains power supply.

But the news isn't all good. The 12.1in STN screen in particular is a major letdown. Brightness is uneven and the images look washed out, with a distinct lack of contrast. A contributing factor in this is the low brightness, which tends to be unable to cope with normal daylight. Another feature that could irritate is the fact that there are latches on either side of the lid rather than a central one; you can't hold the unit in one hand and open it with the other: you have to lay it down.

All the now-standard notebook features are present, including an infra-red interface, two PC Card slots and the option for a second battery, which in this notebook's case would replace the floppy drive to enable up to six hours of continuous usage. The 20X CD-ROM drive is integrated into the side of the case. There are no USB connectors; and while four months ago this wouldn't have mattered, it could be a disadvantage now that there really are USB devices coming to market. For the keyboard-shortcut freaks, it's also worth noting that there's no Windows key.

There are many positive aspects to this notebook, not least the name of Compaq, which guarantees that wherever you are in the world you're likely to find some kind of support should you run into difficulties. But we couldn't recommend the 1570D unless you can negotiate some kind of memory upgrade deal when you buy the system.

IAN ROBSON
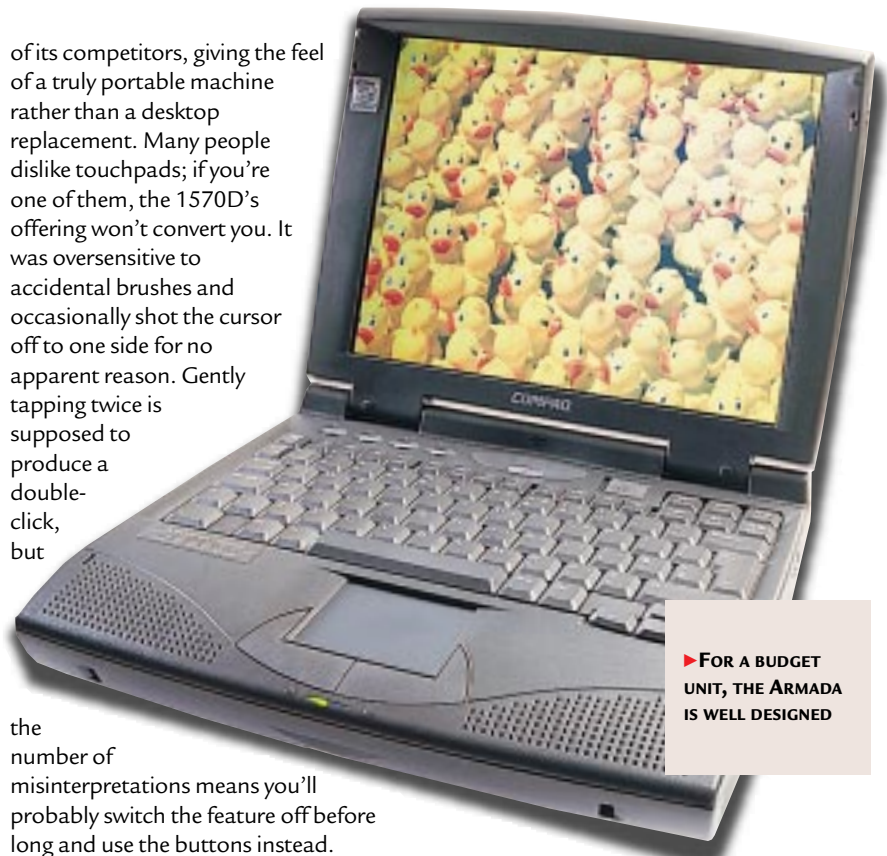
▶ FOR A BUDGET UNIT, THE ARMADA IS WELL DESIGNED

PCW DETAILS

★★★

Price £1526.32 (£1299 ex VAT)
Contact Compaq 0845 270 4000
www.compaq.com
Good Points Sturdy, sleek design. Great keyboard.
Bad Points Slow performance, poor screen.
Conclusion The excellent keyboard and good design are offset by a poor screen, and 16Mb RAM just isn't enough.

PERFORMANCE RESULTS

	Score
Compaq Armada	116
Pico Mobile President	189
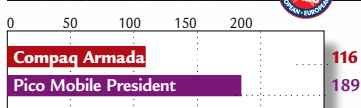
BAPCo Sysmark Windows 95 test scores

Philips DRD5210
DVD upgrade package

DVD drive and MPEG video card delivering motion pictures on Pentium PCs.

Philips is breaking into DVD-ROM with a DVD-ROM drive/DVD-Video decoder card package along the lines of Creative's Encore. The company anxiously sent the package to *PCW* for its worldwide first review. The kit Philips originally submitted proved to be a non-starter, primarily because it was built around a DVD-Video card, with software not designed for use in Europe and that was in the process of being discontinued. But once this was pointed out, a new package duly arrived, containing the Philips DRD5200 drive, RealMagic's Hollywood Plus DVD card, and three sample DVDs of the Muppets, Spycraft and A&M's music sampler.

The DRD5200 DVD-ROM drive itself is a tidily-built, easy-to-fit Plug 'n' Play IDE device. It runs at the current standard of 2X DVD speed, and data throughput in the CD mode is up to a maximum of 4.1Mbit/sec — broadly equivalent to a 24X CD-ROM drive. As well as DVD-ROM, it will read CD-R and CD-RW discs, but not recordable DVD-RAM media.

RealMagic add-on MPEG video playback cards have been around since long before even VideoCD, and RealMagic has developed high-performance cards and ironed out the PC interface problems. The Hollywood Plus card is half-size PCI Plug 'n' Play and installs easily. Because the card does all the decoding work, it will
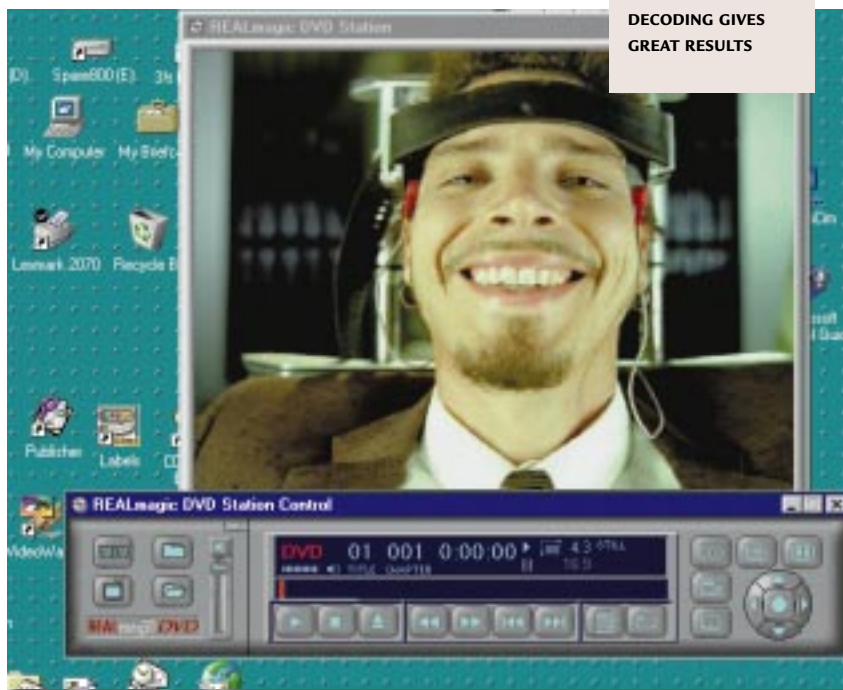
deliver DVD-Video on a medium-speed Pentium PC. It has external leads to connect it to the display card. Hollywood Plus also has connectors to wire it up to a home cinema system — an S-Video output with an S-Video/composite converter cable for video, and both a digital S/PDIF and an analogue stereo output mini-jack for sound. The analogue output can feed video audio to the line input of a sound card, but a better way of linking the two is via the internal CD-ROM audio lead. One of the other complaints about the originally supplied system was that this cable was not supplied; a minor point admittedly, but the Creative package is notable in that it supplies absolutely everything. Philips will have to follow suit in its final package.

Predictably, being a RealMagic, the card setup was quick and easy with no conflicts. The DVD Station playback software presents a VCR-like control panel that can be onscreen or hidden. This gives the basic functions to navigate around the video disc, with keyboard shortcuts used to toggle between monitor and TV. The playback window is infinitely scalable, looks excellent at all sizes, and the display on the TV is first class.

DVD-Video does look fabulous and is well worth the effort. One word of warning for DVD-Video in general, though: you really need Release 2 (OSR2) of Windows 95, as Release 1's lack of PCI bus mastering and other bugs throw up occasional problems and slightly jerky performance.

Comparison with the Creative Encore is inevitable, and Philips will have to ensure that it offers good reasons for buyers to opt for its package over the Creative. Initial pricing indicates it may well be cheaper, and there is no question about the high standard of this system both in terms of picture and build quality. But it is the practical points that will matter, and Philips really needs to offer a fully-integrated package rather than simply bundle the RealMagic card in the box.

There is one real point in favour of Creative's package, although neither Creative nor Philips will thank me for pointing it out. Region code-busting software is easily available on the net for the Encore, making it easy to play either US or UK DVD-Video discs. A similar software hack is yet to emerge for the RealMagic.

TIM FROST

PCW DETAILS

★★★

Price *Around £190 (£162 ex VAT)*
Contact *Philips 0181 689 4444*
www.philips.com
System Requirements *Windows 95 OSR2, Pentium 133.*
Good Points *Good DVD drive, and the package delivers DVD-Video on Pentium PCs.*
Bad Points *Needs to come up to Creative's totally integrated package approach.*
Conclusion *Could be a strong DVD-ROM/Video add-on if Philips delivers the full monty as promised.*

Visioneer PaperPort OneTouch

One-stop home/business scanner with the ability to copy, fax and print documents.

The market is saturated with hybrids — scanners that can photocopy documents, and printers that fax and scan. The Visioneer PaperPort OneTouch scanner falls into this niche, with its added ability to copy, fax and print documents. It comes with a single CD containing its driver, PhotoEnhancer image-editing software and Quicken ExpensABLE SE. The latter seems a pretty

▶ **AN ALL-IN-ONE HOME/BUSINESS HYBRID SOLUTION**

weird choice for a multifunction device, particularly since it seems to come at the expense of any OCR or document management software. A projection of the scanner bed has large, easily-accessible buttons for one-touch scanning, printing and faxing. Driver installation was simple and the scanner was immediately recognised on rebooting the test PC.

We tested the scanner using an A5 colour chart and a piece of printed text. The colour test was scanned at 150dpi resolution and text at its highest optical (600dpi) and interpolated (2400dpi) resolutions. Although the OneTouch's

scan speeds were no more than acceptable, colour reproduction of its printed output was impressive, with excellent detail even in bright, highlight areas. Greyscale definition was even better, with little bleeding between adjacent scales. Clarity of text was equally good. Considering its multiple features, ease of use and quality of final output, the Visioneer OneTouch is an excellent choice for the home or office.

AJITH RAM

PCW DETAILS

★★★★

Price *£222 (£189 ex VAT). £30 cash-back on registering with Visioneer.*
Contact *0800 973245*
www.visioneer.com
Good Points *Great image quality and price.*
Bad Points *No OCR software.*
Conclusion *With its multiple features, an ideal choice for the home or business.*

Panasonic LF-D101 U

Drive offering both DVD-ROM and rewriteable storage — and a very strange disc tray.

Never mind the fact that it's a 2X DVD drive that also writes to 5.2Gb DVD-RAM discs that cost a mere £25 each, and also writes to PD discs. It's the weird disc tray that's the Panasonic D101U's most appealing feature. Press Eject, and a half-tray with slits in it pops out. CD and DVD-ROMs slip into the slits: a slight push on the disc and the drive snaps it up. Cartridge-held DVD-RAM and PD discs slide into the main body of the tray

▶ **THE DRIVE TAKES NORMAL CD-ROMs TOO**
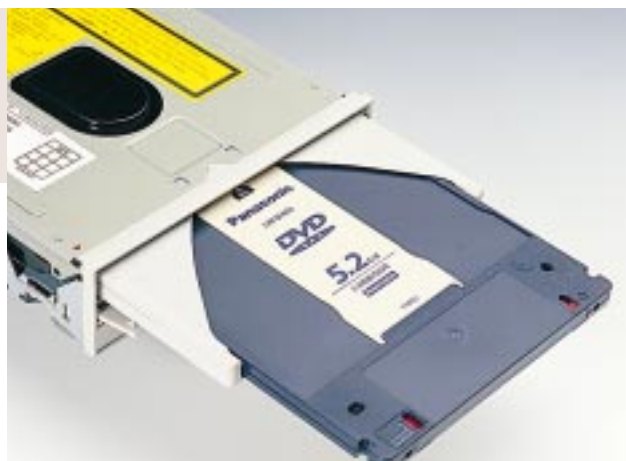
and get eaten with the same ease. It's impressive, and allows the drive to be fitted vertically without the discs falling out. The Panasonic is only the second SCSI DVD-RAM drive on the market, and already the format is looking good value for anyone who needs to store large quantities of data. Formatting each 2.6Gb side of the disc takes seconds, and moving files is pure Windows drag-and-drop. The DVD-RAM drive is already only marginally more expensive than a 2Gb

Jaz drive, but DVD-RAM wins out in the cost-per-megabyte of the media, which is just one-eighth that of Jaz.

The DVD-RAM discs the D101U produces cannot be used on a standard DVD-ROM drive, but as a high-capacity and reasonably fast rewriteable optical storage solution, the D101 stands up well in its own right.

TIM FROST

PCW DETAILS

★★★★

Price *£465 (£399 ex VAT)*
Contact *Panasonic 0800 444 220*
www.panasonic.com
Good Points *DVD-ROM and 5.2Gb rewriteable/removable storage in the one box.*
Bad Points *Currently too expensive.*
Conclusion *A cost-effective, high-capacity storage solution.*

MediaForm 5900 CD-R

High-end CD duplicator that makes light work of copying

With CD-Rs now costing under £1 if bought in bulk, it's cheaper to send out company information, internal data and other promotional stuff on gold disc than paper. But for duplication runs of more than a few discs, a standalone PC can't cut the mustard, which is where dedicated duplication machines come in. The 5900 is near the top of MediaForm's range, an eight-drive unit with built-in controls and hard drive. Despite its specialised target market, it limits its copying process to a three-button sequence. To start a duplication run, the copy master goes in the top drive and blank discs are inserted in the other drives. The firmware analyses the disc to determine the format of the master and automatically sets itself up. The first run makes up to seven copies, and while the copy is in progress the unit puts an image of the CD onto its internal hard drive; this image can then be used as the master for further batches of eight simultaneous copies. Slave units can be added to the system to copy bigger batches: up to 64 discs can be copied simultaneously.

The 5900 seems simplicity itself and it doesn't suffer from all those Windows problems that regularly mess up copies and turn them into expensive drinks mats. Costly, yes, but in time saved for mass production of CD-Rs, the 5900 pays its way.

TIM FROST

▶THE 5900 IS BIG AND EXPENSIVE

PCW DETAILS

★★★

Price *From £5170*
Contact *Magellan 01256 681100*
www.magellanplc.com
Good Points *Bullet-proof CD-R duplication.*
Bad Points *Hefty price tag.*
Conclusion *Essential for heavy CD-R producers.*

Money for Psion Series 5

Get your cash under control with Money for the Psion.

Psion originally lined up Intuit's Pocket Quicken for the Series 5, but it never appeared. Instead, Palmtop has updated and adapted its own Series 3a personal finance manager, Money, for the Series 5. Money boasts a similar feature set to Quicken, and will import and export files in QIF format. If you are familiar with Quicken, you'll have no problem getting used to Money. The top view shows a list of your accounts —
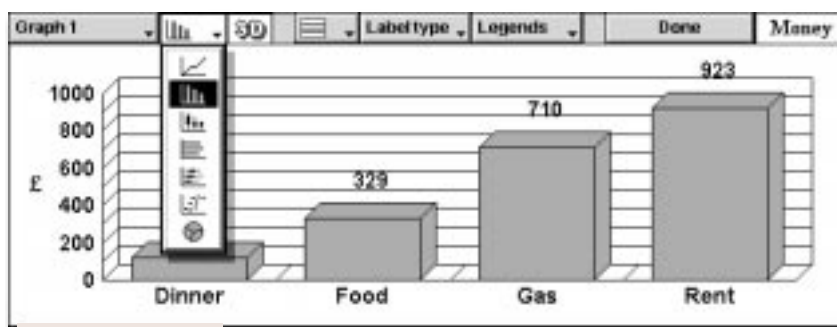
▲MONEY HELPS YOU KEEP TRACK OF EVERYDAY OUTGOINGS

cash, credit card, mortgage — or icons, if you wish. To switch to another view you click one of the four tabs along the top of the screen. Categories view shows any categories you've set up: Book is a list of the actual transactions for a particular account or category; and Scheduled gives you a list of all scheduled transactions. In each of these views you can drill down by clicking within the list of headings, until you get to the transaction details, settings dialog, and so on.

Analysis and reporting functions include transactions, net worth, profit and loss, and forecasts. Graphs in numerous formats are provided for most of these. Money does support multiple currencies, as well as VAT, although most users would probably disable these options. Little has been added in terms of features, or even look and feel, since the Series 3a version, but the pen and touch screen has been implemented to good effect. If you're looking for a personal finance manager for your Series 5, this is it.

MICK ANDON

PCW DETAILS

★★★★

Price *£49.95 (£43 ex VAT)*
Contact *Palmtop BV software available in Dixons and other high street stores.*
www.palmtop.nl
Good Points *Very complete feature set. Fast.*
Bad Points *Won't import from spreadsheet.*
Conclusion *The best Series 5 finance manager.*

Macromedia Flash 3
Web pages made easy

The latest version of this web design package cuts time and effort to a minimum.

▼ **FLASH 3'S INTERFACE IS SOPHISTICATED BUT INTUITIVE**

I t used to be that if a web page looked good, it was inevitably going to swallow bandwidth and freeze dial-up connections nationwide as home users tried to download it over a slow connection. That's no longer the case. Now in its third incarnation, Macromedia Flash continues to provide simple but powerful tools for creating spectacular animation in minutes. Compiling to as little as 10Kb for a minute's 250x400 pixel full-colour animation, the results of your labours will often download quicker than even a low-quality JPEG image.

Like many web development applications, the creation software is sold in retail outlets but the browser plug-in needed to play back your work can be freely downloaded from the Macromedia web site and totals less than 170Kb. Alternatively, your creation will play back in version 5 of RealPlayer or with the Flash ActiveX control in ActiveX hosts such as Director, Authorware or Microsoft Office. Users of version 2 may wonder how the package could be improved, but will no doubt be pleased to learn that the increased functionality has not led to larger file sizes. Flash's primary function is web animation. Before, you had to
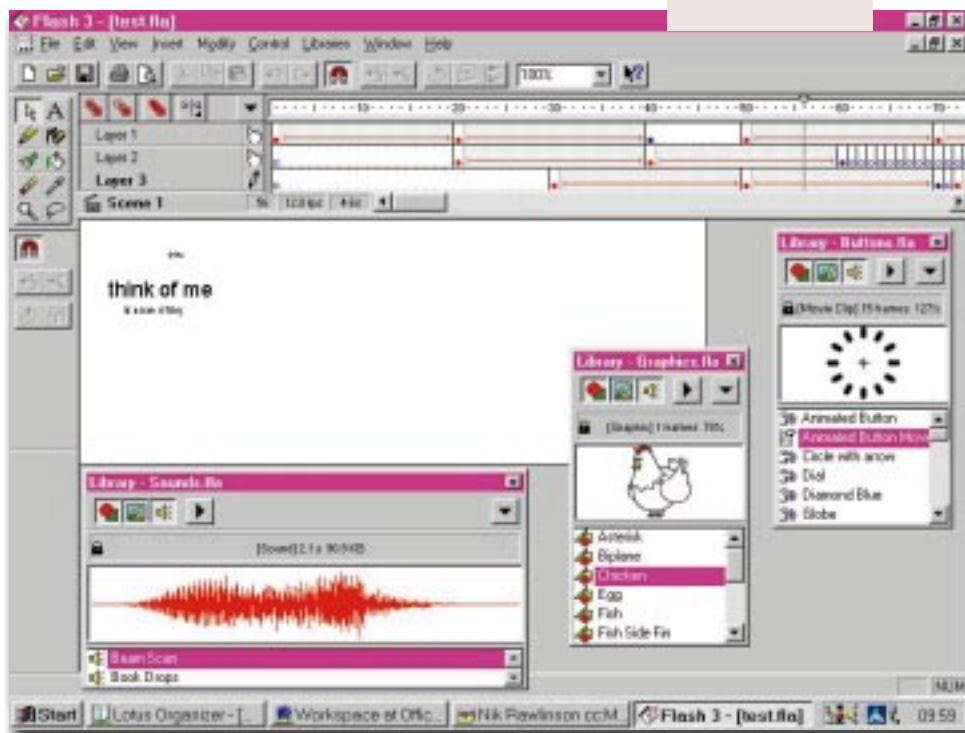
define a keyframe for each step between the first incarnation of a shape and its final image. With Flash 3, you draw the initial shape and the end result, then let the package do the tweening.

The ability to use masks has also been added. When television studio animators create a cartoon, they paint the background on one layer before overlaying it with clear cells containing the moving character, so they don't have to redraw the whole scene every time a character moves. Flash works in the same way, except that it can also treat one layer as a mask. In effect, this treats the areas in which you have worked (with colour applied) as though you have cut through the page. Any animation taking place on a layer beneath this shows through the cut-out areas but is hidden by the untouched parts.

Flash is also the tool of choice for many web designers looking for an easy way to create spectacular menus. MSN has generated many of its screens using Flash. Natural anti-aliasing ensures that your animations always look their best. Jagged edges on text are smoothed out,

and curved lines, which along with other graphical elements, are all rendered as vector images, remain even.

Synchronised sound can be added to your productions. This may coincide with onscreen events or be initiated as a user clicks on a button. Full stereo sound allows for a range of effects such as panning, and by separating the continuous audio stream from audio events Macromedia has allowed users to set independent sampling and compression ratios for these two sound types to further save on download time.

The built-in player allows you to simulate download rates to test how your animation will stream across slow connections. Animations can be exported as QuickTime movies for Mac playback or as Windows AVI files, while individual frames can be saved in a variety of still graphics image formats.

We found the transition from Flash 2 to Flash 3 a breeze, and new users should have no trouble learning to use this fun and powerful package. You can download a trial version of Flash 3 from the Macromedia web site.

NIK RAWLINSON

PCW DETAILS

★★★★★

Price £233.83 (£199 ex VAT) or upgrade for £92.83 (£79 ex VAT) from any previous version.
Contact Computers Unlimited 0181 358 5857 **www.macromedia.com**
Good Points Trial version on the net. Easy to use. Fast. Versatile.
Bad Points Pricey for the full version, but it's the only one of its type.
Conclusion A great buy for anyone interested in jazzing up their web site.

Kai's Power Show

Spice up those presentations — and impress your colleagues — with a wealth of easy-to-use features that make a real impact.

T here's no excuse for lacklustre slide presentations with Kai's Power Show, which brings together a wealth of features into one easy-to-use package for both home and business use. Kai has decided to forgo the usual toolbars and palettes in favour of a hyperlink-type user interface. Show is organised into four different "rooms" where you can carry out tasks according to type: you use the IN Room to import your content, the SORT Room to organise it, the EDIT Room to add transitions and effects, and the OUT Room to save, play or print your show.

▼YOU MAY NEED TO TAKE SEASICKNESS TABLETS BEFORE TRYING OUT SOME OF THE TRANSITION EFFECTS

If you're pressed for time you can simply import your pictures and the QUICKSHOW! automated feature will create a presentation in seconds. If you're not happy with the results, you can go back to adjust the settings and add special transitions, animated text, sound or video. Kai's Power Show has everything you need to give your presentation pizzazz. Some of the transition effects may not be to everyone's taste — some might even make you dizzy — but you're given considerable control over the final result.

SUSAN PEDERSON

NetGraphics Studio 2

The object of the exercise here is optimising graphic images for inclusion on web pages. There's some lovely clipart, too.

T his package is one of the first from Canadian software house Hemera, founded by former Corel executives. It aims to exploit gaps in graphics packages that have yet to catch up with the needs of web designers. NetGraphics Studio2 focuses on the task of accepting vector or graphic image files in any major format and optimising them for web pages. You drag and drop an image into a small viewing screen, and the package recommends whether to export it as a JPEG or GIF. You then choose a compression level and can compare the result with the original. The program presents you with estimated download times for various nominal line speeds. It can also retain transparent backgrounds and add textures to fonts. The package includes 2000 royalty-free photo-objects — the photographic equivalent of clip-art. This library has an excellent indexing system based on keywords. Hemera sees a big future for these instant illustrations and offers no less than 10,000, similarly indexed, in its standalone PhotoObjects collection.

CLIVE AKASS

▶OH YOU PRETTY THING: **PHOTOGRAPHIC CLIPART A-GO-GO FROM HEMERA**
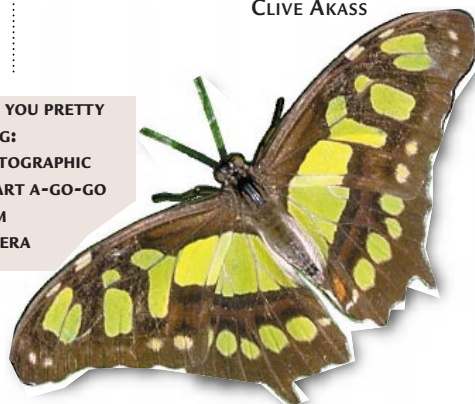
Visual Studio 6
All the tools you need

Microsoft's developer bundle comes with five programming languages, six CDs and a Windows-everywhere mindset.

Visual Studio does for development tools what Office does for business applications. The major components are compilers for Basic, C++, J++ and FoxPro, plus the Visual InterDev Web development tool, Visual SourceSafe version control and two CDs of online help. The Enterprise version has additional modelling, database and performance analysis tools, plus developer versions of the whole BackOffice suite, including NT 4.0 server, Internet Information Server, the SQL Server database, and Exchange Server for messaging. Developer versions are not licensed for deployment.

It is an enormous bundle. The tools merit individual assessment, but Visual Studio also offers a development strategy based on Windows, Component Object Model (COM) and the internet, in that order. The Visual Studio development strategy is called Windows DNA (Distributed Internet Applications). Imagine a company wanting to give a globally dispersed sales force the ability to check stock, place orders and amend customer details. A typical DNA application has the back-end data stored in a server database such as SQL Server or Oracle. The front-end is a web browser, probably Internet Explorer. Web pages are stored on Internet Information Server running on Windows NT. Log-in and data access forms use a combination of dynamic HTML and scripts running in the browser, along with server-side scripts generating on-the-fly web pages through a technology called Active Server Pages. Scripts should not be used for serious processing, so this is handled by calling COM components most often built with Visual Basic or Visual C++. These form a middle tier between the web server and the database, generating data queries that use ADO (ActiveX Data Objects), a COM database API using OLEDB or ODBC drivers. The middle-tier components may be called simultaneously by multiple clients, so they are hosted in Microsoft Transaction Server, providing intelligent management
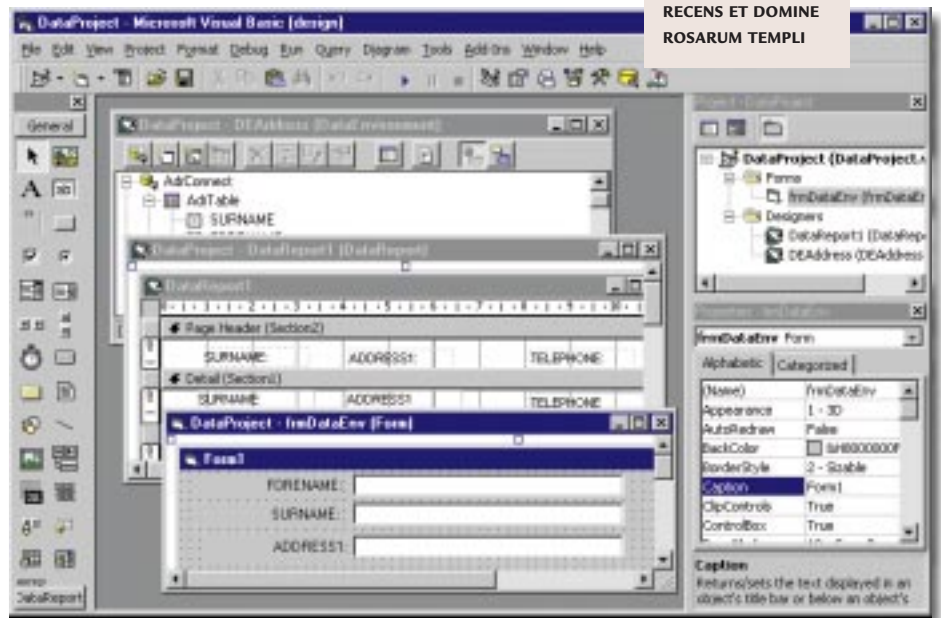
Visual Studio offers a development strategy based on Windows, COM, and the internet, in that order

of object instances, threads and database transactions.

Windows DNA has some notable features. First, Java is an optional extra, in contrast to solutions from IBM, Sun or Novell. Second, it is possible to achieve browser independence by creating a standard HTML web client, but Visual Studio encourages you to use Dynamic HTML, ActiveX controls or script features that require Internet Explorer 4.0. Third, this model makes Visual InterDev the centrepiece of Visual Studio, since this is the place where diverse elements are stitched together. Fourth, multi-language development is an inevitable feature of Windows DNA and increases its complexity. Fifth, Windows

DNA is more complex than traditional Windows or client-server development. And finally, the application involves an intricate set of dependencies, which is why Visual Studio 6.0 ships with an array of service packs and system patches. Windows DNA has clever technology and promising features, but adopters can expect challenges.

Do not expect big changes in Visual C++ 6.0. The product looks and feels much as before, but has several enhancements to improve productivity, and changes in the ATL (Active Template Library) and MFC (Microsoft Foundation Classes) that keep pace with Windows developments. Edit and Continue lets you make simple changes to code during a debug session. Changes are recompiled and applied on the fly, rather like in Visual Basic. In the editor, statement completion pops up member functions and variables as you type. The Project Wizards have been enhanced, with support for new common controls and OLE DB data access. MFC applications no longer have to use the document/view architecture, while ATL objects now include data access consumer and provider options. New tools include the Visual Component Manager, which uses the Microsoft Repository to manage

COM objects, and Visual Studio Analyzer for testing distributed applications. Overall, it is a slick and productive environment, but although plenty of assistance is provided, Microsoft is not attempting to make Visual C++ a RAD tool like Visual J++ or Inprise C++ Builder.

The new Visual Basic looks similar to its predecessor, but this disguises significant changes. Data access has been rebuilt using ADO and a new designer called a Data Environment. Found in the Professional and Enterprise versions, this lets you define a database connection in a non-visual component, accessible from anywhere in the application. The Data Environment has its own properties, events and methods, and fields can be bound to controls on a form via drag-and-drop. Both Visual FoxPro and Inprise Delphi have a similar component, and it is overdue in VB. Database reporting has been revamped, with a native report designer similar in style to that in Microsoft Access. Although not as feature-rich as Crystal Reports, bundled with previous versions of VB, the native component is better integrated and easier to deploy.

VB has new web features for both client and server-side development. On the client, integration with Dynamic HTML as found in Internet Explorer 4 means you can write applications that use web pages instead of traditional VB forms. The snag is that IE must be used as the browser. The same limitation does not apply to Webclasses, a new type of class that runs on Internet Information Server and generates standard HTML. Other new features include language enhancements and integration with Microsoft Transaction Server.

Already reviewed in *PCW* in an earlier beta, Visual J++6.0 is mostly compatible with Sun's Java Development Kit 1.1 but goes its own way by providing RAD Windows development based on a new set of foundation classes called WFC (Windows Foundation Classes). Forgetting for a moment the politics of Java, Visual J++ is Microsoft's best RAD tool, with features that place it ahead of Visual Basic. Points to note are the easy access to the Windows API, extensibility of components similar to Inprise Delphi but easier to program, intelligent localisation that automatically creates and handles resource files, and the ability to create forms that know how to resize their controls. Visual J++ is a gem.

Visual FoxPro 6.0, Microsoft's xBase
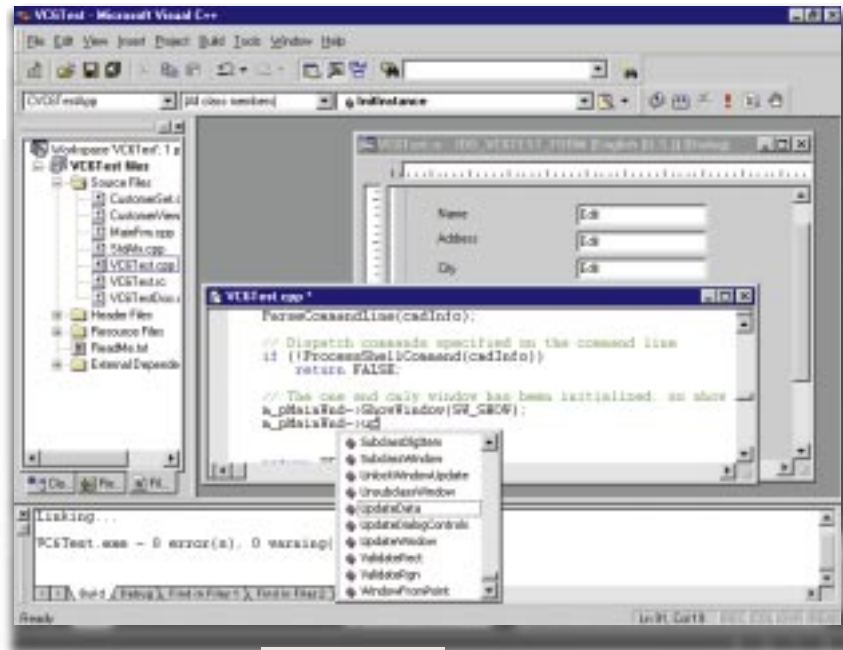
database manager, is a better COM citizen in this version. Automation servers are more flexible, and have specific support for Microsoft Transaction Server. FoxPro can now create Active

WITH FOUR DIFFERENT IDEs, THE SUITE IS NOT YET PROPERLY INTEGRATED

Documents, applications which can be hosted in a container application such as Internet Explorer. Object orientation has been strengthened, with access and assign methods to protect custom properties, and a new foundation class library that significantly speeds development. A coverage profiler lets you analyse the performance of your code, and detect code that is never called.

The problem with FoxPro is that it lacks VB's universality, and will remain a minority tool with a slowly declining market share.

The central application in Visual Studio is Interdev. This is a tool for creating Active Server Pages, web pages hosted by Internet Information Server that can run scripts both on the client and the server. The result is a dynamic web site that can handle such things as live database update and customisation based on user login details.

Version 6.0 — really the second version — has a lot that is new. The Scripting Object Model is a library of script and HTML code that lets you write script for a web site in an object-based manner similar to Visual Basic. The editor and debugger are greatly improved, and a new CSS (Cascading Style Sheets) editor is included. Database support is simplified by new design-time controls — objects that look like controls at design time, but which actually generate script for runtime execution.

There are links to Visual SourceSafe for team development.

This is an ambitious product that integrates HTML page design with scripting, data access, and control of middle-tier COM server components. Although much improved, it remains awkward at times thanks to the mixture of languages and the presentation of client-side, server-side, visual and non-visual objects. There is further scope for simplification, but Visual Interdev successfully integrates the main elements of dynamic web development.

TIM ANDERSON

PCW DETAILS

★★★★

Price *Not yet available*
Contact *Microsoft 0345 002000*
www.eu.microsoft.com
Good Points *COM everywhere lets you build powerful, flexible components. Great productivity features in Visual C++ and J++. Fantastic value for Windows developers.*
Bad Points *Depends on numerous system patches. Windows DNA applications are hard to deploy.*
Conclusion *A must for Windows developers, but the overall strategy looks like a work in progress.*

An eye on OCR
Xerox vs Visioneer

PCW recognises a **good OCR program** when it sees one, so here are two — Pagis Pro 2.0 and ProOCR100

Pagis Pro 2.0, a suite of programs designed for the small office and home user, provides a comprehensive set of document management facilities. These include scanning photographs and text-based documents, visual filing of documents, optical character recognition (OCR), editing of photographs, colour photocopying, faxing, filling in forms, annotating scanned documents and emailing colour photos. The Pagis Pro 2.0 suite of programs comprises TextBridge Pro 98, Pagis, MGI PhotoSuite and Pagis Copier.

TextBridge Pro 98 converts scanned document images into text for importation into word processing or other software. It is one of the best OCR packages around, since it satisfies the three most important requirements of OCR software: speed, recognition

PCW DETAILS

Pagis Pro 2.0
★★★★★

Street Price *£116 (£99 ex VAT)*
Contact *Xerox/ScanSoft 01923 209140*
www.pagis.com
System Requirements *Pentium, 24Mb RAM (32Mb recommended), Windows 95/98/NT4, CD-ROM drive.*
Good Points *Range of features. Cheap.*
Bad Points *TextBridge 98 isn't as fast as ProOCR100.*
Conclusion *Excellent all-round document processing and management.*

original layout of the scanned document.

Pagis is essentially a document management tool. It provides scanning and filing facilities for photographs and documents, and works with Windows Explorer to create a visual desktop for scanned images. Clicking any Windows Explorer folder with the right mouse button turns it into a Pagis Folder and generates browsable image thumbnails for all the documents within it. In addition, integrated Launch and Send-To bars provide access to Pagis

functions, using drag-and-drop links to over 140 Windows applications. The built-in search tools allow scanned images and files of popular PC file formats to be found and provide several search options, including full-text (content), assigned keywords and advanced Boolean search techniques. PhotoSuite is an image-editing and photo-retouching program which includes a range of tools and special effects to manipulate photographs and images. It also provides templates for greeting cards, calendars and posters. Completing the package, Pagis Copier uses your colour scanner and colour printer to provide photocopying facilities. For many users, this feature alone could be reason enough to justify buying the program.

Unlike Pagis, with its range of document management features, Visioneer ProOCR100 is a dedicated OCR program — the equivalent of the TextBridge Pro 98 application included in Pagis Pro 2.0. ProOCR100 claims to be twice as fast as its competitors. Our tests didn't quite bear this out, but it is noticeably faster, although its processing speed is affected by the document's fonts and layout and the quality of the scan. It also has the merit of being able to retain formatting of multi-column documents (magazine and newspaper articles), spreadsheet tables and the like.

ProOCR100 gives accurate results on a variety of documents — typed, printed, faxed, numeric and dot-matrix printouts. Like most other OCR software it has a one-button scanning feature which will do the lot. But there's also a manual mode which allows you to select areas of the document to scan. This method always yields faster results since you can

avoid areas of the image which contain smudges or marks, making life easier for the recognition engine. Both TextBridge and ProOCR100 can export their results to HTML as well as to other common formats, including Lotus 1-2-3, Excel, Word, WordPro, WordPerfect, RTF and ASCII. TextBridge can also export to Adobe Acrobat PDF.

While TextBridge Pro 98 supports more European languages, has a training mode and can be used from within other programs, ProOCR100 is faster and cheaper. If all you need is OCR, ProOCR100 is just the ticket, but the document management facilities offered by Pagis makes a more rounded package.
PANICOS GEORGHIADES

PCW DETAILS

ProOCR100
★★★★★

Street Price *£58 (£49 ex VAT)*
Contact *Visioneer 0800 973245*
www.visioneer.com
System Requirements *486, Windows 95/NT4, 16Mb of RAM (32Mb RAM for Windows NT), 15Mb hard drive space, CD-ROM drive.*
Good Points *Easy to use, cheap, fast and accurate.*
Bad points *None.*
Conclusion *The best OCR in its price range.*

Microsoft Office 97

Tested over six months

A valuable upgrade and a great timesaver, don't knock this suite until you've tried it.

I didn't pay much attention to the hype when Office 97 was released last year. After reading reviews condemning the package as slow and bloated, I came to own a copy six months ago only because, being an existing user of Office 95, the upgrade was free. I thought it only fair to test the product myself before writing it off, and I'm glad I did.

As a student I use all five of the Office family members. The main applications integrate extremely well. The toolbars are strikingly similar throughout the suite, and the excellent design and user-friendliness are standard Microsoft. The applications use common tools such as the Clipart Gallery, from which you can access the vast clipart collection on the CD. Copying and pasting information between the applications is easy, though in my case very slow.

Web integration seems to be Microsoft's next step towards world domination. While editing and viewing Word documents, web and email addresses are automatically converted to links, which you click on to launch Internet Explorer. Word 97 can edit and save HTML documents, and includes a toolbar devoted to web-page tools, whereas all Office applications include the web toolbar. The "Microsoft on the Web" menu provides quick links to various parts of the Microsoft web site.

A big improvement on previous versions of Office is the introduction of VBA (Visual Basic for Applications). I can use exactly the same skills in Access to create macros in Word and Excel, with the result that I don't have to spend hours searching through online help files looking for a command.

With Office 97 you get much more than the five flagship applications, and the CD includes a wealth of utilities and resources. The Office ValuPack contains

▶**WORD 97** CAN EDIT AND SAVE **HTML** DOCUMENTS, AND INCLUDES A TOOLBAR DEVOTED TO WEB TOOLS

information and software updates, as well as a small collection of True Type fonts. Although the Office Binder is a

Web integration seems to be Microsoft's next step towards world domination

complete waste of space, the Photo Editor is extremely useful for small operations such as converting images from one format to another.

On the downside, the email compatibility glitch in Outlook is a problem, and I find it easier to use Outlook primarily for faxes, contacts and phone dialling, leaving the email handling to the more capable Outlook Express.

There are only two major problems that directly affect me. The first comes when I try to work on the same file at home and at school — nightmares of Access come to mind. The school uses version 2, I use version 8, and there's no option to save in an earlier version.

The second problem is possibly the most annoying and frustrating feature I have ever encountered in all my experience with computers. In Word, misspelt words

are underlined in red and grammar mistakes are underlined in green. This isn't helpful to me, as I'm red/green colour blind. But these are things I have learned to live with. No review of Office 97 would be complete without mentioning Find Fast. On my P75 it seems to achieve just one thing: to slow everything to a crawl. At least it's easy to remove.

Overall, Office 97 has been a worth-while upgrade. The wizards and templates are superb for creating a week's work in just a few hours, leaving more time for other, far more important aspects of life, like the World Cup.

GRAHAM STONEMAN

PCW DETAILS

★★★★

Price *£420 (street)*
Contact *Microsoft 0345 002000*
www.eu.microsoft.com
Good Points *Consistent interface, web features, standard macro language.*
Bad Points *Idiotic grammar suggestions, compatibility problems with earlier versions.*
Conclusion *A valuableupgrade, though not recommended for low-class PCs.*

Psion Siena

Tested over eight months

Can the Series 5's little sister, the Siena, teach its bigger sibling a thing or two?

The Siena is simpler, smaller, lighter and much cheaper than Psion's Series 5. Mine stores all my contacts, ideas, appointments, notes and figures. The only problem I have with it is that my fingers are too big for its dinky little keys. The keyboard is fine on a solid surface, but on a train, for example, I have to hold the Psion in my left hand and type with my forefinger. The superb screen is zoomable and you can adjust the contrast.

The Siena boasts a word processor with most of the usual features: a spreadsheet with graphs; a wonderful schedule manager with views, alarms and to-do lists; a customisable address database; world time with international dialling codes; a calculator; and even its own programming language (OPL) so you can write your own applications. Third-party software, including games, is available from the internet. Siena-to-PC data transfer is via a serial cable and a Windows package which converts Psion files into other formats. There is no internal expansion — you get what you pay for, which is either 512Kb of RAM or a whole megabyte. Files are compressible in some applications, which saves memory. Battery life works out at 25 to 30 hours, and the Siena can take rechargeable batteries. It has built-in power management, too.

This isn't really a machine to keep IBM's group accounts, but it's perfectly adequate for quick figures and notes: I actually wrote this review on the Siena.

JOE TARRANT

Panasonic Panasync/Pro 7G

Tested over six months

Sometimes, attractive things *do* come in large packages. This is one of them.

There are times when you really need to buy the nicest piece of hardware you can afford. So when my trusty 17in monitor died at the hands of unwanted intruders three months ago, I took the opportunity to go the whole hog and replace it with a nice, shiny, huge PanaSync/Pro 7G 21in monitor. The Pro 7G is basically a two-foot cube, tapering slightly at the back. And since it weighs in at just under 30kg, moving it is not for the faint-hearted, hence the two-year on-site warranty. Connections are for the standard PC 15-pin D connector (detachable cable supplied) or via five BNC connectors, RGB and V&H sync. Additionally, the Pro 7G will connect to a Mac via an adapter (not supplied). These days, 21in doesn't mean 21in, but there are 20 fine inches of viewable screen. With a dot pitch of 0.25mm, that's nearly two million pixels, permitting screen resolutions up to 1600x1200. Scan rates peak at 75Hz for all modes except standard VGA.

Controls are simple: four buttons on the front panel are used to navigate the 19 options available via the on-screen display. As well as screen dimensioning tools there are adjustments for video level, colour temperature, moiré reduction (horizontal and vertical) and input select, and five different languages to do it in. With 13 memories, each time you change resolution or scan frequency, the monitor remembers the settings and recalls them. Oldest settings are lost first if you have more than 13, which is pretty unlikely.

Despite its size, I happily recommend the Pro 7G. I use it with a dual PII running NT and Matrox Millennium II.

NEIL G JARMAN

Concise Oxford Dictionary
with sound

Tested over six months

Always getting your tongue in a twist? A 'talking' dictionary could be just what you need.

For the serious writer, or indeed reader, a good dictionary is essential. While all the main word processors have built-in spell checkers, these do not contain definitions. And although dictionaries in book form enable you to find a word out of thousands of definitions in just seconds, they still have some limitations — one of the main ones being how they convey the pronunciation of a word. Usually, this is accomplished by a collection of letters and special characters used to describe well-known sounds. I always had problems with this information, until I bought the Concise Oxford Dictionary (COD) on CD-ROM with sound. The COD ninth edition comes supplied on a single CD and contains 140,000 definitions. A setup program gives the choice of quick (8Mb) or full (26Mb) installation; the full version copies the text data to hard disk. Both installations keep the sound data for pronunciations on the CD-ROM, because of the large amount of space it requires. Once installed, a custom browser provides access to the definitions. The simplest way to find a word is to click on the Quick Search button and enter the first few characters of the required word in the text box below. The word index display along the left of the browser window updates after every character entered. When the required word is found in the index list, a single click displays its definition in the wider Definition pane on the right.

The online version of COD also displays those cryptic pronunciation characters; when you double-click, you hear an audio pronunciation (you need a sound card). For a word like "schedule", multiple pronunciations are provided; not all audio CD-ROM

► **CLICK ON QUICK SEARCH, ENTER THE FIRST FEW LETTERS OF THE WORD, AND UP POPS A DETAILED LIST OF DEFINITIONS**
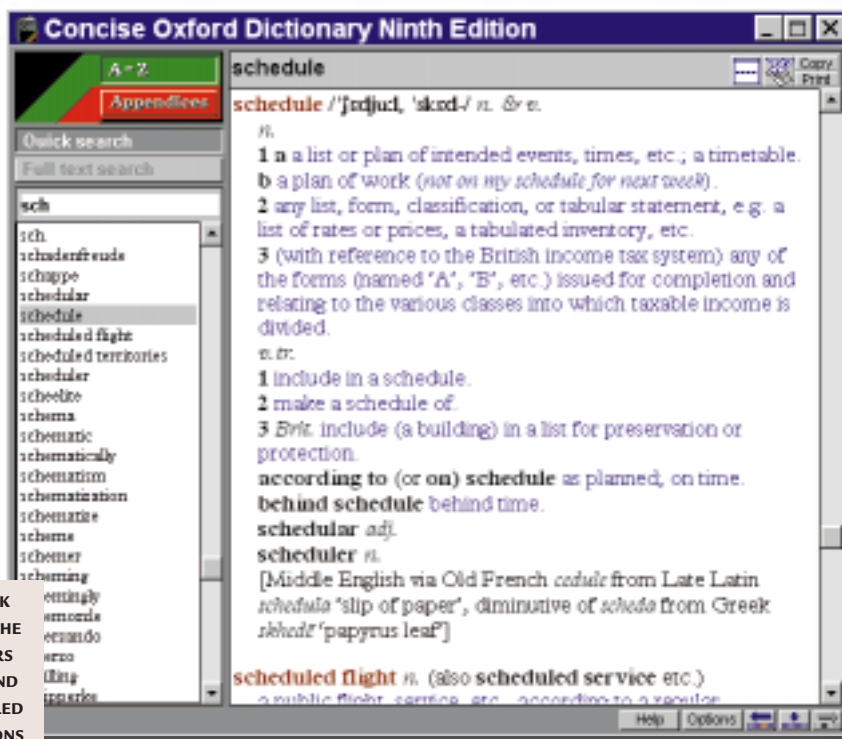
dictionaries do this. Definition text can be copied into other applications, and you can also copy words from Microsoft Word, say, and paste them into the Quick Search text box for easy location.

The online version of COD also displays those cryptic pronunciation characters

There are also extensive in-built hypertext facilities. If you don't understand the meaning of any word used in a definition, double-clicking on that word takes you to its definition. Besides the location of specific words, COD also provides a "Full text search" facility, which can find a word in the definition of any word within the whole dictionary. This is very useful when you need to find out in what context a word is used. For example, the word "computer" is found in the definition of Algol, artificial intelligence, Basic, binary code, bug, bus, and central processing unit. The search word "computer" is highlighted in yellow each time it occurs

in the definition of the other words listed. The word index on the left conveniently shortens from its usual complete list of all words to just those words containing the search term. Finally, the COD has 20 appendices to supplement the standard word definitions. These provide information ranging from "Abbreviations used in the dictionary" through to a "Style guide" for English grammar usage.

With sophisticated search facilities, clipboard support, up-to-date definitions and audio pronunciations, COD is a valuable resource.

SIMON WILKINSON

PCW DETAILS

★★★★

Price *£19.99*
Contact *01865 556767*
www.oup.co.uk
Good Points *Being able to hear the way words should be pronounced.*
Bad Points *Nothing springs to mind.*
Conclusion *The answer to a writer's prayers.*

Counter

Affordable electronic commerce solutions are allowing even the smallest business to **set up an online store**. Terence Green sets out the options available.

ONLY A YEAR AGO IT WOULD HAVE COST THE AVERAGE SMALL BUSINESS THOUSANDS OF POUNDS in software and programming services to set up an online storefront, but an influx of inexpensive solutions over the past six months has made it possible to take your products or services online for as little as £15 a month. The internet not only enables businesses to offer customers an additional level of service, but also opens up a sales channel through which they can reach new customers. Small businesses in the UK can use the internet to offer speciality products, from foodstuffs to clothing, to a worldwide audience of expatriates and Anglophiles. The internet also serves as a platform for entirely new ventures; the best-known example is Amazon books, which was created purely as an internet sales outlet.

Whether you're considering taking a business online or starting an internet business, you now have the advantage that a low-entry cost means that you can spend more money on advertising and promoting the service. Simply putting up a well-designed store with attractive products isn't necessarily going to do the trick if people don't know about it. Amazon managed to garner a mountain of press coverage by being the first in its field, but for a long time it also had to spend more on promoting the service than it did on running it. Obviously, you need to advertise your presence in the places where your customers congregate — and that's not only on the internet. While it's important to have your store indexed in as many internet search engines as possible, you should not neglect the traditional promotional methods. If you already run a mail order operation and advertise in periodicals, be sure to list your internet address (URL) along with your telephone number and address.

Mail order operations are ideal candidates for taking online because you already have a database of products in a paper catalogue which can easily be presented as web pages as well. At its most basic, a web store is simply a web-based (HTML) catalogue with an associated ordering system. Another important benefit of already having a mail order system is that you have the experience of fulfilling orders. Calculating sales taxes and shipping charges and delivery for an international audience takes quite a bit of organisation, as does the handling of returns and multiple currencies and the thorny question of customer support.

Remember that handling customer service calls from a worldwide audience implies a 24-hour service. If you haven't previously sold though mail order, it's probably advisable to begin by restricting your service to the UK.

A low-entry cost means that you can spend more money on advertising

ADVERTISING, PRODUCT PROMOTION and order fulfillment are fairly similar business issues for any sales operation, whether on the internet or not. But a difference arises when it comes to the catalogue of products — an internet catalogue can be much more dynamic than a paper equivalent. This is one area where it is important to choose your electronic commerce software carefully.

Some of the less expensive products are quite basic and may not appeal to you if your aim is to make your online store a unique experience. On the other hand, an all-singing, all-dancing store that can only be experienced by a minority of web browsers will drastically reduce your potential customer base. An online store needs to load pages quickly to draw customers in, and it needs to have a smooth buying process too. Asking people to register their details before they browse the store, for example, is a sure way to turn away custom.

There are basically two ways of arranging payment online. One is to stick to the mail order pattern and allow people to order online but ask them to confirm their payment details by fax,

revolution

Counter Revolution
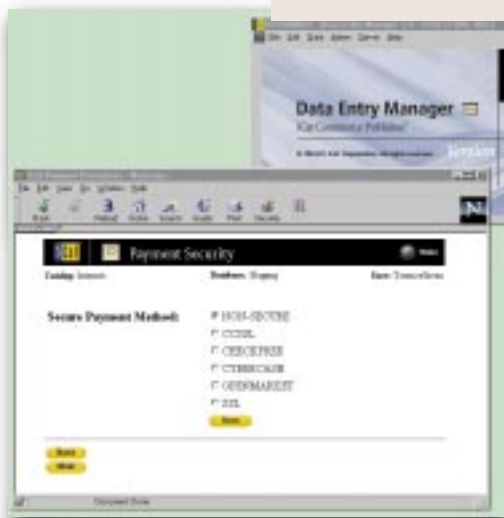
phone or post. Many internet stores offer this option because it is familiar, and most people have no problem with giving their credit card details over the phone or via fax. But the system creates potential problems in matching up orders and payments and it may not be a satisfactory way of dealing with international orders. A much better system is to take payment online so that customers can make their purchase in one convenient process. To take payment online you need a payment processor and a merchant agreement that enables you to accept credit card payments. There are several payment processors and finding one is not difficult. If you already have a regular merchant agreement, for mail order sales perhaps, then it should be easy to extend that to deal with online payments. If, however, you are starting from scratch, you will have to provide a great deal of information about your business plan.

Once you have obtained your merchant status and an agreement with a payment processor, taking online payments is easy. When a customer decides to buy from your online store, a secure link is set up between the customer and your payment processing service. The customer's credit card details are passed across to the payment processor over this link and verified. If the payment is authorised, it is debited from the customer and transferred into your account. The payment processor advises the customer and the merchant that payment has been accepted. Simultaneously, the details of the order are passed to you and you can go ahead and process it, knowing that payment has been received. This process varies in operation according to the level of service you provide. With entry-level software,

you have to be sure that your stock level is sufficient to meet demand; whereas with more sophisticated packages, you can integrate your back-office systems with your online store so that customers can check stock levels online before ordering. You will also need more advanced software to implement backorder and part payment systems.

Current payment systems are based on credit cards, and cash payment schemes are still being thrashed out. Barclays and BT both have cash payment schemes which are in their early stages, so it's only a matter of time before they become more widely available. The advantage of electronic cash is that a formal agreement is not needed to process it.

If you have a large selection of products and a sales process that is already computerised, you'll want to integrate an internet operation into your order processing system. An example might be a business selling artists' supplies. The stock list will be large with a few main categories (pens, inks, papers), several sub-categories (types of paper, pen) and many different attributes in each sub-category (colour, size). For such a project, you would be well advised to approach a professional internet commerce service provider.

Electronic commerce service providers usually work with a range of software products to meet the varying needs of their customers. The essential quality is that they have the ability to build a complete service, from creating, hosting and maintaining the site to order and payment processing. It need not be horrendously expensive, either. You can be up and running for a few thousand pounds, which is probably less than you will need to spend on advertising. At the other end of the scale are online stores with a handful of products or perhaps even a single product, for example a specialist newsletter or a range

of half a dozen topical T-shirt designs.

A number of inexpensive entry-level products and subscription-based services would meet these needs. IBM Home Page Creator <www.ibm.com/hpc/uk> provides site hosting on a secure server and a shopping basket for taking orders through a web catalogue which you create online using a Java-based application. No knowledge of HTML is required, nor any investment in software. Order processing with tax and shipping calculation is included and online payment processing is an optional extra. The service is based on five service levels. The basic service costs £15 to set up, plus £15 per month, for which you can sell up to 12 items online. The higher levels offer access to online payment processing and room for more catalogue items — up to 500 for the £120 per month Platinum service.

HPC is the first of an impending multitude of subscription services. You can sign up online for a free 30-day trial and if you don't get on with it, simply cancel before the end of the trial period at no cost. The service includes arranging and registering an internet domain name, which costs £45 for two years. Further developments along these lines are imminent from other commerce software vendors such as iCAT <www.icat.com> and Intershop <www.intershop.com>.

Actinic Catalog is produced in the UK <www.actinic.co.uk> and costs only £350 for the software, which runs on Windows 95 and Windows NT. It produces simple commerce-enabled catalogues for which you need a hosted web server. It does not need to be a secure server as Actinic Catalog includes its own secure ordering process which allows you to collect payment details online. But you have to process payments manually as online processing is not included.

Even cheaper is Shop@ssistant from The Floyd Consultancy <www.floyd.co.uk> at a rock-bottom £199. The product is basically a set of shopping-basket scripts written in JavaScript which you attach to your web site. You will have to do a fair amount of manual editing and become familiar with JavaScript and HTML to get the best out of it. There is also a version which has been tailored to work with the WorldPay system to provide online payment processing.

The only fly in the ointment is that customers have to use a browser such as Netscape Navigator

version 3 or Microsoft Internet Explorer version 3. There are several packaged mid-range products costing £2000 to £3000 which create catalogues from databases and have all the hooks required to link them into existing order and payment processing systems. They use open database standards, usually ODBC, enabling a merchant who already has a stock database to feed information directly into the online catalogue. iCAT Electronic Commerce Suite, Intershop 3.0, and Cat@log from The Vision Factory <www.thevisionfactory.com> fall into this category. The key feature of these products is that web stores can be created largely by pointing and clicking and filling in some detail descriptions. Although Microsoft Commerce Server and IBM net.Commerce software are in the same price range and have similar features, they are more orientated to programmed solutions than to point-and-click site creation. Specialist commerce services are available from a variety of sources. Many ISPs offer store services, as do telcos such as BT. Web-Commerce is a new service from Cable & Wireless offering secure, scaleable services for small to medium sized businesses on a subscription basis. Merchants pay a setup fee of £1000, an

Counter Revolution

annual fee of £1000 and a service charge of five percent of the transaction cost. The charges include fees for payment and order processing but not web hosting. Cable & Wireless can provide that too but the secure payment service can be used with any hosted site. You need a merchant agreement for online payments; Cable & Wireless will help to arrange that with Barclays Merchant Services. ShopSite from Open Market is an interesting product, designed to be hosted by commerce service providers in conjunction with a payment processing service provided by Open Market. The software is new to the UK and at the time of writing there's only one UK reseller, Venus at <www.venus.co.uk>. Merchants sign up for commerce service and then use a web browser to create their store online. It's very easy to use. You create your web store using any HTML editor and then use ShopSite to add the "buy" buttons which trigger the ordering process. An entry-level version, ShopSite Express, which is limited to 25 items and lacks the online payment processing option, is being given away free to Microsoft FrontPage users at <frontpage.shopsite.com>.
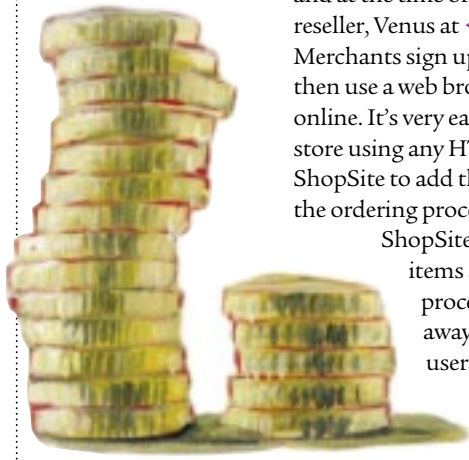
One way to avoid being lost in cyberspace is to join an online mall, but perhaps not immediately — they have not been amazingly successful so far. The best hosts for malls are large online service providers such as AOL, the emerging Internet "portals"' such as Netscape Netcenter and Microsoft Network, and national telecoms carriers such as BT. None have malls that are affordable for small business users, but it can only be a matter of time before they do.

Many commerce software providers are producing mall software aimed at the small business user. Recently, Actinic introduced SuperMall, aimed at special-interest groups and demonstrated at <www.i-mall.co.uk>. SuperMall hosts pay £2500 to service up to five shops and £349 per additional shop.

PCW CONTACTS

IBM Home Page Creator
IBM, www.ibm.com/hpc/uk
Actinic Catalog
Actinic Software, www.actinic.co.uk
Shop@ssistant
The Floyd Consultancy, www.floyd.co.uk
iCAT Electronic Commerce Suite
iCAT, www.icat.co.uk
Intershop 3.0
Intershop, www.intershop.com
Cat@log
The Vision Factory, www.thevisionfactory.com
Web-Commerce
Cable & Wireless, www.web-commerce.co.uk
ShopSite
Open Market, www.shopsite.com
Commerce Server
Microsoft, www.microsoft.com
Payment processing
WorldPay, www.worldpay.com
NetBanx, www.netbanx.com

Service & Reliability survey

SATISFIED WITH YOUR **PC** OR **ISP**? THE TIME HAS COME TO **REVEAL YOUR OPINIONS** IN THE INDUSTRY'S BIGGEST INDEPENDENT USER SURVEY.

Whether you've spent well over the odds for the latest state-of-the-art PC or found yourself a bargain printer, the point of any such purchase is that it works and goes on working. The last thing you want to find yourself lumbered with is an unreliable piece of equipment that becomes a job in itself, rather than a way of easing your job load.

As computing forges ahead as a dominant part of modern life, both at work and at home, so have the expectations of you, the buyer. It is becoming paramount that scenarios such as the risk of losing important files if your PC crashes or missing a time-critical deadline while printing a document, because your printer jams, are jno longer acceptable. Unfortunately, though these are things we would rather not have to deal with, they still remain a normality of computer equipment usage.

Naturally, as you become a more knowledgeable buyer, you look to lessen the likelihood of such eventualities. Basing purchasing decisions on price and a whole gamut of specifications are important factors, but after-sales service and support are gaining ground as the heavyweights, in the "why I must buy" league table. And why not? You want the best deal you can get. You want value for your money.

But how do you know which manufacturer is providing the best technical support? Which brands out there can be trusted for product reliability? And the real test for any vendor — customer loyalty. Which vendors do buyers actually want to repurchase from and which brand would buyers be moved to recommend to others?

Trying to get such answers, that are both valid and accurate, can prove a daunting task. But what better way to get to the truth than to obtain first-hand experience and information from the

significant, vendor customer bases. Our survey asked you the typical questions about the make of PC and/or mobile you used, what brand of printer you had and which ISP you subscribed to. But it also widened the scope of the survey by asking you in-depth questions about service and support relationship elements. So we found out from you, for instance, what the print quality was like from your printer, how easy it was to upgrade your PC, the ability to connect when you wanted to via your ISP, and when something went wrong, how it was dealt with.

Depicting the outcome of our survey in our graphs, Maritz Research has shown the top-line results which give in each category an overall winner of reliability , the brand you would definitely repurchase from and which you would definitely recommend to others. The vendors have been placed into categories of significantly above average, average or below average. This method has been chosen, rather than simply saying what was scored by each manufacturer, because it overcomes reporting weaknesses where there is very little differentiation between the vendors.

Rather than list pages of figures for you to trawl through, we've done al the hard work: in each of the PC, mobile, printer and ISP sections, you'll find the facts required for you to make a confident purchasing decision. The reports that follow are as revealing as they are useful.

Respondents were given the options of stating they were either "Very satisfied", "Satisfied", "Neutral", "Dissatisfied" or "Very dissatisfied" with particular aspects of their equipment and/or support. The facts reported here will reflect only those answers which stated a respondent was "Very satisfied" or "Dissatisfied" and "Very dissatisfied" with these areas. We are not basing any of our survey report on answers from respondents who sat on the fence.

For us, "Very satisfied" means the product genuinely made users very happy — it delivered that little bit extra worth noting and praising. We excluded "Satisfied" answers because this simply reflects that your product has done what you expected it to do, which is not glowing praise and can only be interpreted as such in a time when consumers are used to being misled by advertising and are relieved to have something that works. "Dissatisfied" and "Very dissatisfied" both indicate the products and/or support were not up to scratch and did not fulfil the user's expectations.

Ever conscious to provide you with a complete picture, we have offered all vendors which are mentioned in our data the "Right to Reply"— putting in writing their responses to our survey's results.

ALANA JUMAN BLINCOE

end-user — you, our readers. Carrying out our own lab tests on products gives us part of the picture, but to get the full view we have to know not only how the product performs, but also what the pluses (and the minuses) are when you buy into a particular brand.

So PCW, in tandem with Maritz Research [see panel, right] have sought to investigate, with your input, just which brands in the market are pulling their weight in service and reliability, and which ones are not.

In PCW's first ever independent readership survey, you'll be getting results which present the facts that you 'want' to know about and the ultimate guide to the best brands for technical support, product efficiency and durability. In this survey we will of course be rating PCs, mobiles and printers. And for the first time ever in any such survey, PCW will undertake evaluating the performance of ISPs.

The survey questionnaire went out to our entire readership base in three issues of the magazine, including our 20th anniversary issue [PCW, May 98] which sold over £195,000 copies. The questionnaire was also available on our web site. This enabled us to have a broader-based data collection platform that encouraged greater participation and gave us more accurate targeting of some of the smaller, but still

Maritz Research

DESKTOPS & MOBILES

BEFORE WE LAUNCH INTO OUR **DESKTOP & MOBILE CATEGORY,** let's set the picture. Out of all our respondents, 88% of you had just a PC, 1% had only a laptop, and 11% of you had both. (Surprisingly, 15% of the people who built their own computer didn't feel confident to call it either a desktop or a laptop. Perhaps they had engineered a PDA type.) The majority of users, 32%, bought equipment in 1997, while a scant 3% of you are using machines pre-dating 1992. But, as you would expect, most people have a three-year replacement cycle, and 70% of you had bought your equipment between 1996 and 1998.

Mail order and buying direct proved the most popular ways to purchase hardware: 62% of you said this was how you had bought your last piece

> Eyebrows were raised at **THE INADEQUACY OF VENDORS GETTING ALL THE RELEVANT KIT** in one go. One respondent received an empty box!

of computing equipment. While 18% opted for purchasing through retail, only 15% of respondents chose to go to their local reseller. Interestingly, 35% of mobiles were bought through dealers.

Choosing the best place to buy your equipment is one thing, but how good were vendors on the product availability front? Compaq satisfied only 40% of its customers in this area, while Dan Technology certainly pleased its public, leaving more than two thirds of its customers with absolutely no problems of getting hold of kit.

PCW queried the condition our readers hardware is in when it is delivered. Top scorer, Gateway, had a 75% satisfaction rating in this category, and Dan and Toshiba also did well, with 70 and 71% respectively. Compaq and Evesham scored the lowest marks with 55% each.

Eyebrows were raised, however, at the inadequacy of vendors getting all the relevant kit dispatched in one go. One respondent in our survey claimed to have received an empty box! It wasn't a Dan customer, though, because eight out of ten Dan buyers were very happy with this aspect of Dan's service, whereas only 55% of customers buying from Compaq could give the company top marks. This may be explained by the fact that 20% of Compaq customers use their machines for businesses compared to just 5% of Dan's. These business users may expect delivery completeness to be a reasonable expectation, whereas home users may be more open to giving high marks for just getting all the kit to them.

Installation

Ease of installation was the next area tackled by our survey. Gateway and Opus Tiny got top marks in this category – 65% of their users were completely satisfied with the installation process. Mobiles proved marginally easier than desktops to get going, with satisfaction scores of 56% against 52%. Notebook king Toshiba was the exception — it too ranked 65%. But, this satisfied installation figure of mobiles could also reflect the fact that the purchase of most of them was from dealers who would have installed them.

If you think all machines are alike, then check out the scores our survey uncovered when we looked at build quality. Packard Bell and Compaq could muster only 35% satisfaction scores from their users, and Opus Tiny gathered only 33%. but, Dan Technology managed to please 69% of its customers, and Toshiba kept the mobile end up with 62%. Unfortunately, Toshiba does let itself down somewhat when it comes to features, with only 38% of its customers getting exactly what they want. Packard Bell hits bottom with 24%, while no-name clones and other brands please less than a third of their buyers.

Compatibility

On the compatibility front, Compaq users have not found their machines the easiest to get along with other devices – only 38% were happy compared to 71% of Dan's customers, which is a good seven points clear of competition. Gateway stood in with 63%.

The standard of software included with machines also proved very disappointing to customers. Gateway led the pack, with 49% of its users satisfied, while Compaq languished at the bottom of the pile with 21%. A large number of you complained about Windows 95: it either kept crashing, was unstable, or there were upgrade problems. One respondent said: "Windows 95 is the pits," which is a lot more polite than *some* of the comments we received about it.

Speed & price/performance

Speed performance of kit is an issue across the board — only 30% of you were happy with this element. Compaq proved significantly less satisfying to its customers than the majority of brands. However, price/performance threw up some interesting winners. The home builders were very pleased with their efforts, and 60% of them felt they had got good value for money.

Coming in second were the clone builders: 42% of users were sure that not paying for a brand name had saved them money and not lost them anything in performance. Although no-one ever got fired for buying IBM, a rather measly 21% were pleased they had done it. The Packard Bell customers were even more miserable, with 22% of them dissatisfied with the company's price and performance.

PCs, though, seem to be a reasonably hardy bunch – 47% of desktops and 52% of mobiles did not suffer from any problems over the last six months, although 45% of desktops and 40% of mobiles succumbed to between one and five technical hiccups over the same period. The most common problem experienced was hanging/frozen PCs, which accounted for 39% of our respondents' computing headaches. Software glitches were a close second, with 30%. Compaq machines seemed particularly susceptible to these two problems: 55% of its users had trouble with PCs freezing, while 45% had encountered software stress.

Help & support

The preferred method of solving a customer problem is by telephone and helpline support. The vendor helped 58% of you in this way, while 55% were helped through your place of purchase. Manufacturers solved 61% of all problems with desktops over the phone, compared to 27% for mobiles. Mobiles sent to base to be repaired accounted for 60%, whereas only 26% of desktops were fixed in this way.

Toshiba's reputation suffered a dent, as only 15% of its customers found its repair service totally satisfactory. This figure appears even more dismal compared to an industry average of 39% and an outstanding Dell performance of 53%. There were no high scorers when we looked at the time taken to carry out repairs.

Regarding the quality of repair, Dan did well, with 59% considering the job well done. Unlike Toshiba, which had 31% of its customers unhappy with its repair standards. Opus Tiny had only 17% of its customers go through its repair process very satisfied with the time taken, 33% very satisfied with the quality, and an enormous 86% thought the price was right for the cost of repair. Just over a third, 35%, of Compaq's customers felt the same.

Recommendation

Dan can look forward to friends, relatives and colleagues of its customers making sales pitches on its behalf, as 63% will definitely give the hard sell, while 21% probably will. However, 19% of Packard Bell users will not recommend the brand, 8% of home builders will not recommend Compaq to others, and 12% definitely won't.

Very satisfied with overall reliability of PC

Relative performance

- Dan
- Toshiba Mobile
- HP
- Gateway
- Dell
- Evesham
- Simply
- MJN
- Viglen
- IBM desktop
- Mesh
- Hi Grade
- IBM mobile
- Mitac
- Elonex
- Opus
- ACER
- Fujitsu
- AST
- Time
- Compaq desktop
- Packard Bell
- Compaq mobile
- Atlantic

BELOW AVERAGE AVERAGE ABOVE AVERAGE
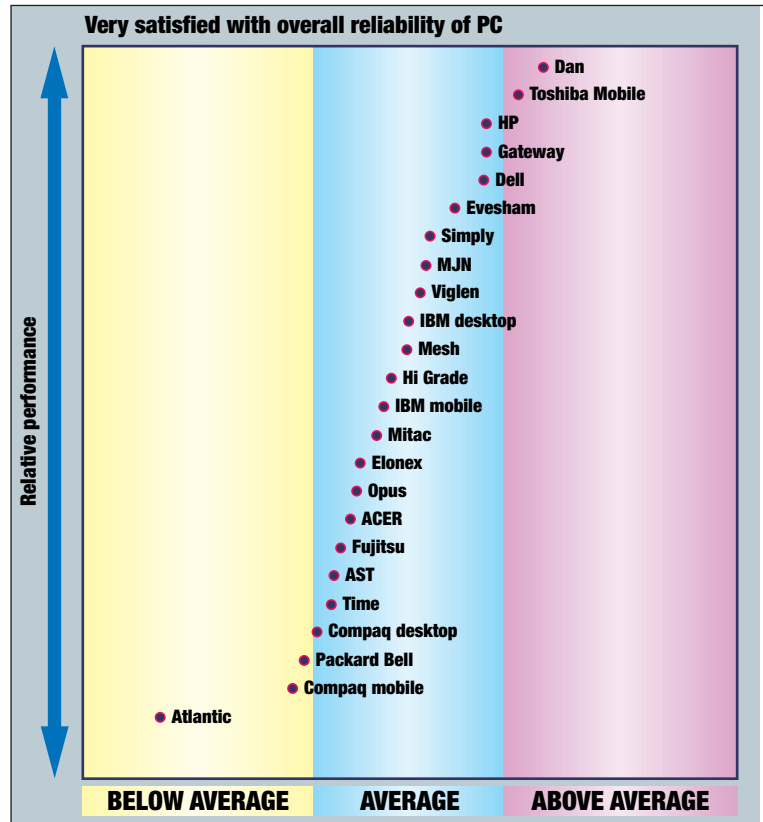
▲DAN CAME TOP IN THIS CATEGORY, TOSHIBA WAS A CLOSE SECOND, AND COMPAQ CAME VERY NEAR THE BOTTOM

▼DAN CUSTOMERS INTEND TO BUY DAN AGAIN, BUT IT'S A DIFFERENT STORY FOR PACKARD BELL, OPUS TINY AND COMPAQ

Will definitely repurchase the same brand in the future

Relative performance

- Dan
- Dell
- Toshiba Mobile
- Gateway
- Simply
- HP
- Mesh
- ACER
- Hi Grade
- Evesham
- IBM desktop
- Time
- Fujitsu
- MJN
- Compaq desktop
- IBM mobile
- Viglen
- Elonex
- Compaq mobile
- Opus
- Atlantic
- AST
- Mitac
- Packard Bell

BELOW AVERAGE AVERAGE ABOVE AVERAGE

RELIABILITY SURVEY *feature*
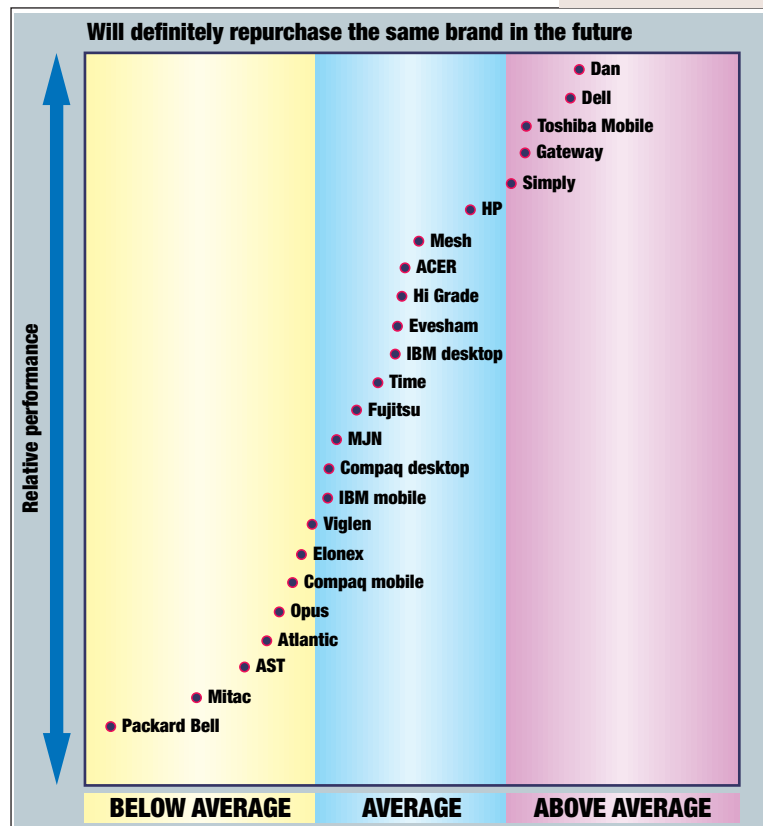
PRINTERS

PRINTER QUALITY WAS AN ISSUE FOR THE MAJORITY. Less than half of the respondents said they rated their printer's build. For Lexmark, more than two thirds failed to give their kit the thumbs up. Exuberant advertising could have exacerbated this situation, because the features available to customers fell miserably short of expectations. Close to three quarters of Lexmark users wanted more or a higher standard, and Epson failed to please 55% of its users. Laser printers offered the best package, according to 44% of users.

stakes, with 69% of its customers getting instant printing action when they connected their devices. Hewlett-Packard (HP) and Canon weren't too far behind, both with just under 65%. Lexmark logged 53% high user satisfaction.

Print speed & quality

IT users always tend to feel the need for speed, but our respondents haven't been getting the adrenaline rush of watching hardcopy output at warp factor nine. Less than a quarter were pleased with the speed performance of their printer. A massive 85% of Canon users are suffering from cartridge crawl, and top performer HP has just 28% of patient users. Laser technology delivered satisfaction to only 36% of its backers.

Getting to the crux of printer performance, we asked what the print quality was like. The overwhelming verdict is, it's not good enough. Almost two thirds of respondents who use laser printers, naturally think they produce the highest-quality output, but even 45% of the technology's users are not totally satisfied. Epson's customers were best satisfied, with 45% of them enjoying the clarity of ink on paper. But just over one third of users are happy with the performance of their printers.

Over a third of our respondents are angry that they cannot upgrade their printer – 43% of Canon users, the worst score, found this. Epson suffers from having only one in nine of its customers happy with its upgrade path. And more than two thirds of dot-matrix users feel lumbered with their printer choice. Laser technology, although seen as the most easily upgradable of all printer formats, gave satisfaction to only 13%.

Printer problems

Problems with printers, unsurprisingly, scored highly. We asked how many problems had been encountered by users over the last six months. All brands scored highly. HP users suffered the most in this category: 2% had over ten problems during the last six months, but 69% had enjoyed a trouble-free half year. Surprisingly, 90% of dot-matrix users, for all their objections, had experienced no problems in the last six months, compared with two thirds of laser users.

Paper jamming proved to be the biggest headache for users, affecting 37% of them. Lexmark stood out as the worst, though, causing nearly 63% of users this problem. Almost a quarter of printers failed, due to printer driver problems. But it was HP that topped this section, with 29% of its users suffering problems.

> Users haven't been getting **THE ADRENALINE RUSH OF WATCHING HARDCOPY OUTPUT AT WARP FACTOR NINE** Less than 25% were pleased with the speed

Overall, customers were happy with the ease of printer installation. Lexmark performed the poorest in this category, with only 55% of its users being very satisfied. Less than half of dot-matrix technology users found installation a joy, compared with almost two thirds of inkjet users, and 6% of the dot-matrix respondents proved to be a very dissatisfied bunch. Inkjet users made up more than three quarters of the entire survey — maybe the dot-matrix devotees should think about joining them.

Epson topped the hardware compatibility

▼ HEWLETT PACKARD LASER MONOS MOST DEFINITELY HAVE THE UPPERHAND

Very satisfied with overall reliability of printer

Relative performance →

- HP Laser mono
- Panasonic Dot matrix mono
- Epson Dot matrix mono
- Epson Inkjet
- Panasonic Laser mono
- HP Inkjet
- Canon Inkjet
- Lexmark Inkjet colour

| BELOW AVERAGE | AVERAGE | ABOVE AVERAGE |

Will definitely recommend brand to colleagues/friends

Relative performance

- HP Laser mono
- Epson Inkjet
- Panasonic Laser mono
- HP Inkjet
- Epson Dot matrix mono
- Panasonic Dot matrix mono
- Canon Inkjet
- Lexmark Inkjet colour

BELOW AVERAGE **AVERAGE** **ABOVE AVERAGE**

▲ RECOMMENDATION COMES HIGHLY FROM HEWLETT PACKARD LASER MONO USERS

▼ THE EPSON INKJET HANGS IN THERE, BUT HP'S LASER MONO WILL BE ON USERS' SHOPPING LISTS AGAIN

Will definitely repurchase the same brand in the future

Relative performance

- HP Laser mono
- Epson Inkjet
- HP Inkjet
- Epson Dot matrix mono
- Panasonic Laser mono
- Panasonic Dot matrix mono
- Canon Inkjet
- Lexmark Inkjet colour

BELOW AVERAGE **AVERAGE** **ABOVE AVERAGE**
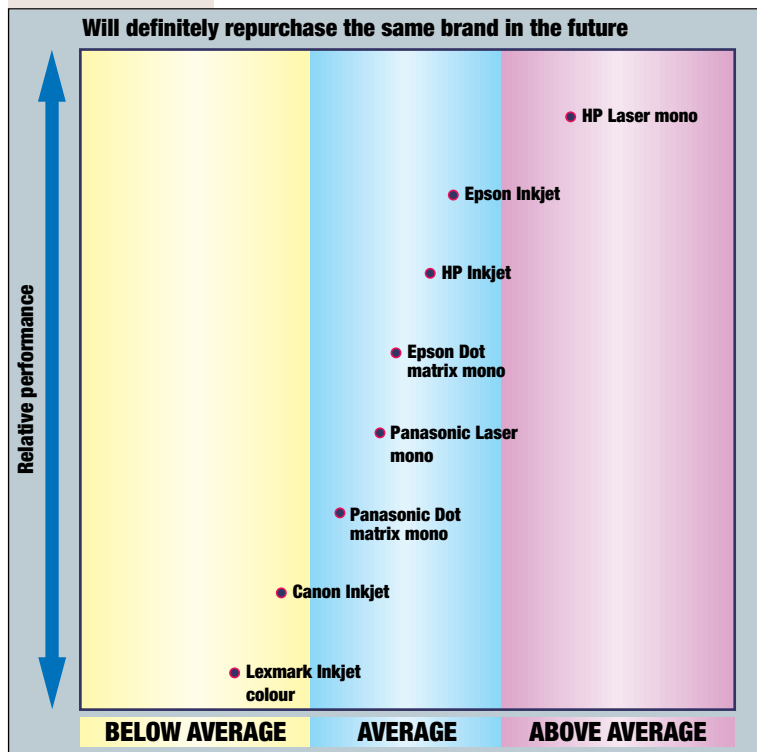
Phone support, though, solved over half of the printing problems, while 14% of users used email and web support. The same number had it replaced and a further 18% returned their machines for repair. About a third, 35%, of our respondents were happy with the repair job, but 20% were not.

The time taken for repairs shows that 50% of Epson users were very happy with the repair time, while a further 43% felt that their service was adequate. Lexmark had no customers dissatisfied with the time it took for repairs, unlike HP, which upset 17% of its users, and Canon, which crossed a staggering 29%. Almost half, 46%, of Epson customers were pleased with the quality of repair, but 14% felt the opposite. However, two fifths of Lexmark customers were very happy with the outcome.

Repair, reliability & pricing

Trouble-free printing is actually a reality for some users, though. Respondents have been reasonably satisfied with the reliability of their printers – just 50% of respondents were unhappy with their buys. Again, almost half, 48%, of Epson users and 47% of inkjet users were very satisfied with their printers' performance, compared with 54% of both dot-matrix and laser printer users.

Lexmark's repair pricing was pleasing to four in five respondents. Canon did less well here, with just 39% of its customers feeling that they had got a good deal, while 26% thought that they were overcharged. A quarter of dot-matrix customers thought they had got value for money, 60% of inkjet users were happy with the cost of repair, and 39% of laser buyers were satisfied with costs.

Users of the non-leading brands felt that they had a far better deal on cost of ownership than the users of named vendors. This may be because of the premium attached to leading brands and their high marketing costs. Almost half, 48%, of no-named printer users were satisfied with cost of ownership compared with the name brands. HP does best, with one in four of its users considering they had got value for money, and 51% of dot-matrix users felt the same, compared with 22% of inkjet users and 33% of laser users.

Also on the cost front, 28% of respondents felt they were being ripped off over the cost of consumables, such as ribbons, cartridges and toners. Feeling the financial sting the worse, though, were Canon customers: 42% believe they are being overcharged, while 33% of Epson users and 24% of HP feel the same. Nevertheless, three quarters of our respondents spend less than £20 per month on consumables – just 1% rack up bills of £80 or more.

INTERNET SERVICE PROVIDERS (ISPs)

A LARGE MAJORITY OF YOU, 81%, USE YOUR **ISP** CONNECTION FOR WEB ACCESS AND EMAIL. NetDirect was used most for this process, by 98% of its users, as did 93% of Demon's subscribers.

In terms of connection ability, all the ISPs in the survey scored average marks. U-net came out on top, with 48%, and Globalnet came second, with 42%. About one sixth, 15%, of NetDirect's customers were dissatisfied with this aspect of the provider.

Desired access speeds did not leave much for some of you to shout about. CompuServe failed to deliver desired access speeds to 26% of its subscribers, and only 7% of its users claimed to be pleased with its performance. This compared starkly with the 55% of happy U-net subscribers and 44% of NetDirect users.

CompuServe's direct competitors also faired better, with 16% of AOL's customers being very satisfied, and 24% of Demon users being happy with their access speed. But AOL did manage to notch up 15% of disgruntled users.

Set-up & connection

Ease of set-up proved a thorny problem for the larger ISPs. Only 20% of CompuServe's sub-scribers and 22% of Demon's found the whole process to be smooth-running, although AOL faired better with 33% of users being satisfied

with the set-up procedure. However, of the smaller operators, VirginNet walked away with the honour of having 53% of its users very satisfied with the set-up process, while one in two of NetDirect's subscribers were pleased. But BT came bottom in this category, with 16% of its customers unhappy.

Demon's UK coverage meant that 76% of its subscribers were very content with their ability to get connected at local rates. On the smaller scale, U-net did the business for 76% of its users. VirginNet also did well, with 72%, and was closely followed by Globalnet, with 67% of happy users. Enthusiasm for AOL was curiously muted, with just 44% of subscribers really rating this aspect of its service.

The large ISPs do not seem to have built up a huge amount of confidence within their subscriber base regarding their reliability: 14% of CompuServe's users, 19% of AOL's and 22% of Demon's, is all that can sing the praises of their chosen provider. Again, small is beautiful with U-net calling in the approval of 58% of its users, followed by 40% of VirginNet's.

Ease of installation is another area where the big players fall down, either because of their inadequacies or because, owing to the large number of customers, there's bound to be a greater proportion that complain about them. Only one in five of both CompuServe and Demon users found their product easy to install. AOL came out with 32%, but big-brand BT obviously hasn't got the formula right: just 14% of its users rated its installation procedure positively. VirginNet, though, is pleasing 48% of its customers, and U-net also scores highly in this area, with 53%.

Users are definitely wanting more from the big players: 22% of AOL's customers and 21% of CompuServe's say they are not getting value for money. This is especially disappointing when you put these figures alongside U-net's happy band of supporters, of which 68% find every penny well spent. NetDirect also does well, with 59% of its users satisfied with their spend.

Yet quality of service is not really rated by 75% of internet users. Just 11% of CompuServe's customers and 15% of AOL's think they're on quality street. However, NetDirect is managing to please 45% of its customers, while U-net's gratifying 58%.

Connection speed

It could be the volume of users, but again the larger ISPs fall down on delivering what the users want in terms of connection speed. Only 6% of CompuServe subscribers get the speed they need

▼ THE BIG PLAYERS, LIKE **COMPUSERVE** AND **AOL,** GET LOW RECOMMENDATION POINTS

Will definitely recommend ISP to colleagues/friends

Relative performance

- U-net
- NetDirect Internet
- Cable Online
- Demon
- Global Internet
- Virgin Net
- UUNET PIPEX
- ClaraNET
- BT Internet
- MSN
- LineOne
- AOL
- Compuserve

BELOW AVERAGE | **AVERAGE** | **ABOVE AVERAGE**

Very satisfied with overall reliability of provider

Relative performance

U-net
NetDirect Internet
Cable Online
Virgin Net
Global Internet
Demon
ClaraNET
UUNET PIPEX
BT Internet
LineOne
MSN
AOL
Compuserve

BELOW AVERAGE **AVERAGE** **ABOVE AVERAGE**

▼ **THERE ARE ONLY TWO ISPs ARE ABOVE AVERAGE IN OVERALL RELIABILITY**

▼ **SOME ISPs ARE FIND IT VERY DIFFICULT TO KEEP HOLD OF THEIR CUSTOMERS**

Will definitely purchase the same ISP in the future

Relative performance

U-net
Virgin Net
UUNET PIPEX
NetDirect Internet
Cable Online
Global Internet
LineOne
Demon
MSN
BT Internet
ClaraNET
AOL
Compuserve

BELOW AVERAGE **AVERAGE** **ABOVE AVERAGE**
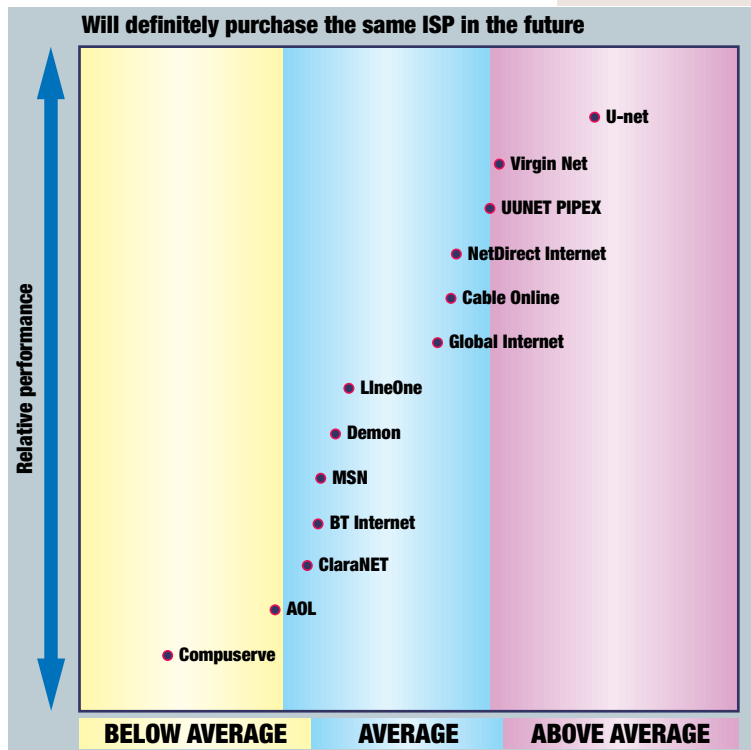
and 12% of AOL's feel the same. Maybe the customers of the smaller ISPs are less demanding or perhaps they are not competing for bandwidth with many others. Nevertheless, 45% of U-net users get themselves connected as fast as they like. NetDirect is close behind, with 42%, but 29% of CompuServe's users are outright disappointed in this aspect of its service, as are 23% of AOL customers.

Technical support

Response to problems mirrors the failings of ISPs in most other aspects of service. Over a fifth, 22%, of CompuServe's users are not happy, nor are 24% of Demon's users. Meanwhile, U-net satisfies, once again, 61% of its customers, and VirginNet does the business for 47% of its user base.

Less than a quarter of internet users think they get the technical support they want. The worse performers in this area are CompuServe, BT and Demon.

Quality of content

Quality online is abysmal across the board. Both the big and the small ISPs are doing it wrong, according to our respondents. Regarding online content, only 16% of both VirginNet and CompuServe users like what they see. Demon gets just 12% of satisfied subscribers, and 13% goes to BT. Top scorer is NetDirect, with 35% of its users enjoying the content it supplies.

The availability of search engines is another "could do better" area. Demon weighs in top of the larger players, with 36% of its subscribers getting to seek out what they want, and BT is close behind with 33%. On the other side of the business, U-net delivers the goods to 55% of its users, and NetDirect is in there with 43%.

CompuServe must be relying on the number of internet virgins trying to get online, as only 12% of its existing subscriber base will definitely repurchase from it in the future. Things aren't much better for AOL, which can boast a hardcore loyal following of just 16%. Demon does best, with 35% definitely sticking with its service, and 42% probably making the same decision. Almost three quarters of U-net customers plan to re-subscribe, as do 50% of NetDirect's.

Recommendation

The figures tell us a very similar story for user recommendations. CompuServe has 13% of its customers committed to spreading the word, as will 18% of AOL's. Demon will benefit from an unpaid sales force of 34% of its customers, while U-net's dedicated 75% of users will preach its gospel, as will 51% of NetDirect's subscribers.

RELIABILITY SURVEY

feature

THE CUSTOMERS CONCLUDE...

After reading and evaluating the information in our survey, the winners we have selected should come as no surprise to you. We have chosen overall winners – those which have come top in their area in the reliability, repurchase and recommendation stakes. And we have highly commended those that were just pipped to the post by the overall winners, but which we feel should be awarded some form of recognition for their consistently high standards.

The overall winners are:
Dan Technology for PCs
Hewlett Packard for printers
Toshiba for laptops
U-net for ISP

The company's which have been highly commended are:
NetDirect for ISP
Epson for printers
Dell for PCs

What makes a winner...

The results of the survey show some of the usual suspects have risen to the top, while for others there have been some surprising outcomes. Branding may be working for a number of the bigger names, but when it comes to the crunch, their product performance and after-sales practices need to be reassessed, because the smaller players are winning hands down on providing all-round value for money.

It is evident from the responses in our survey, that although price and specification are important parts of your buying decision, support and reliability are taking up a bigger wedge of your purchasing criteria. This is not only the case with hardware users, but is also apparent in the results our survey discovered in the ISP sector. Technical support is an extremely important area to the service subscriber; more so than content – although some ISPs seem to think it's the other way round.

However, there are opportunities for vendors to improve and become more user friendly – and it is happening. As our survey showed, most problems handled by manufacturers and points of sale were dealt with over the telephone. These outlets are developing call centres with more sophisticated problem-logging and problem-categorising systems, which make it easier for their engineers to address issues. And some vendors are working hard to educate the user and their sales force, working on the ethos that knowledge means prevention. But it can only be accelerated and guided by you, the customer.

Thank you...

We must take this opportunity to say thank you to all the *PCW* readers who took the time to respond to our questionnaire. Without your knowledge and experience of the market, we would not have been able to make *PCW*'s first ever readership survey as comprehensive and insightful as we believe it is.

It is not only an opportunity for you to distinguish the brands that offer you value for your money, and indicate which vendors give you the support and care you want; but your responses will also give the manufacturers a chance to understand what you the user see as important and how their products are performing at the cutting edge of real-world usage. The results of this survey will certainly give them food for thought. But most of all, we hope that it will prove an invaluable aid to you in making the best purchasing decisions.

PETER HOBDAY, FINANCIAL DIRECTOR, DAN TECHNOLOGY:
"The service and support users will get is becoming more of a contributing factor to their purchase. We do get people saying to us we will never buy from certain companies, because they don't have good service and support.

Buyers should look at the total cost of ownership – it's like buying a Lada and being surprised when, 12 months later, you find you have to buy another one. We are trying to reinforce the view that there is differentiation between PCs, and we differentiate ourselves by concentrating on quality of product and service."

Company CV:
- Dan Technology founded 1988
- London-based head office
- Turnover: £46.73m for 1996/97
- 182 employees nationwide
- Offices in Leeds and Networking subsidiary in Buckinghamshire
- Supplies PCs, workstations etc
- Sells to end users direct

JON VAN DUYNE, GENERAL MANAGER, CONSUMER PRODUCTS BUSINESS ORGANISATION:
"We are obviously delighted that HP is the winner in the printer category. Awards like *PCW*'s become ever more important, both to the customer and the industry. There are a large number of players in an increasingly competitive environment, and these awards provide a good indicator to how well everyone is performing according to the customer. The industry must respond to the consumer, and we at HP will analyse these results to make sure we are still in the number one position next year."

Company CV:
- Second largest provider of computing in the world
- UK's 26th largest exporter
- Turnover: £1.9bn (UK) for 1996
- UK offices have 5,400 employees
- HP has five UK-based R&D and manufacturing divisions
- Provides intranet solutions etc
- Sells through resellers/retailers

WINNER LAPTOP

TOSHIBA

ALAN THOMPSON, DIRECTOR, TOSHIBA PC DIVISION:

"I'm delighted that we have won this award. For us it confirms our commitment to customer satisfaction. It's nice to see that some independent data from customers has put us out on top.

This award encourages us to redouble our efforts in improving our products, and what we will never do is just coast along because we're doing well. Our strive to design and produce better products gets more challenging as people request thinner and lighter laptops.

Our response is to improve our performance and be in tune with what the customers want."

Company CV :
☛ UK offices based in Weybridge
☛ Turnover in 1997: £650 million
☛ 1,500 employees in UK
☛ Toshiba has been present in Europe for 25 years
☛ Product include PCs, consumer products, electronic components and industrial equipment
☛ Sells products through resellers

WINNER ISP

U-NET
Easy Internet Access

DR BILL UNSWORTH, MANAGING DIRECTOR, U-NET

"This is a remarkable result in what has been a remarkable year for us. It's always been our intention to become the UK's largest independent provider of internet services, and the results of this survey are a vindication of our policy of reinvestment in network infrastructure and customer support. It also tells us that we achieved this without losing sight of our customers needs.

We are obviously delighted to have come top in all areas of *PCW*'s survey."

Company CV :
☛ Funded in 1994
☛ HQ in Warrington www.u-net.net
☛ Annual revenue of £4 million
☛ 50 employees
☛ 25,000 subscribers
☛ Provides connection packages: Dialup, ISDN leased line and web hosting services

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COMMENDED PC

DELL

MARTIN DAVIES, CUSTOMER SERVICES DIRECTOR, DELL DIRECT UK AND IRELAND.

"We are delighted to receive this service award. Customer satisfaction with our products and services is our No. 1 priority. Reader awards are valued, as they reflect what the people on the ground really think. Dell is committed to delivering the best customer experience, and we welcome the independent feedback these surveys give us.

We believe that there is an opportunity for us to further enhance the level of service we deliver to the small business sector and we will be working with that goal in mind."

Company CV:
☛ Company founded in 1984
☛ Dell UK set up in 1987
☛ HQ based in Berkshire
☛ 4,000 people employed in UK and Ireland
☛ Turnover in 1998: $12.3 billion
☛ Products includes desktops and laptop, servers and workstations
☛ Sells direct

COMMENDED PRINTER

EPSON

TONY PETFORD, DIRECTOR OF MARKETING, EPSON UK:

"We are extremely pleased to accept this award from *PCW*, especially, as it is an award voted for by our customers and *PCW* readers.

We believe our unique MicroPiezo inkjet technology at the core of our product line is responsible for EPSON being voted the number one inkjet manufacturer. EPSON's MicroPiezo set the new gold standard at up to 1440dpi resolution. This survey also shows the demand for dot-matrix printers, which is why EPSON continues to release improved impact printers every year."

Company CV:
☛ UK offices set up in 1988
☛ UK headquarters in Hemel Hempstead
☛ Manufacturing plant in Telford
☛ 28,000+ employees world-wide
☛ Turnover worldwide: US $8bn, 1997/1998
☛ Products: range of printers
☛ Sells via retail and resellers

COMMENDED ISP

NetDirect

CHRIS ANDERSON, MANAGING DIRECTOR, NETDIRECT:

"Our core values have always been quality of service, reliability and value for money. The *PCW* survey is an endorsement of this.

However, we have a policy of continual improvement, which means we will be looking to better these results in future."

NetDirect offers services and packages – including rapid response to technical and customer queries, business users getting full specialist technical support for single and multiple user connections, and the Dial business user connection package.

Company CV:
☛ Based in Greenwich www.netdirect.net.uk
☛ Company founded in 1995
☛ 50 employees
☛ 12,000+ subscribers
☛ Expertise in TotalDial business user connection package. Multiple connection packages. TotalNet packages, and much more

LETTERS
Right to Reply

FROM CAROLYN WORTH, SPOKESPERSON, EVESHAM MICROS

As a thoroughly British company, it is satisfying to see that our customers have voted Evesham Micros as one of the top ten computer companies.

Evesham Micros has worked hard over the last 15 years to provide what our customers want. We have invested heavily in research and development to bring cutting-edge technology to the market, but we have never forgotten that reliability is crucial to the end-user. We were first to offer two years on-site warranty as standard and we intend to keep improving in all those vital areas.

We never forget that buying a computer does not mean the relationship with our customers stops when we deliver the goods. By providing free lifetime technical support as well as the warranty, we can make sure that an EveshamVale computer will give sterling service for many years to come. We look forward to being featured again next year.

FROM NICOLA KIRBY, PR MANAGER, COMPUSERVE

Our own member satisfaction surveys do not reflect the results of your survey, neither does the latest Keynote/BoardWatch Survey which recently voted CompuServe No. 1 for the fastest web-page download time — twice as fast as the industry average! The real measure of the quality of our service is reflected by members voting with their feet – UK membership has increased every month for the past seven years.

In addition to internet access, we provide a range of exclusive high-value products/services, targeted at improving the productivity of professional people. We offer a very different product to a very different target market.

We recognise that the internet doesn't always meet users' expectations, [but] we can assure *PCW* readers that CompuServe is fully committed to addressing these issues and matching the needs of our members.

FROM RICHARD WOODS, SENIOR SPOKESPERSON, U-NET UK

What is very pleasing about this survey, especially to a business-focused ISP such as U-net UK, is that the response on the ISP questions was more than half the total overall. That shows how increasingly important the internet is to the world of computing.

It is also gratifying that the reliability factors once again reflect where we have been putting the focus of our work in recent months. As the internet is moving into areas of "mission critical" business activities, the demand for a reliable, quality service becomes increasingly important. That can only be achieved by significant investment by the provider and close understanding of the needs of its customers.

FROM MAGGIE GALLANT, HEAD OF PR, AOL UK

AOL UK now has 450,000 members, making it the number one internet online service in the UK. The fact that we have achieved this in only 30 months since our launch, means that the public clearly recognises that we deliver the best possible online experience for the whole family.

AOL members demand more than straight internet access. They are buying ease of use, relevance of content, unique features such as Buddy Lists and Instant Messenger, and outstanding service support.

We are committed to offering value for money, and in response to our members, we introduced new pricing plans in 1997, which gives the choice of unlimited usage or a light-user plan.

AOL is also actively testing new technologies and delivery platforms designed to improve the online experience.

FROM DAVID CLARKE, MANAGING DIRECTOR, VIRGINNET

We are delighted, but not surprised, by these results, as they reinforce the feedback we get from our subscribers every day.

The quality of our content, combined with an extremely reliable connection and round-the-clock customer support, results in a value-for-money service that other ISPs find hard to compete with. This is one of the main reasons why consumers love VirginNet and, as the survey shows, around 40 percent would recommend us to their friends. I was particularly pleased with this result, as word of mouth has been a very important factor in our growth to date.

We plan to keep growing, and we have recently increased our transatlantic bandwidth by more than 50 percent, to ensure faster searching and surfing, and our European bandwidth has been expanded by some 400 percent.

New content launching this year will include a travel channel (which will launch in July), more news, concerts, recruitment, shopping, banking, chats and events.

FROM CHRIS BAKOLAS, TECHNICAL & MARKETING DIRECTOR, DAN TECHNOLOGY

Dan recognises the importance of value for money – but our customers don't want us to sacrifice quality on the altar of low prices. Sticking to our founding principle of "quality first" requires continuous investment in efficient sales, support and production systems; it means maintaining

good relations with the best component suppliers; and it means ensuring that every Dan employee makes a positive contribution to our customers' buying experience.

None of this comes cheap, so no-one could accuse Dan of operating at the bargain-basement end of the market. That's why we're cock-a-hoop at coming out so well in *PCW*'s 1998 Service and Reliability survey. It's a fantastic tribute to the professionalism of our workforce. It's also great to know that our constant pursuit of excellence is something Dan customers continue to value.

FROM PAUL BURWOOD, LASERJET PRODUCT MANAGER, HEWLETT PACKARD

We are extremely pleased to see that HP LaserJets have come out on top in the independent *PCW* survey. We put great emphasis on developing our products to a high specification, and it's good to see this has paid dividends for the consumer.

We have been building a strong preference for our products by ensuring they are of high quality and are easy to use, across the board. The consumer recognises this, which is highlighted by both their repurchase rate and recommendations to friends.

As a company we always strive to improve our products, and this is a constant process. Where we meet only average scores, we will seek to improve those, so we can maintain and strengthen our leadership position in the laser printer market.

> **We're COCK-A-HOOP AT COMING OUT SO WELL IN *PCW*'S 1998 SURVEY   It's a fantastic tribute to the professionalism of our work force (*Dan Technology*)**

FROM ANLIN TING-MASON, GENERAL MANAGER, BT INTERNET

Over the two years since our creation, BT Internet has been a very popular and reliable service. At the beginning of this year, BT Internet experienced an unprecedented increase in demand for the service. To address this, we implemented an extensive investment programme to increase capacity and service levels for customers. This programme took place during the same period your research was being conducted and, unfortunately, led to our level of service reliability being below the high standards that we offer our customers. This upgrade is now complete and BT Internet is once again a reliable service.

We now have capacity for 350,000 customers and have simplified our registration process to make it an easy task for new customers to sign up. This, allied to the 90 extra helpline operators and the redesigning of our home page and guest page, underlines our continuing efforts to make the internet a reliable and enjoyable experience for all our customers.

FROM PAUL KINSLER, GENERAL MANAGER, MESH COMPUTERS

There was a time when we looked at such surveys with a feeling of trepidation; not because we were in any doubt about the focus with which we regard customer service, but because we are aware of the time it takes for change to make an impact with the bulk of users. It is, therefore, gratifying that our considerable investment in support systems and personnel has dispelled any negatives about Mesh. However, this only serves to encourage us to redouble our efforts to lead the way in customer service standards.

We were surprised that, in spite of winning 47 hardware and service awards in the past year, we did not score more highly on features or price/ performance value! We look forward to next year's survey results with interest.

FROM MARTIN DAVIES, CUSTOMER SERVICES DIRECTOR IN TECHNICAL SUPPORT, DELL

Your own April edition features research that rates Dell best in pre and post sales support.

In summary, the survey indicates to us that while Dell is perceived as delivering a higher than average level of service, there is an opportunity for us to further enhance the level of service we deliver to the small business sector. From a sales viewpoint, we segment our business around specific customer groupings, such as small business, corporate, public sector etc. This focus lets us concentrate on the specific requirements of individual market segments and to deliver an enhanced customer experience. The service and support organisation is aligned to these business segments so that we can ensure that the needs of these customers are addressed.

Dell welcomes the feedback this survey brings to your readers.

FROM FLORENCE MARCASTEL, MARKETING COMMUNICATIONS COORDINATOR, CLARANET

Since the company was formed, ClaraNET has been constantly looking at providing the best possible service to its customers, and we are delighted to find all our hard work has been rewarded through the *PCW* survey results.

We have recently made substantial investment in all areas of the business, as we understand the importance of providing an excellent service with a human touch. We were particularly pleased to be rated highly for value for money, as we pride ourselves in our ability to offer packages to meet both our customers' budgets and needs.

The majority of our customers come through a personal recommendation from friends or colleagues, so it is especially gratifying to find us rated so highly by our customer base.

QUESTIONNAIRE

PERSONAL COMPUTER WORLD

We know from your letters and emails that, while many readers are home PC users, many of you make decisions about how PC equipment is purchased for business and work purposes. Here at *Personal Computer World* we try to provide the information you need to make better business decisions — but we can only do that if we know what matters to you when you are choosing machines for business. You can help us provide the service you want by completing this questionnaire. And if an even better, more helpful *Personal Computer World* isn't a good enough reason on its own, we've got £200 of Eurostar vouchers to give away so that you can whisk a friend or partner away for a special weekend. We are also giving away 50 *Personal Computer World* conference bags.

If you do not want to cut out the questionnaire, please photocopy it and send it to the address at the end of this survey [p155]. It doesn't need a stamp. The Eurostar vouchers will be given to the first name drawn out of the hat on 1st November 1998.

Your answers are confidential and your name will not be added to any mailing lists as a result of sending this survey in. If you don't want to enter the draw, then just leave the name and address blank — but please feel free to complete the questionnaire anyway.

1 *Are you involved in your company's decisions about buying PCs?*

Yes ☐ 1 - This questionnaire is for you. Please let us know your views.

No ☐ 2 - This questionnaire isn't really for you. But you can still fill it out and enter the draw if you want.

2 *Do you authorise, recommend or specify your company's PC or PC-related purchases?*

I authorise purchases ☐ 1 *Please answer Q3*
I recommend purchases ☐ 2 *Please answer Q4*
I specify purchases ☐ 3 *Please answer Q4*

3a *What is your annual PC equipment and software budget?*

Under £1,000 ☐ 1
£1,000 - £4,999 ☐ 2
£5,000 - £9,999 ☐ 3
£10,000 - £19,999 ☐ 4
£20,000 - £49,999 ☐ 5
£50,000 - £99,999 ☐ 6
£100,000 - £250,000 ☐ 7
Over £250,000 ☐ 8

3b *Do you expect your budget for next year to increase, decrease or stay about the same?*

I expect the budget will increase next year ☐ 1
I expect the budget will decrease next year ☐ 2
I expect the budget will be about the same next year ☐ 3

4 *How often are you involved in decisions to purchase PCs for your company?*

Every week or two ☐ 1
About once a month ☐ 2
Five or six times a year ☐ 3
Three or four times a year ☐ 4
Once or twice a year ☐ 5
Less often ☐ 6

5 *Which of the following are you planning to buy for business use in the next twelve months?*

Hardware
Network servers ☐ 1
Desktop ☐ 2
Notebook ☐ 3
Palmtop/PDA ☐ 4
Laser printer ☐ 5
Inkjet printer ☐ 6
Scanner ☐ 7
Modem ☐ 8
17" monitor ☐ 9
21" monitor ☐ 10
Processor upgrade ☐ 11
Memory upgrade ☐ 12
Storage ☐ 13
Digital Camera ☐ 14
Mobile phone ☐ 15

Services
Internet access ☐ 16
On line data ☐ 17
Other *(please write in below)* ☐ 18

Software
Networking software *(eg Windows NT)* ☐ 1
Office suite ☐ 2
Word processing ☐ 3
Spreadsheets ☐ 4
Graphics/DTP ☐ 5
Finance/accounting ☐ 6
Personal organiser/Scheduler ☐ 7
Project management ☐ 8
Database ☐ 9
Telephone contact management ☐ 10
E-mail or Internet related ☐ 11
Other *(please write in below)* ☐ 12

6 *How many PCs did your company purchase last year?*

None ☐ 1
Less than five ☐ 2
6-10 ☐ 3
11-20 ☐ 4
21-50 ☐ 5
Over 50 ☐ 6
Don't know/can't remember ☐ 7

CHOOSING PCs AND PC PRODUCTS

7 *Do you have a company policy to always buy PCs and PC products from the same supplier or from an approved list?*

Yes ☐¹   No ☐²

IF YES: Which suppliers or manufacturers would you buy from? *Please write the names of your top* **three** *approved suppliers in the space below.*

_____

_____

_____

8 *When you are considering the choice of* **supplier** *of a PC or PC related equipment, what factors influence you in choosing one supplier over another? (We are assuming that there is a choice of suppliers, all of whom offer the basic spec required at similar prices.) Please indicate (i) the most important factor, (ii) the second most important factor, and (iii) the third most important factor by ticking* **once** *in each column below.*

	(i) Most most important	*(ii) 2nd most important*	*(iii) 3rd most important*
Low price	☐¹	☐²	☐³
Reputation of supplier	☐¹	☐²	☐³
Speed of delivery	☐¹	☐²	☐³
After-sales service	☐¹	☐²	☐³
Global presence	☐¹	☐²	☐³
Availability of specific brands	☐¹	☐²	☐³
Quality of service/product support	☐¹	☐²	☐³
Reputation of products	☐¹	☐²	☐³
Knowledge of business (user) requirements	☐¹	☐²	☐³
Location of supplier	☐¹	☐²	☐³
Installation support	☐¹	☐²	☐³
Previous business relationship	☐¹	☐²	☐³
Recommendation	☐¹	☐²	☐³
Full service vendor	☐¹	☐²	☐³
Other *(specify)*			
_____	☐¹	☐²	☐³

9 *IF PRICE IS A FACTOR (i.e. ticked at question 8): How do you find the cheapest available supplier?*

Please tick all that apply

Compare advertised prices in a monthly IT magazine *(e.g. PERSONAL COMPUTER WORLD)*	☐¹
Compare advertised prices in national newspapers	☐²
Compare advertised prices in the business press *(e.g. The Economist)*	☐³
Compare advertised prices on the Internet	☐⁴
Compare prices at a large outlet *(eg PC World)*	☐⁵
Ring round a number of suppliers for quotes	☐⁶
Rely on previous experience of suppliers	☐⁷
Personal recommendation	☐⁸
Delegate price comparisons to someone else	☐⁹
Other *(please specify)*	
_____	☐¹⁰

10 *IF REPUTATION IS A FACTOR (i.e. ticked at question 8): Listed below are some of the things that go towards making up the reputation of PC suppliers. For each one, please indicate how important you think it is by ticking the appropriate box.*

	Very important	*Quite important*	*Not very important*	*Not at all important*
Advertisements in specialist IT magazines *(like PERSONAL COMPUTER WORLD)*	☐¹	☐²	☐³	☐⁴
Advertisements in national newspapers	☐¹	☐²	☐³	☐⁴
Advertisements in the business press	☐¹	☐²	☐³	☐⁴
Advertisements on television/radio	☐¹	☐²	☐³	☐⁴
Brands available	☐¹	☐²	☐³	☐⁴
Suppliers' own web-sites	☐¹	☐²	☐³	☐⁴
Manufacturer or supplier literature and mailings	☐¹	☐²	☐³	☐⁴
Recommendations/test results in magazines like PERSONAL COMPUTER WORLD	☐¹	☐²	☐³	☐⁴
Recommendations from friends/colleagues/consultants	☐¹	☐²	☐³	☐⁴
Previous experience of the company	☐¹	☐²	☐³	☐⁴
Other *(please specify)*				
_____	☐¹	☐²	☐³	☐⁴
_____	☐¹	☐²	☐³	☐⁴

11 ▸ *When you are considering the choice of products, what factors influence you in choosing one **brand** over another? (We are assuming that there is a choice of brands which offer a similar specification or function.) Please indicate (i) the most important factor, (ii) the second most important factor, and (iii) the third most important factor by ticking **once** in each column below.*

	(i) Most important	(ii) 2nd most important	(iii) 3rd most important
Low price	☐ 1	☐ 2	☐ 3
Reputation of products	☐ 1	☐ 2	☐ 3
Speed of delivery	☐ 1	☐ 2	☐ 3
Technical superiority/Innovation	☐ 1	☐ 2	☐ 3
After-sales service	☐ 1	☐ 2	☐ 3
Compatibility with existing machines	☐ 1	☐ 2	☐ 3
Global presence	☐ 1	☐ 2	☐ 3
Low cost of ownership	☐ 1	☐ 2	☐ 3
Reliability	☐ 1	☐ 2	☐ 3
Installation support	☐ 1	☐ 2	☐ 3
Upgradability	☐ 1	☐ 2	☐ 3
Recommendation	☐ 1	☐ 2	☐ 3
Full service vendor	☐ 1	☐ 2	☐ 3
Other *(please specify)*			
_____	☐ 1	☐ 2	☐ 3

12 ▸ *IF PRICE IS A FACTOR (i.e. ticked at question 11): How do you find the cheapest available brand?*

Please tick all that apply

Compare advertised prices in a monthly IT magazine *(e.g. PERSONAL COMPUTER WORLD)*	☐ 1
Compare advertised prices on the Internet	☐ 2
Compare prices at a large outlet *(e.g. PC World)*	☐ 3
Read reviews/comparative tables in the PC press	☐ 4
Ring round a number of suppliers for quotes	☐ 5
Personal recommendation	☐ 6
Delegate price comparisons to someone else	☐ 7
Other *(please specify)*	
_____	☐ 8

13 ▸ *Listed below are some of the factors that might lead people to **change** the brand of PC or PC related products that they buy. Please tick all of the factors that you think might affect you.*

Press advertisements	☐ 1
Poster/outdoor advertising	☐ 2
Television/Radio	☐ 3
Word of mouth	☐ 4
Reviews and lab tests	☐ 5
Price/value for money	☐ 6
Product literature/direct mail from manufacturer	☐ 7
Design and technology	☐ 8
Reputation	☐ 9
Web presence	☐ 10
Availability of product	☐ 11
Personal experience	☐ 12
Other *(please specify)*	
_____	☐ 13

YOUR WORK

14 ▸ *Is your job principally concerned with IT?*

Yes - my main work area is IT	☐ 1
No - my main work area is outside IT	☐ 2
I have a general responsibility which includes IT but I am not an IT professional	☐ 3

15 ▸ *Please tick the box below which best describes your job title.*

Owner/Partner	☐ 1
Director	☐ 2
General manager	☐ 3
IT/network/telecomms manager	☐ 4
Technical support manager	☐ 5
Purchasing manager	☐ 6
Other manager/Department head	☐ 7
Executive	☐ 8
IT Consultant	☐ 9
Management consultant	☐ 10
Other *(please write your job title)*	☐ 11
_____	

16 *About how many people does your company employ?*

- Less than ten ☐ 1
- 10 - 49 ☐ 2
- 50 - 99 ☐ 3
- 100 - 199 ☐ 4
- 200 - 499 ☐ 5
- 500 or more ☐ 6

17 *What type of work does your company do? (Please tick the* **one** *item that best describes your company's work.)*

- Civil Engineering/Construction ☐ 1
- Computers/Information technology ☐ 2
- Defence ☐ 3
- Education ☐ 4
- Energy (Oil, gas, electricity) ☐ 5
- Finance/Banking/Insurance ☐ 6
- Government/public services ☐ 7
- Industry/industrial engineering/manufacturing ☐ 8
- Law/Accountancy/Management consultancy ☐ 9
- Media ☐ 10
- Medical/pharmaceutical ☐ 11
- Retail and distribution ☐ 12
- Telecommunications ☐ 13
- Travel ☐ 14
- Other (please specify) ☐ 15 ☐

_____

18 *Which of the following areas do you get involved in?*

- General Management ☐ 1
- Sales & Marketing ☐ 2
- Finance ☐ 3
- Production ☐ 4
- Information Technology/Networks/Communications ☐ 5
- Research and Development/Corporate Planning ☐ 6
- Customer service ☐ 7
- Other *(please write on the line below)* ☐ 8

_____

19 *When your company buys computers are these purchased retail or direct? (Please tick all that apply.)*

- Retail ☐ 1
- Direct from manufacturer ☐ 2
- Direct from reseller ☐ 3
- PC dealers ☐ 4
- Via consultant ☐ 5
- Other (please write in) ☐ 6

_____

PERSONAL COMPUTER WORLD

20 *Do you have a subscription to PERSONAL COMPUTER WORLD?*

Yes ☐ 1   No ☐ 2

21 *How often do you read PERSONAL COMPUTER WORLD?*

- I read almost every issue ☐ 1
- I read most issues *(around 3 out of 4)* ☐ 2
- I only read it occasionally ☐ 3

22 *Here are a number of things that people have said about PERSONAL COMPUTER WORLD. Please tick the appropriate box beside each statement to indicate how much you personally agree or disagree.*

	Agree a lot	Agree a little	Neither agree nor disagree	Disagree a little	Disagree a lot
I use information that I get from Personal Computer World in choosing PCs to purchase	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
I use information that I get from PERSONAL COMPUTER WORLD in purchasing peripherals/components	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
PERSONAL COMPUTER WORLD's reviews help me choose between brands	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
The main value of PERSONAL COMPUTER WORLD is in the editorial information	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
The main value of PERSONAL COMPUTER WORLD is in the advertisements	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
I value both the editorial and the advertisements	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
The new look in this issue is a big improvement	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
It is much easier to find things in the new layout	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
The new look PERSONAL COMPUTER WORLD is much easier to read	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

23 *If you could change one thing about the new look Personal Computer World, what would it be?*

_____

_____

_____

24a *Do you ever retain **features or reviews** from PERSONAL COMPUTER WORLD for future reference on products or prices?*

Yes ☐ 1 *Please answer Q24b*
No ☐ 2 *Please skip to Q25*

24b *About how often do you do so?*

Every issue ☐ 1
Most issues ☐ 2
Only occasionally ☐ 3

25a *Do you ever retain **advertisements** from PERSONAL COMPUTER WORLD for future reference on products or prices?*

Yes ☐ 1 *Please answer Q25b*
No ☐ 2 *Please skip to Q26*

25b *About how often do you do so?*

Every issue ☐ 1
Most issues ☐ 2
Only occasionally ☐ 3

26 *Have you ever made an enquiry or bought something as a result of an advertisement in PERSONAL COMPUTER WORLD?*

Yes ☐ 1   No ☐ 2

27a *Which of these other computer magazines have you read or referred to in the past six months?*

27b *Which do you find gives you the most useful information that you can use in making buying decisions?*

	a/ read	b/ find most useful
Computer Buyer	☐ 1	☐ 1
Computer Shopper	☐ 2	☐ 2
ComputerAct!ve	☐ 3	☐ 3
Computing	☐ 4	☐ 4
Information Week	☐ 5	☐ 5
IT Week	☐ 6	☐ 6
PC Advisor	☐ 7	☐ 7
PC Direct	☐ 8	☐ 8
PC Magazine	☐ 9	☐ 9
PC Plus	☐ 10	☐ 10
PC Pro	☐ 11	☐ 11
PERSONAL COMPUTER WORLD	☐ 12	☐ 12
What PC? And Software	☐ 13	☐ 13

28 *Do you ever retain **features or reviews** in computer magazines other than PERSONAL COMPUTER WORLD?*

Yes ☐ 1   No ☐ 2

29 *Do you ever retain **advertisements** in computer magazines other than PERSONAL COMPUTER WORLD?*

Yes ☐ 1   No ☐ 2

30 *Have you ever made an enquiry or bought something as a result of an advertisement in another computer magazine?*

Yes ☐ 1   No ☐ 2

31a *Have you ever made an enquiry or bought something as a result of an advertisement in the national or business press?*

Yes ☐ 1 *Please answer Q31b*
No ☐ 2 *Please skip to Q32*

31b *Which newspaper/magazine was this? (Please specify*

_____

_____

AND FINALLY

32 *How old are you?*

Under 25 ☐ 1
25 - 34 ☐ 2
35 - 44 ☐ 3
45 - 54 ☐ 4
55 - 64 ☐ 5
65+ ☐ 6

THANK YOU FOR YOUR HELP

Your reply will be treated in the strictest confidence and analysed in statistical form only. However, if you want to take part in the prize draw to **win £200 worth of Eurostar vouchers**, please fill in your name and address in the space below.

Name: _____

Address: _____

_____

_____

Please return this questionnaire to:
PERSONAL COMPUTER WORLD SURVEY,
c/o NSM, FREEPOST, Oxford OX2 7BR
YOU DO NOT NEED A STAMP
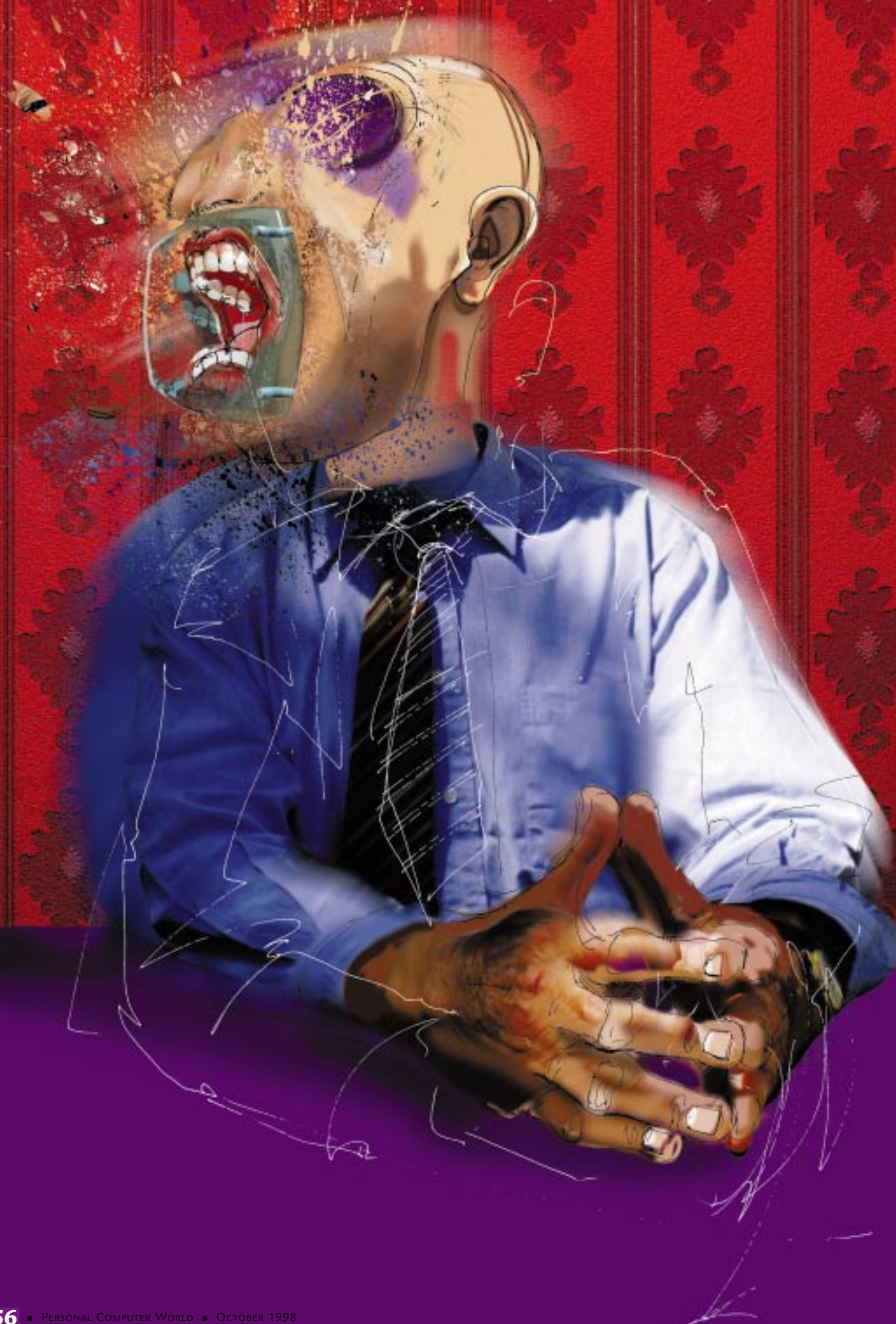
Your word is their command

Speech recognition programs are becoming so clever, they can now understand even the most articulately-challenged of users. Roger Gann and Adele Dyer tested the **LISTENING ABILITIES** of the latest leading products.

THE DAYS WHEN you had to speak in staccato dalek tones to your computer as if you too were a machine, are long gone. Continuous-speech products let you talk naturally, if slowly and carefully, to your PC. The obvious advantage of this is that it is faster. Most people can type at only 40 words a minute at best, but they can talk at 200 words a minute. Most continuous-speech recognition systems make it possible to dictate up to 140 words a minute when the system is fully trained. Even if you factor-in the time it takes to correct the dictated text, you can still input text faster than you can type. The downside is that continuous speech products are extremely power hungry. Their development has been delayed as much by the lack of sufficiently powerful processors in office and home PCs, as by the difficulties of coding.

Dragon Systems NaturallySpeaking Preferred

The latest release of Dragon Systems' Naturally-Speaking is available in four different versions, all supplied with a noise-cancelling microphone headset. The Standard, Preferred, Professional and Point & Speak versions feature Dragon's new BestMatch technology, which boasts improved recognition accuracy and support for natural language commands in Word 97. This technology recognises commands even if you phrase them in different ways. All versions have an active vocabulary of 62,000 words and space for a further 54,000 user-added words.

All versions offer integration with both Word 97 and WordPerfect 8, which is good news, although support for WordPro as well would have been even better. You can dictate directly into pretty much any other Windows applications, too. Dragon's entry-level continuous speech package, Point & Speak, sells for £50; it only lets you correct mistakes using the keyboard, not your voice, however. The Preferred and Professional versions allow you to store dictation on a MiniDisc for later processing — an option dubbed NaturallyMobile. They also offer text-to-speech synthesis and audio playback of words dictated.

Installation follows the usual well-trodden path, with wizards leading you through the audio set-up and then the voice enrolment. This is a two-stage process: a short initial calibration is followed by a 30-minute spell of reading out loud. Fortunately, you are given a choice of

Most people can type at only 40 words a minute, but can talk at 200 words a minute

Features to look for in voice recognition software

☛A standard dictionary of around 30,000 words and a back-up dictionary of up to 260,000 words.
☛Most packages let you add up to 64,000 of your own words, or

to add specialist dictionaries — a legal one, for example.
☛You can dictate into a WordPad-like environment, various versions of Word or WordPerfect, or any

Windows application.
☛Correction facilities: these need to be seamless if you don't want to spend more time correcting text than dictating it.
☛Command and

control facilities for formatting text and managing applications.
☛Some packages let you set up macros for repetitive tasks.
☛Most packages have text-to-speech facilities:

they can read back what you said, or synthesise speech from text imported into the program.
☛The majority of packages let you enroll more than one user.
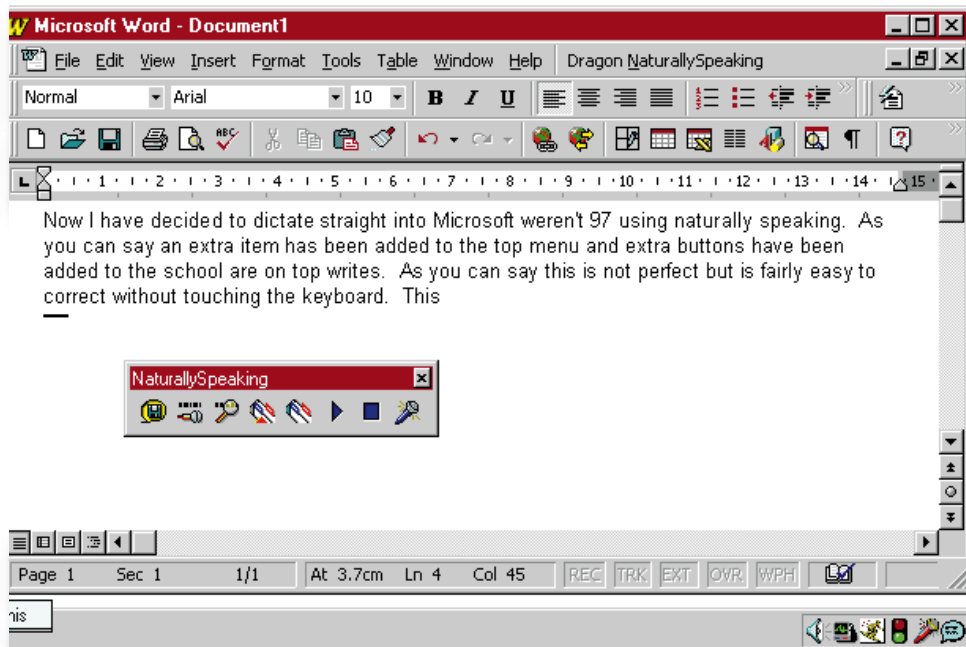
▲ NATURALLYSPEAKING
INTEGRATES WITH
WORD 97, APPENDING
ITSELF TO THE MENU

your words here before they are transferred to your application. And you don't have to stop dictating when you want to edit or make corrections. If you make a mistake, you just say "Scratch that", to delete the last thing you said. You can also select words and navigate throughout your document simply by saying them. The Preferred version has a vocabulary of 42,000 words which you can bump up to 230,000, although you may have to increase your memory substantially to support this many. In the same way

sample scripts to read out, one of which is a rather amusing view of computers and Comdex. Crunching the voice data took less than 15 minutes, so the whole enrolment process is commendably swift, and there are some helpful multimedia clips, too, showing how to use the program all the way through. As in IBM's ViaVoice 98, there are several ways to get your words on to the screen. One method is via a WordPad lookalike, which you can dictate into, and then copy the words across or save as a text or RTF file. You can also configure the program from here. Alternatively, you can fire-up Word 97 or WordPerfect 8. If you're using Word, an extra menu item appears, from which you select NaturalWord, which takes just a few seconds to load. An extra toolbar containing the NaturallySpeaking buttons is then appended to your toolbar.

Once NaturallySpeaking is loaded, a speech bubble on the taskbar indicates whether you can dictate into the current active application, and a little microphone icon shows whether the mike is switched on or off. We tested NaturallySpeaking after only 30 minutes of training, and initial results were impressive. Not only did it post a low rate of mistakes when compared to ViaVoice 98 and FreeSpeech98, but it also registered words noticeably faster than its rivals. As you talk, a small yellow speech bubble appears next to the cursor, and you can check

Adding special words is easy: you point Naturally-Speaking at a list of words and the program processes most words automatically

as ViaVoice, NaturallySpeaking has a vocabulary builder which searches text files, to look up unusual words to add to your vocabulary. Adding special words is particularly easy: all you do is point NaturallySpeaking at a list of words —

such as Word 97's CUSTOM.DIC file — and the program processes most words automatically, so you don't have to say them. Even so, it can't cope with all words — FDISK, for example.

NaturallySpeaking Preferred, however, isn't quite as clever as ViaVoice 98. It won't automatically format numbers and telephone numbers — you have to say "Pound sign 45" to get £45. Dragon Systems still uses its clunky MouseGrid method of manoeuvring your mouse. And a control centre on permanent display would be helpful.

PCW DETAILS

NaturallySpeaking
★★★★
Price *£149 (£126.81 exc VAT)*
Contact *Dragon Systems UK 01242 678575*
www.dragonsystems.com
System Requirements *Windows 95, NT 4, P133MHz, 60Mb hard-disk space, 40Mb to save recorded speech, 15Mb to install text-to-speech, 32Mb RAM.*
Good Points *Fast, good level of accuracy, easy to use, short enrolment.*
Bad Points *Not as sophisticated as ViaVoice 98.*
Conclusion *On a par with ViaVoice 98 for overall accuracy, but with a noticeable speed advantage.*

IBM ViaVoice 98 Executive

Both the £140 Executive Edition and the £50 Home Edition of ViaVoice 98 have the same 32-bit recognition engine and support continuous speech recognition. They also offer direct dictation into Word 97 and the IBM WordPad lookalike, SpeakPad. ViaVoice 98 offers a natural language command for Word 97, too. It has a 56,000 word vocabulary and can absorb a further 64,000 manually-added words.

New to this release of ViaVoice 98 is the ability to automatically recognise and format numbers, dates, times and prices. The Executive version also enables you to dictate into most Windows applications, and features full system-wide command and control. As a bonus, you also get a specialised vocabulary, Legal Topic.

Installing the package is very simple. Online help is of a high order and you get useful multimedia demonstrations. On launching the software for the first time, you have to set up the microphone and the audio levels. Then a three-minute wizard establishes you as a user by prompting you to say a few words and sentences, and by building a personal profile. At this point, your computer is ready to start listening.

Initially, enrolment consists of dictating 100 sentences, which takes less than 20 minutes. However, accuracy won't be very good until you complete the full enrolment of 476 sentences, which takes about an hour and a quarter: and it takes another hour or two for the program to crunch that data. Although the program is stated to run on a Pentium 166MMX, it ran quite slowly on a non-MMX P166 with 48Mb, so you might

consider a P200 as a more realistic entry level. ViaVoice 98 Executive comes bundled with the Andrea NC80 microphone. This is a rather basic headset, and the microphone was a little reluctant to stay adjusted.

In theory, ViaVoice 98 is backwardly compatible with the previous version. However, when I tried upgrading my two ViaVoice installations on a Windows 98 and a Windows NT 4 PC, the program wouldn't even load. The package offers the option of migrating previous enrolments, but I was unable to do this. IBM's technical support suggested hacking the registry to expunge all trace of previous installations, which is something
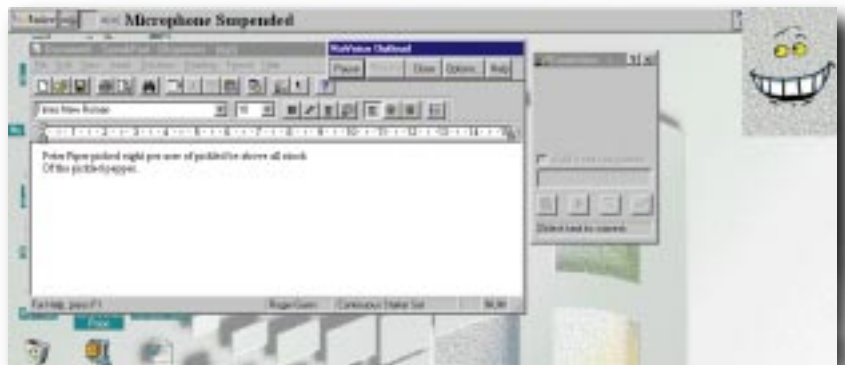
▲ **WITH VIAVOICE 98** YOU CAN DICTATE TO ANY WINDOWS APPLICATION

the software should have handled automatically. But, in practice, losing previous enrolments isn't a big problem, because the latest version samples at 22KHz, twice the speed of the previous version. As a result, migrated previous enrolments will be distinctly lo-fi and less accurate.

ViaVoice 98 presents a clean, simple interface. The VoiceCenter Taskbar, which sits at the top of the screen, displays the user's name, a simple

How does speech recognition work?

All speech recognition packages work in the same way. A microphone picks up the sound of your voice and then feeds the analogue sounds back to your sound card. The better the microphone, the more background noise it will filter out, increasing the chances of the word being recognised accurately. Minimum sound requirement is a good 16-bit sound card – the sound chips in many

notebooks simply aren't good enough.
The sound is compared to a database of sounds stored on the system. Whole words are not identified immediately, but are broken up into their constituent parts, or phonemes — English has about 80 phonemes from which all words are constructed. Phonemes are analysed individually, then in groups, and finally as words, to make sure a

correct identification has been made. This statistical analysis eliminates various possibilities according to the likelihood of one phoneme following another and making up a word.
Most packages work with a number of pre-recorded sets of phonemes. They will ask you to identify yourself as either male or female and over or under 16. From this – and from the analysis

of words recorded during the training session – the system decides which set of phonemes it will use.
Language modelling is also used to second-guess what the word might be according to where it comes in the sentence.
Finally, contextual modelling looks at the words in sequences to find the right match. For example, the system might decide

whether it is "to", "two" or "too", depending on the words before and after it – for example, "walk to London", "walk two miles" or "walk too far".
The majority of packages can carry out contextual modelling on only three words at a time. But as processor power increases, they will be able to carry out grammatical analysis of full sentences, and so improve accuracy.

Your word is their command

microphone on/off button, a volume metre and a ViaVoice menu button. With the mike active, you simply say "Dictate to word": Word 97 is then loaded and you can start dictating.

IBM has always loved its totally arcane error messages and has continued to uphold tradition in the case of ViaVoice 98. Whenever a problem crops up, you receive an incomprehensible and thoroughly unhelpful message, along the lines of "SMAPI RC=60".

ViaVoice 98 is modeless — in other words, you can mix dictated text and commands. All you have to do is make a slight pause, and ViaVoice 98 knows that your next word is a command rather than text. This can take some getting used to, as most people do not dictate in one fluid stream. If you're not sure what commands are available, a "What can I say?" command conjures up a long list for you to browse through. Easy navigating is one of ViaVoice 98's strong points.

The way you correct the dictated text is a big improvement on earlier releases of ViaVoice. You can opt to have a correction window permanently on display, and when you speak the words you want to correct, or double-click on them, they will appear in the window. You then listen to the words, and either dictate them again, or select from a list of alternative suggestions in the window. These words can be added to the program's vocabulary automatically. As before, ViaVoice 98 allows you to analyse documents to pick out words that aren't in its vocabulary.

Like NaturallySpeaking, ViaVoice 98 Executive includes a text-to-speech synthesiser which can read a document back to you. The voice is fine, but Robbie the Robot has the edge on it.

PCW DETAILS

ViaVoice 98 Executive
★★★★

Price *£140 (£119.49 exc VAT)*
Contact *IBM Speech Systems 01705 492249*
www.software.ibm.com
System Requirements *Windows 95, 98 or NT 4. P166MMX, 256Kb L2 cache, 180Mb hard-disk space, 32Mb RAM with 95/98 (48Mb with Word 97), 48Mb RAM with NT 4 (64Mb with Word 97).*
Good Points *Many new features, high degree of accuracy, very easy to use.*
Bad Points *Upgrade feature doesn't work.*
Conclusion *Offers state-of-the-art recognition rates. Once IBM sorts out the migration issues, it will be a tough choice between this and NaturallySpeaking 3.0.*

Lernout and Hauspie Voice XPress Plus

At the time of writing, the UK version of Voice XPress Plus was not available. Lernout and Hauspie was unwilling to let *PCW* loose on the US version, and insisted on demonstrating it to us. Hence, we didn't get the chance to test it as thoroughly as we would have liked.

The UK version of Voice XPress Plus, which lets you dictate straight into Word 7 and Word 97, will be in the shops by mid-September. This version will be followed soon afterwards by Voice XPress Pro, which allows you to dictate into any Windows application. When you first load the package, it puts 30,000 words into active memory and stores a further 230,000 words on the hard disk. Using a PII 233 with 128Mb RAM — a much more powerful machine than the one we used to test the other packages — enrolment took a full 50 minutes and processing that data took 41 minutes. After enrolment, the recognition rate seemed good — about 90 percent accurate

▼**PICK THE COMMAND YOU WANT TO USE FROM A LIST**
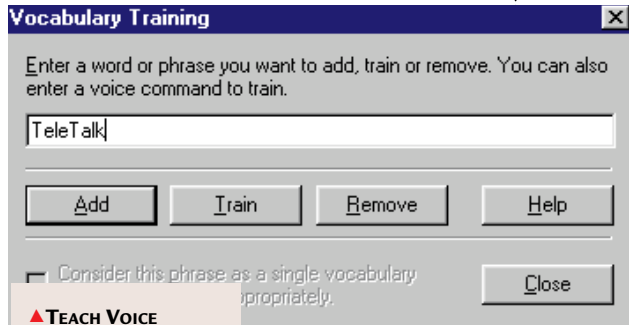
▲**TEACH VOICE XPRESS PLUS NEW WORDS**

when speaking quite slowly. When we stepped up the pace, it was able to catch a good 80 percent accurately. As the demonstration was quite short, we could not see how much it would improve over time. Even in the short time we had to evaluate Voice XPress Plus, it did not appear to be as well thought out as other packages. For example, you still needed to swap from dictation mode to command mode, in order to format text, and some of the correction methods seemed unnecessarily cumbersome.

PCW DETAILS

Voice XPress Plus
System Requirements *Windows 98, 95 or NT 4, P166MMX, 40Mb RAM (98/95), 48Mb RAM (NT 4), 130Mb hard-disk space.*

Your word is their command

Philips FreeSpeech98

Philips has been a significant player in the vertical dictation markets for some time, and FreeSpeech98 is its first venture in the general-purpose speech recognition market. This is a well-specified début: it's a continuous speech package which allows you to dictate text straight into most applications — not just Word 97 or a WordPad lookalike. It can also function as a command and control package, so you can navigate Windows 98 without having to go near the keyboard. Unusually, FreeSpeech98 is available as a 30Mb download from the Philips web site, www.freespace.com. This is a time-limited version, though, restricted to just seven days.

Another novelty is that FreeSpeech98 is being sold over the internet and won't be available as a retail product. This means, of course, there's no bundled microphone headset or printed documentation, apart from a 45-page manual in Word format, which you can print out. At present, only the US English version is available for download, and this can be registered for a very reasonable $39 (£24). International versions will be available later this year. However, I had no problem using the US version with my strongish south London twang. It includes a 200,000-word lexicon derived from the Oxford University Press dictionary.

Installation is extremely simple, and once it's complete, Philips says you should dictate a minimum of 15 minutes of speech for the program to get a handle on the way you speak. But if you want it to do a proper job, then you will need to speak for a further 60 minutes or so. The enrolment process is quite smooth, so long as everything is recognised and there is no need to click on anything. You are given a choice of reading material, which is welcome. Once installed, FreeSpeech98 appears as a taskbar at the top of the screen. A green or red traffic light indicates whether you can dictate directly into the current active application.

For a £24 program, FreeSpeech98 worked surprisingly well. Making corrections is a little awkward, as you can't play back the sound of the word at the same time as you correct it. Even so, it's simple to use and, with practice, its accuracy is impressive.

PCW DETAILS

FreeSpeech 98

★★★

Price *$39 (£24; £20.43 ex VAT) registration fee*
Contact *Philips Speech Processing 01206 755555*
Good Points *Simple interface, easy to use, well specified, good accuracy.*
Bad Points *There's no documentation and no bundled headset.*
Conclusion *An unpretentious package that is cheap, well specified, and delivers high levels of accuracy. The absence of a microphone headset is a nuisance and could deter the casual home-buyer.*

Our final word on the subject

Picking the best of these products is not easy. Philips has entered the consumer end of the speech software market with some style. Its FreeSpeech98 is an unpretentious product, at once cheap and well specified. On top of that, it delivers high levels of accuracy. However, the absence of a microphone headset, a device critical to the success of voice recognition products, could deter the casual home buyer. **The latest version of ViaVoice offers a list of improvements over its predecessor.** As well as having a very large active vocabulary, it also has some nice touches, such as natural formatting of dates and numbers. It allows you to switch from dictation to navigation by merely pausing slightly, which is very clever. Above all, though, it offers state-of-the-art recognition rates. Once IBM sorts out the migration issues, the product should give Naturally-Speaking 3.0 some tough competition. **While ViaVoice 98 and NaturallySpeaking 3.0 run pretty much neck and neck in the overall accuracy stakes,** the latter offers a noticeable speed advantage. And the legion of WordPerfect 8 users will obviously prefer it. Hence, Naturally-Speaking 3.0 is our Editor's Choice. **The packages we have reviewed are only the beginning.** Still to come are advances such as the grammatical analysis, or parsing, of whole sentences, data mining and audio indexing, which will let you pick out a word or phrase from a long passage of dictated sound. **In the next few years we will be able to speak to all kinds of devices,** not just PCs. So, you'll be able to program the video and the washing machine, control the temperature in your home, and write a letter on your PDA, all through spoken commands. **For more on this brave, new world, see Futures, p238.**

IT's winnin
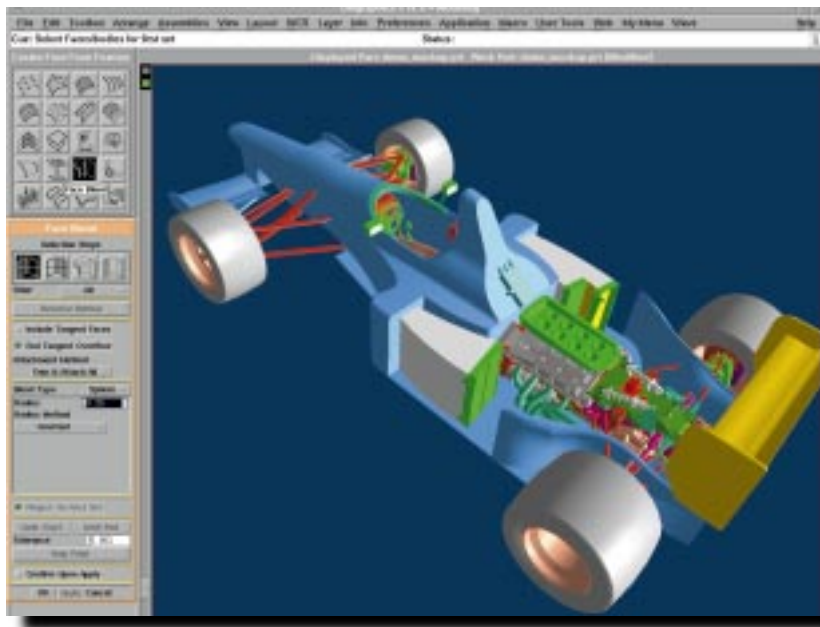
THE PARTNERSHIP BETWEEN HIGH-PROFILE TECHNOLOGY SUPPLIERS AND CAR MAKERS HAS BECOME THE UNSEEN DRIVING FORCE BEHIND THE **GLAMOROUS SPORT OF MOTOR RACING**. PAUL TRUEMAN TRACKS THE CHANGES

g formula

IF YOU STOPPED THE AVERAGE MAN in the street and asked him to name the most important contributors to a Formula One team's success, he'd probably say the driver, the engine manufacturers, and possibly the tyre suppliers. Chances are, though, that he'd forget the other most important factor in creating a winning team – bleeding-edge technology supplied for next to nothing, in some cases, by global IT brands.

Over the last ten years, IT has transformed nearly every aspect of Formula One racing. Some changes are well known, such as the conception and design of components on CAD/CAM workstations. Others have been less widely feted, like the ability to race hundreds of additional practice laps over a Grand Prix weekend from the comfort of a team's R&D lab thousands of miles away from the track.

Thirty years ago, you might well have found legendary racers like Stirling Moss and Fangio underneath their cars minutes before the race, tinkering with the front axle. After all, who else was as familiar with the car? But 30 years ago, Moss won the British Grand Prix with an average flat-out speed of 87mph. Nowadays, drivers rarely take corners at less than 110mph.

Long-established teams like McLaren started using CAD in the late 1980s. Nowadays, for new teams on the block, such as Stewart (former world champion Jackie Stewart's fledgling team), the drawing-board is no longer an option.

Stewart's engineers work in partnership with Hewlett-Packard and use its K-Class workstations running CAD software supplied

Long-established teams like McLaren started using CAD in the 1980s

by Unigraphics Solutions. Using HP's 64-bit RISC 8000 processor, along with an average 1.5Gb of RAM and 17Gb hard drives, these processing monsters are worth around £35,000. In a relatively modest team like Stewart, ten designers specialise in areas such as aerodynamics, suspension, chassis and transmission, and another ten all-rounders provide the specialists with back-up if they need it. Communication is essential and the Assembly Navigation Tool in the Unigraphics CAD software gives them communal use of virtual space, creating the file structure that links together the relevant design sections. All the individual design schemes are visible on the system from day one, and as the designers fill in the details, the car gradually takes shape.

HP **HAS THE STRONGEST LINKS** in Formula One with the Jordan team, supplying all its research and racing hardware. Fully integrated CAD/CAM enables Jordan's designers to model their components using an application called Ideas from SDRC Technology. This not only allows full 3D modelling of the finished component, but can also generate machining on the CNC tool-cutting machinery on the factory floor. Engineers can decide whether to go ahead with the manufacturing process after they have run Finite Element Analysis software, which tests the component as a moving part in the car and subjects it to stress tests. If it performs well, cutting paths are designated according to the 3D model. Depending on the complexity of the design, a prototype can be produced the same day, and engineers can hold a component drawn up on the screen in the palm of their hand within a few hours of finishing the design. In a sport where designs for the next season's car are begun well before the end of the present one, such speed is crucial.

Probably the most processor-intensive CAD task is Computational Fluid Dynamics (CFD). CFD simulates on screen the way a fully modelled 3D car will respond on the track, acting as a virtual wind tunnel. The Stewart designers also test a less than half-scale model of their 1998 car, the SF2, in their tunnel in San Clemente, California. Equipped with a rolling road, the tunnel can produce speeds of up to 140mph, and the Stewart team spent 1,300 hours in it designing their first car, the SF1. All the design teams use CFD in tandem with real wind tunnels because it is less expensive and time-consuming than physical testing.

"Aerodynamics is probably the single biggest differentiator between the teams, given that we all have pretty similar engines," says Dave Morgan, the HP racing IT specialist who works on a full-time loan basis with Jordan. "If you

Generic Jordan 197 front wing configuration
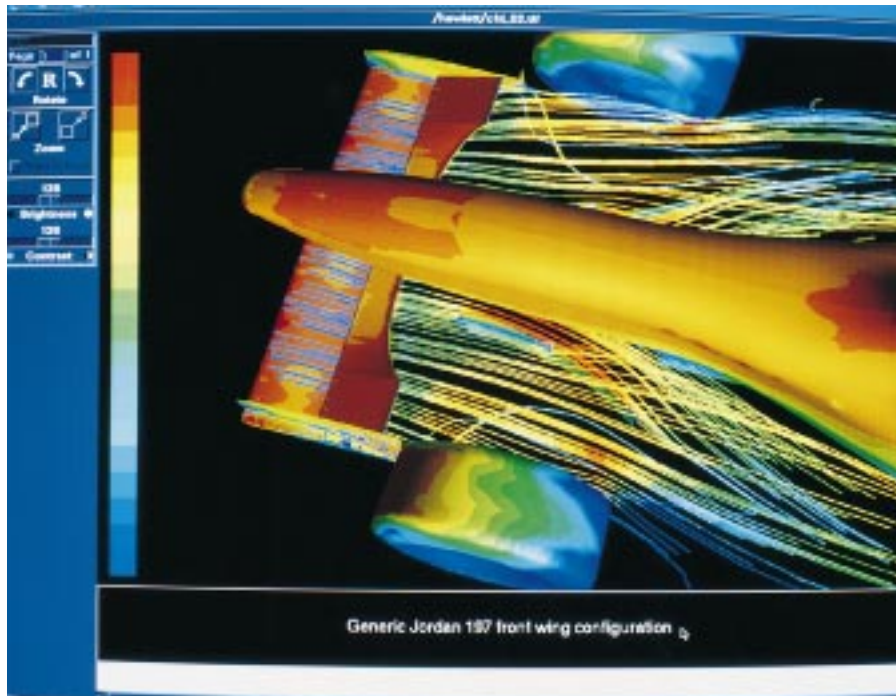
▲ **IT IS RARE FOR F1 DRIVERS TO TAKE CORNERS AT LESS THAN 110MPH IN A RACE**

Engineers can hold a prototype in their hand within hours of designing the car on screen

▲ **SENSORS ALL OVER THE CAR RELAY INFORMATION BACK TO ENGINEERS IN THE PITS**

consider that a difference of 8-10 horsepower is a significant amount, but that you would need that much just to make roughly a 1/10th second difference in lap times, you see how important it is to airflow-test the cars so thoroughly."

Using CFD, the Jordan engineers "pressure-tap" the car to diagnose the aerodynamic flows over it. Components are designed and modelled using the Ideas package, and then machined to the 40% size that Jordan uses for its wind-tunnel car. Morgan says: "At the moment, there is only so far you can go on the screen."

With several gigabytes of RAM, quadruple processors and a 60Gb hard drive, if you were to buy the V-Class server from HP you would need around £250,000 in the bank. But as well as the jaw-dropping specifications of the systems used in the conception of these cars, you still need sensors to measure their performance on the track. "There are only about 100 factors and components on the car that you can measure during a lap," says Gary Morgan, the HP specialist working with Jordan. "But from the raw data the sensors produce, we can calculate and extrapolate up to three thousand values."

THE **SENSORS MEASURE EVERYTHING** from engine temperature to the height of the chassis off the road and the pressure on the car's suspension. "Fundamental values are those like the temperature of your engine oil, fuel temperature, and pressures on the gearbox and brakes," explains John Digby, head of research and development for the Stewart team. "There are numerous strain gauges on the car, feeding us raw data all the time. We use both linear and

rotational potentiometers to convert the mechanical movement into an electronic signal that the car can transmit."

There are three ways the engineers can get their hands on the data being gathered by the on-car sensors: real-time telemetry (RTT) that transmits data constantly between car and pits during the race; burst telemetry that dumps a larger amount of information at a set point on the track, usually as the car passes the pits; and in-car data acquisition that is downloaded after the race by connecting a landline to the car.

THE STEWART TEAM MONITORS 32 RTT channels on a constant UHF radio link from the car to a receptor on the pit wall. "Most of those channels are dedicated to sending data from certain sensors," explains Digby. "But there are a few that we can reconfigure during the race, should the data we receive indicate a particular problem." In recent years, FIA (Fédération Internationale de l'Automobile), Formula One's governing body, has taken steps to reverse the progress made in the communications technology. Three years ago it outlawed "active suspension", the practice of using UHF radio signals during the race to alter the car for every bend of the track. It was thought that this would give teams with the most advanced comms set-up an unfair advantage over other teams. Now UHF can only be a one-way car-receptor, and the car can only be reprogrammed until the last qualifying lap, using a land-line. There are other restrictions on UHF: teams transmitting on high frequencies need to apply for a licence for each race, and their frequencies must be nowhere near those used by the various countries' emergency services.

Trackside teams usually have two engineers monitoring the RTT and burst transfer data.

Aerodynamics is probably the single biggest differentiator between the Formula One racing cars

▼ **F1** PIT TEAMS ARE FIERCELY COMPETITIVE WITH ONE ANOTHER

They do not have the time during a race to do much more than monitor the car, and the importance of RTT was borne out to dramatic effect in the fourth race of the season in San Marino this year. Leading at the halfway stage by nearly 25 seconds, David Coulthard looked in no danger from the chasing Michael Schumacher. From lap 40 though, Coulthard's lead was gradually eroded and commentators assumed that McLaren's team director, Ron Dennis, was looking worried because of a probable brake problem. What no-one outside the McLaren pits could have known was that Dennis had instructed Coulthard to slow down because telemetry revealed that his oil cooling system was malfunctioning due to debris build-up. Without that knowledge Coulthard would have lost the race; in fact, he won by four and a half seconds.

The off-site resources of a race team feature increasingly heavily during a race weekend. In the days before the race, the teams are usually

▼ THE DRIVERS ARE THE FOCUS OF ATTENTION, BUT THEY DON'T WIN RACES ON THEIR OWN

How do they do that?

On each lap, as the two Stewart cars pass the pits, their cars dump 50 microwave radio channels of data acquired during the lap, 32 of which have the same configuration as those monitored in real-time, with an additional 18 channels measuring whatever

else the engineers deem important. Once transmitted into the pits, there are a variety of ways to transfer the data. The Jordan pits have a 10Mbit/sec IR link from the receptor dish on the pit wall to their two NT servers, and these then pass on the data to the engineers

via a Cat5 cabling link using an Ethernet 10BaseT 10Mbit/sec connection. Jordan used to run a Unix OS on their pit system, but the telemetry software from Tag requires Microsoft's NT platform. Apart from the two HP Kayak high-end servers running NT in

the pits, there are four PCs used to analyse the data, as well as 20 notebooks on-site for

race analysis and NT workstations with P233 processors and 128Mb RAM.
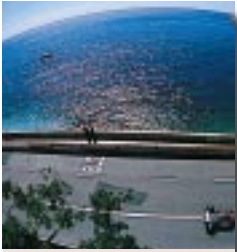
▲ PART OF THE SPONSORSHIP APPEAL FOR COMPANIES IS THE GLAMOUR OF **F1**

allowed just an hour or two on the track to calculate their final settings and adjustments for the race, with strict FIA limits on the number of practice laps allowed. But by taking advantage of both the telemetry and telecommunications technology at their disposal, the race teams are able to sidestep the regulations and race as many laps as they deem necessary. The Jordan trackside team transmit their telemetry to their research facility located at their factory near Silverstone, from which the team of research engineers there can set up an exact model of the car and track.

"You can never really predict the comms setup available to you at the track until you get there. We use a variety of comms, from GSM mobile phones to ISDN, and even standard phone lines," says Morgan. "We send large megabyte files down the lines, but it's the luck of the draw as to how advanced a country's telecom carrier is."

A full-size model of the Jordan car is put on the simulation rig in the labs, with the engine, suspension and chassis settings replicated using the telemetry gained from the practice laps. The track is defined by the suspension data received from the drivers' best lap times, and the tyres replaced by servo-mechanisms that replicate the bumps and track surface. Four servos are also placed over the car to simulate the downforce operating on it during the race. Engineers tweak the settings until they arrive at the optimum settings, then transmit the configuration to the team at the track, who analyse the data and alter the cars' settings accordingly.

For all the influence on the sport of the fantastic technology at the disposal of the teams, it is still the drivers and their skill that will ensure the future of Formula One. FIA has shown its commitment to keeping the sport competitive by outlawing technology that might be seen to replace driving skill. It seems safe to assume that the sport will continue to strike the right balance between automation and individual brilliance, because the governing body knows that it isn't the hardware on display that millions continue to tune in for, but the drivers who risk their necks every fortnight. ❑

Solution providers

Hewlett-Packard's relationship with Jordan is a neat example of an IT phenomenon – solution-based selling. The term "solution provider" describes companies that supply not only the computer hardware, but the support infrastructure as well. HP's partnership with Jordan began in 1995, and HP spent the following season transforming the way the team worked, from installing Jordan's first internal email system to supplying the hardware needed to design and run the cars, as well as an on-site IT specialist. Jordan not only needs the technology, but also the guaranteed 24-hour, 365-days-a-year technical support.

"It's not merely

▲ **HP** NOT ONLY GUARANTEES HARDWARE BUT ALSO SUPPORT

about box-shifting," says HP's Geoff Banks. "It's what happens when it goes wrong, and in a Formula One year you can never take your eye off the ball." But what's really in it for HP? People often talk about the benefits of Formula One sponsorship, with logos being seen by millions, but in effect that's just the icing on the cake. It would be naïve to think that a company would pour up to £10 million a season into a racing team, simply for a small logo on the side of a car that whizzes by potential customers at up to 200mph. Formula One is a great advertisement for these IT companies in itself. Glamourous and exciting, it is also the most technologically demanding sport in the world. And not
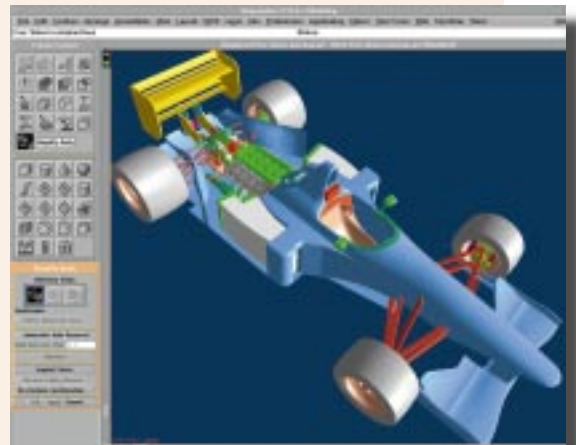
▲ HIGH-END WORKSTATIONS ARE USED TO CREATE THE **3D** MODELS

only does HP get the chance to invite top-level corporate types to schmooze the race away; it also gets to strengthen ties and angle for deals with the other sponsors of their race team. HP is keen to stress that, with Jordan at least, it is not in it for the money. Gary Morgan, Jordan's on-site IT specialist from HP, says: "We're not there to make a profit or loss from Jordan. The team receives a value from us in terms of hardware and support, and they give us a value back in terms of hospitality and PR." Jamie Snowdon, an industry analyst for Input, says: "How can you get a sexier example of your ability to provide global round-the-clock service than supporting a Formula One racing team that moves base every two weeks?"

Power packs

The chips are down as AMD and Intel go head to head in this confrontation between new K6 and Celeron 300MHz chips. These ten top PCs offer a fair amount of power for a fair price.

The processor wars have reached new heights with the entry of AMD's K6-2 3D and Intel's 300MHz Celeron processors — both of which are aimed at the sub-£1000 market. In our August PC group test, AMD made its presence felt in the budget market with the attractively priced K6 266MHz processor. In fact, a system powered by an AMD chip won our Editor's Choice award against stiff competition from Intel and Cyrix.

AMD's new product is a little different from its previous x86 processors. For the first time AMD has managed to steal a march on Intel with the introduction of the K6-2 300MHz processor, which has new instructions to help accelerate 3D functions in CAD applications and games. The downside is that, just like Intel's MMX instructions, the applications must be specifically written to take advantage of the 3D Now! instruction set. Moreover, the drivers of the various graphics cards need to be rewritten to take advantage of the processor's new capabilities. At the time of going to press, in our group test only video cards based on the nVidia's Riva 128 chipset had fully optimised drivers for the K6-2 3D. However, other graphics board manufacturers, including S3, ATI and Matrox, have promised to deliver compatible drivers in the near future.

In sharp contrast to the K6-2 3D, industry reception to Intel's low-cost Celeron processor has at best been mixed. The Celeron faced a barrage of criticism for its lack of on-chip cache, which meant a considerable decrease in performance. Our previous tests seemed to prove this claim, with the comparably priced AMD systems coming out well ahead. Perhaps stung by the adverse reception accorded to the Celeron, Intel has brought forward the launch of its next processor in the Celeron series, codenamed Mendocino. This will have some cache and is expected to perform better than its predecessor. For a full review of the first of these systems, see our Reviews section, starting on page 78.

For this test we have specified systems aimed at mid-range users who have an eye for a bargain but also want a reasonable amount of power. So we asked for 64Mb RAM, at least a 4Gb hard drive, 17in monitor, sound card, speakers and a 4Mb video card.

Contents

PCs tested and reviewed by Ajith Ram.

POWER PACKS...

Actinet **Netrunner**

Sporting a 300MHz Celeron processor, the Actinet Netrunner is impeccably configured. The Netrunner is one of the few systems not to come with a large number of programs running in the background. And this tidy software installation is complimented by the effort taken to configure the hardware. With most of the cables kept

well out of the way, the internal components are easy to reach for upgrading. The ATX case is well ventilated.

Like the Mertec Home Media, the Actinet system is immensely upgradeable. Built on the foundation of an Abit BX motherboard, the Netrunner can easily hold a faster processor from Intel or Cyrix. In fact, it can house many of the upcoming processors which go beyond 450MHz. The 64Mb RAM comes in a single module, leaving three DIMM slots free. In addition to the four free PCI slots, it has one 3.5in and two 5.25in bays free. The Abit motherboard is one of the best choices for compulsive overclockers. It offers the option of changing your processor speed through the CPU SoftMenu in the BIOS, eliminating the need to open up the computer. However, proper precautions must be taken before attempting overclocking. The multimedia side of the Netrunner is delivered by an AWE 64 sound card, speakers and sub-woofer. Unlike some of the barebone systems in our group test, the Netrunner also has a decent

software bundle which includes Lotus SmartSuite, IBM Simply Speaking and a multimedia bundle including Corel Draw.

The signal produced by an Intel i740 graphics card is reproduced well displayed by the 17in ADI 5GT monitor, which supports a maximum resolution of 1600x1200 at 75Hz.

PCW DETAILS

Price *£1267.62 (£1079 ex VAT)*
Contact *Actinet 01952 270703*
www.actinet.co.uk
Good Points *Excellent construction, easily upgradeable.*
Bad Points *Mediocre performance.*
Conclusion *A well-constructed system let down by an average performance.*

Build Quality	★★★★★
Performance	★★
Value for Money	★★★
Overall Rating	★★★

Carrera **PowerMedia K6-2.300**

The PowerMedia was the second system in our group test to come with a DVD ROM drive. The Panasonic drive is not the only unique component in the system. It also sports
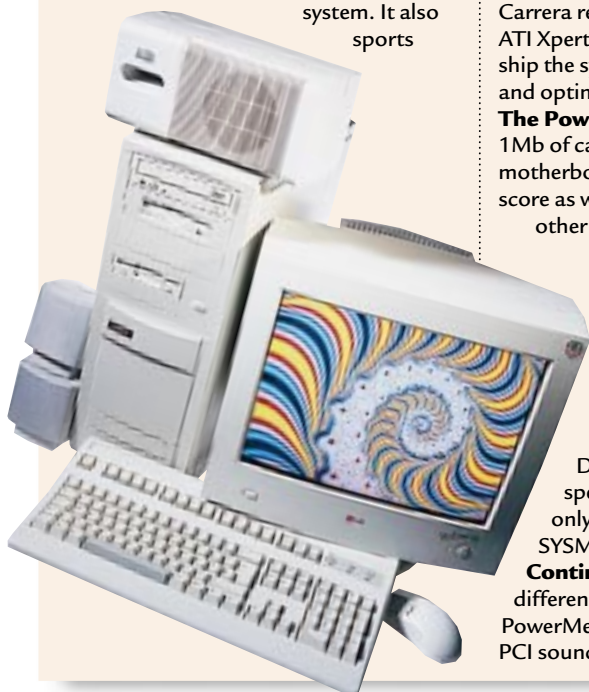
Matrox's latest 2D/3D graphics card, the Millennium G200. Unfortunately the optimised Matrox drivers for the K6-2 processor were not available, and so in the review machine Carrera replaced the Matrox with an ATI Xpert@Play card. Carrera plans to ship the system with the Matrox card and optimised drivers.

The PowerMedia also comes with 1Mb of cache on the Socket 7 motherboard. However, it failed to score as well as the Mesh , the only other system with 1Mb of L2 cache. This may have been because, just as on the KT Star 3D Power, the Carrera runs numerous applications, including Lotus SmartSuite, in the background, which seriously depletes system resources. Despite its impressive specifications, the PowerMedia only achieved an average SYSMark score of 296.

Continuing the trend of being different from the rest, the PowerMedia comes with a SonicStorm PCI sound card which was powerful

enough to handle the output from the DVD. But, like the Mertec system, the speaker quality is less than ideal.

One truly impressive feature of the Carrera system is the LG monitor. The controls are easy to access and colour reproduction is exceptionally good. Able to handle a resolution of 1024x768 at 75Hz, its output was among the best in our group test.

PCW DETAILS

Price *£1291.33 (£1099 ex VAT)*
Contact *Carrera 0171 830 0486*
www.carrera.co.uk
Good Points *Excellent monitor, powerful graphics card, well-built system.*
Bad Points *Poor software installation.*
Conclusion *A potentially powerful system hampered by poor configuration.*

Build Quality	★★★★
Performance	★★★
Value for Money	★★★★
Overall Rating	★★★

group test

POWER PACKS...

Dabs Direct **CE300**

The first thing we noticed about the Dabs system built around the Celeron processor was its display — there was none. We tracked down the source of the problem to a loose-fitting ATI Xpert@Play AGP card. We found that the AGP connector was a little too small for the slot and had a tendency to come loose. Other manufacturers in our group test avoided this problem by anchoring the video card to the side of the ATX case. **The Dabs CE300** is the only Celeron system to come with cache on the motherboard. Although it provided a slight performance increase, it was not earth shattering. That said, the SYSMark and Final Reality scores of 224 and 3.17 are the highest among the Celeron systems.

The 64Mb SDRAM comes in a single module, leaving two slots free for a maximum of 384Mb unbuffered RAM. Moreover, since the Dabs CE300 has a BX motherboard and three free PCI slots, the upgrade potential is very high. Unfortunately, these impressive specifications are in sharp contrast to the shoddy construction. In addition to the loose video card, the cables hang loose, making access difficult.
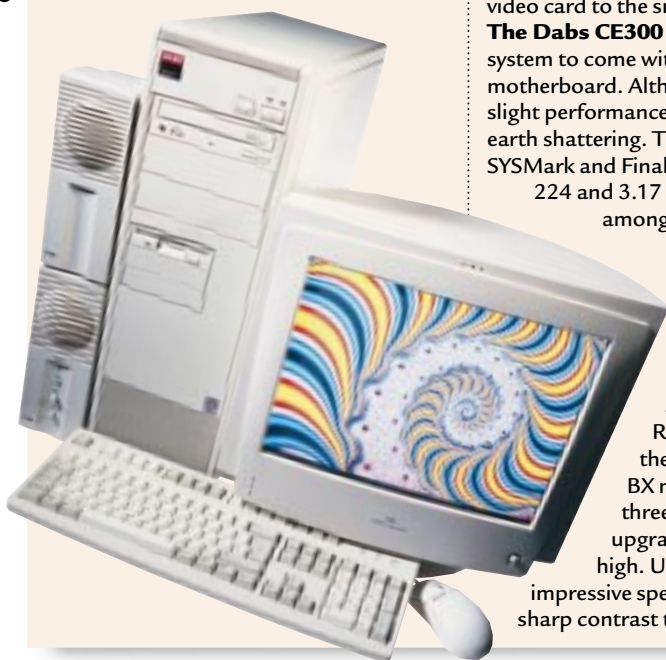
The 17in ADI 5P monitor is able to support a maximum refresh rate of 85Hz at a resolution of 1024x768. Its display is not quite as sharp as those on the ADI monitors that come with the Mesh and Actinet systems.

PCW DETAILS

Price *£1056.33 (£899 ex VAT)*
Contact *Dabs Direct 0800 558866*
Good Points *Good components, fastest Celeron performance.*
Bad Points *Poor construction, mediocre speakers.*
Conclusion *A well-specified system undermined by poor build quality.*

Build Quality	★★
Performance	★★★
Value for Money	★★★
Overall Rating	★★★

Elonex **MCX-6300AX**

Elonex replaced the original AMD K6-2 machine it gave us, the PT – 6300, with its new MCX-6300AX. The difference between the two was staggering. The MCX-6300AX is built around a MicroStar motherboard which includes both on-board video and on-board sound.

The graphics chip is an ATI 3D Rage Pro on the AGP bus with 4Mb of on-board RAM. The sound comes from a SonicStorm chip on the PCI bus. All the other ports come straight off the motherboard, making the inside of the case one of the cleanest we have seen. **The case is easy to dismantle**. Take out the RAM, and the 3.5in bays can be detached simply by undoing one clip: changing hard drives is a breeze. The 100MHz motherboard, running here at just 95MHz, means that expansion slots are kept to a minimum, with two PCI-only slots and one shared PCI/ISA slot, and one PCI slot filled with a PCI modem. If your habit is to fill your machine so that it is overflowing with cards, you might need a board with more expansion room than this. Furthermore, there is only one free DIMM slot, and just one free 5.25in bay.
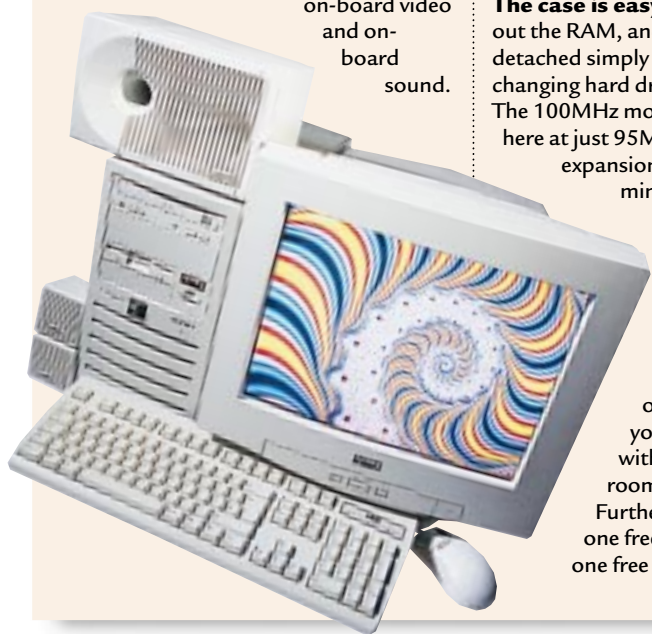
Elonex was the only company to provide a monitor under the company's own name, but this did not translate into a better display. Although sharp at a resolution of 1024x768, the controls are difficult to master and the maximum refresh rate of 85Hz is not as high as other monitors here.

PCW DETAILS

Price *£845 (£719.15 ex VAT)*
Contact *Elonex 0181 452 4444*
www.elonex.co.uk
Good Points *Compact and well built.*
Bad Points *Little room for upgrading.*
Conclusion *Good price and configuration, but will date quickly.*

Build Quality	★★★★
Performance	★★★
Value for Money	★★★
Overall Rating	★★★

KT Star 3D Power

Despite its impressive title, the KT system only managed an average performance. Equipped with AMD's latest processor, the K6-2, the KT Star 3D Power achieved a mediocre score of 288 in our SYSMark test compared to the other K6-2 machines. Its Final Reality figures were equally unimpressive.

Perhaps this average performance was partly due to the ATI All-In-Wonder Pro, which has a built-in TV tuner but no fully optimised drivers for the K6-2. There should be a considerable improvement in performance once ATI's optimised drivers are installed in the system. Another factor could be the large number of applications that run in the background at start-up, including Lotus SmartSuite and Internet Explorer.

The 3D Power comes in an ATX case that is smaller and wider than most. The interior of the system is a forest of wires and cables, and a few of them — particularly the cables running from the CD-ROM and hard drive — are twisted together at the very top of the case. This prevents easy access to some of the internal components, particularly the graphics card and heat sink. One nice touch is that the Seagate Medalist hard drive is placed on a specially built plate, leaving an extra 3.5in bay free for upgrading. The Diamond Monster 3Dfx card included with the system might interest gamers as it is a second-generation card based on the Voodoo chipset. Barring the presence of twisted wires, the system itself is well built and easily upgradeable.

The CTX monitor, which is able to handle a resolution of 1024x1768 at 75Hz, provides bright images at all colour depths.

PCW DETAILS

Price £1232.58 (£1049 ex VAT)
Contact KT Computers 0181 961 8897 www.ktcomputers.co.uk
Good Points Zip drive, dedicated 3D card, excellent monitor.
Bad Points Messy interior, unoptimised display drivers.
Conclusion A well-specified system let down slightly by poor construction and software installation.

Build Quality	★★★
Performance	★★★
Value for Money	★★★★
Overall Rating	★★★

Mertec Home Media

Perhaps the tidiest system in our group test, the Mertec Home Media came with a Creative Labs DVD ROM rather than its ubiquitous CD relation. The first thing we noticed on opening this Celeron system was the amount of free space inside it: all the cables are neatly clipped together and taped well away from the critical components. Out of the four DIMM slots available, only one was occupied, leaving ample room for upgrading. Even more impressive is the BX motherboard which houses the Celeron processor. Although the Celeron does not need a BX motherboard, its presence provides reassurance for the future. The buyer can easily upgrade to one of the faster Intel or Cyrix processors.
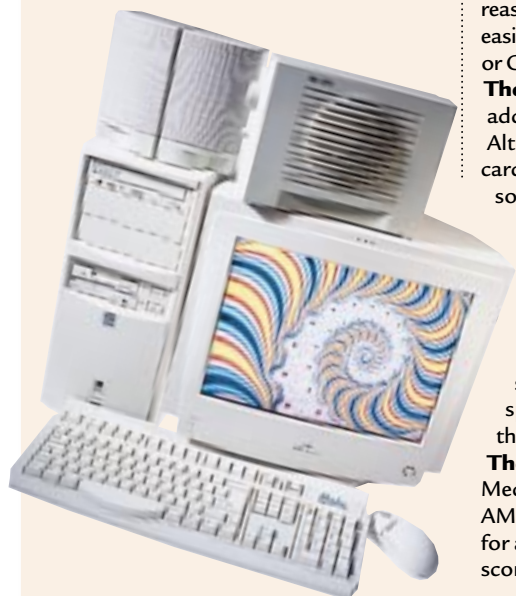
The Iomega Zip drive is a welcome addition to any multimedia system. Although the AWE 64 is an ISA sound card, it proved adequate for the DVD software bundled with the system. However, as new DVD titles which make full use of Dolby AC-3 Surround Sound become available, the user might have to upgrade to a more robust PCI card. The multimedia side of this system is let down slightly by the speakers, which failed to reproduce the high quality of DVD sound.

The performance of the Home Media could not compete with any AMD system but was still impressive for a Celeron system. Its SYSMark score of 210 was only average, but its Final Reality score was much better. The ADI Microscan monitor that came with the system is rather ungainly, with an extra projection on either side. It can handle a resolution of 1024x768 at 75Hz and the picture quality is sharp. The button and knob controls are easily accessible.

PCW DETAILS

Price £1173.83 (£999 ex VAT)
Contact Mertec 01792 473700 www.mertec.co.uk
Good Points Easily upgradeable, good multimedia performance.
Bad Points Average overall performance, poor speakers.
Conclusion A well-specified system at an enticing price.

Build Quality	★★★★★
Performance	★★★
Value for Money	★★★★
Overall Rating	★★★★

HIGHLY COMMENDED
PERSONAL COMPUTER WORLD

PCW Labs Report

Head to head: K6-2 3D Now! versus Celeron

A year ago, Intel stepped up its challenge to Advanced Micro Devices (AMD). In the months before, AMD had grabbed the market's attention with the release of the K6. Stung into action, Intel responded by releasing an even faster version of its recently launched Pentium II processor. However, this year, AMD can have its cake and eat it, as the company's new K6-2 processor takes the x86 architecture in a slightly new direction.

Although the original K6 was an excellent choice for the business user, its games and 3D performance fell below Pentium II standards as its floating-point unit (FPU) was less powerful. With the appearance of increasingly 3D-intensive games and applications, AMD would have been sidelined if it had not produced a processor to rectify this defect. The K6-2 is AMD's answer to the brute FPU power of the Pentium II. The K6-2 has 27 new instructions, called 3D Now!, which accelerate 3D functions. Hard-coded into the chip, 3D Now! exploits a technology called Single Instruction Multiple Data Execution (SIMD). This fetches and processes instructions in batches rather than dealing with them one at a time. Another instruction in 3D Now! allows reciprocal division. Processors are usually faster at multiplication sums than division. The K6-2 turns this handicap into an advantage by multiplying instead of dividing, using a reciprocal number. For example, instead of dividing a number by three, it multiplies the number by 0.333. This speeds up complex calculations considerably.

Despite the industry's heady reaction to the K6-2, the future of AMD is not assured. For one thing, Intel's answer to 3D Now! will make its début early next year in the form of the Katmai Instruction Set (KNI). With a fully pipelined FPU, this chip will almost certainly be more powerful than the K6-2. Having learned from the MMX débacle, Intel is set to launch this processor with much more support from software developers.

Another, more serious threat to AMD is the possible obsolescence of Socket 7. While licensing Socket 7 technology from Intel, AMD gave up its right to move its processors to Slot 1 or Slot 2 motherboards. Although the bus speeds of Socket 7 motherboards have been raised to 100MHz, the possibility of a further increase appears bleak. AMD is preparing to produce its own proprietary motherboard technology which is incompatible with Intel's designs. It

remains to be seen whether the market will make this a winner like the K6-2. Intel's new low-cost processor series, the Celeron, had a most unfavourable début. Although intended as a serious contender in the budget PC market that could compete with AMD and Cyrix, the Celeron had few features to make it stand out.

The K6-2 is AMD's answer to the brute FPU power of the Pentium II

In fact, it came with one critical feature missing — the on-chip cache which produces tremendous improvement in speed. Intel even brought out a new chipset, the 440EX, to be used on motherboards housing the Celeron. It is essentially a cut-down version of the successful LX chipset, but does not support error-correction memory or multiple processors. With BIOS support, a Celeron can be used on an older LX motherboard. Even older 440FX motherboards can support the processor if the manufacturer provides a flash BIOS update; however, this is much less likely.

Due to the lack of Level 2 cache, the Celeron's performance in business applications is comparable only to that of a Pentium MMX. However, in most current games which do not make use of the cache, it is an impressive performer because its FPU is the same as that of a Pentium II. The next processor in the Celeron series, codenamed Mendocino [Reviews, p78], will have 128Kb cache and début at 333MHz.

ABOVE THE INTERAL ARCHITECTURE OF THE K6-2 3D NOW!
INSET THE SOCKET 7 K6-2
LEFT THE CASELESS CELERON

POWER PACKS...

Mesh **Elite K6 3D 300A**

Built on the backbone of the AMD K6-2 processor, the Mesh Elite has a 40X CD-ROM drive. Previous labs tests of 24X and 32X CD-ROMs showed that they rarely approach their stated maximum speed — which is also the case with the 40X CD-ROM that came with this system. Its performance peaked around the speed of an ordinary 24-speed drive — sufficient for most purposes. The most noticeable feature of the Mesh system is its massive multimedia speakers and subwoofer. Coming with no less than six components, the Teac speakers are capable of reproducing true Dolby Surround sound. Unfortunately, the internal components are somewhat underspecified for the job. Although the AWE 64 sound card is an excellent choice for most PC users, it supports only simulated 3D positional audio and is not able to reproduce true Surround sound. So having six speakers and a remote control is something of an overkill.

The interior of the system is acceptably tidy, and most of the cables are kept well away from the critical components. Like the Carrera, the Mesh also has 1Mb of Level 2 cache on the motherboard. The high SYSMark score of 318 reflected this as well as the overall high-quality build of the system. The Mesh system is easily upgradeable as it has two DIMM and two PCI slots free. This, along with the tidy interior, should make the upgrading process painless. The Diamond Viper video card with optimised drivers for the K6-2 produced excellent results at all colour depths. The ADI 5GT monitor, built on Trinitron technology, supports a high resolution of 1600x1200 at 75Hz. However, we found the controls a little difficult to master.

PCW DETAILS

Price *£1198.50 (£1020 ex VAT)*
Contact *Mesh 0181 208 2028*
www.meshplc.co.uk
Good Points *Excellent monitor, easily upgradeable, well built.*
Bad Points *No DVD to take advantage of the six multimedia speakers.*
Conclusion *A powerful system at an attractive price.*

Build Quality	★★★★
Performance	★★★★
Value for Money	★★★
Overall Rating	★★★★

Panrix **Nitro 3D**

Panrix has a reputation for manufacturing high-quality systems, and upholds that reputation with the Nitro 3D. One of the best constructed AMD systems in our group test, the Nitro 3D, like the Mertec and the Carrera, has an interior layout that is an upgrader's dream. The K6-2 processor sits on a Microstar Super Socket 7 100MHz system bus motherboard. The cables are tucked well away from the critical components, and the components are arranged in such a way that there is enough room for easy access. The 64Mb RAM comes in a single module, leaving two slots free for upgrading. There are also three free bays.
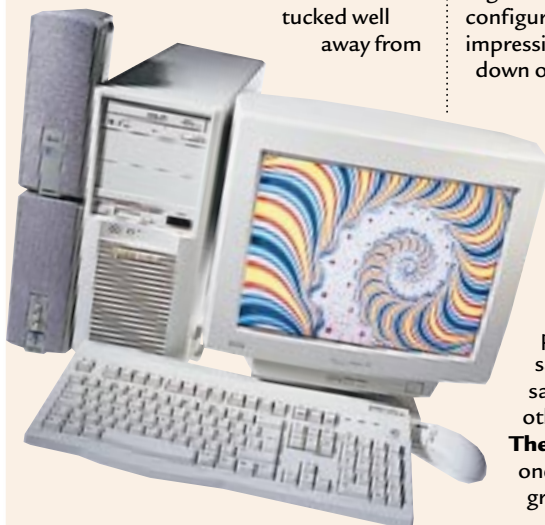
The Nitro 3D has a massive Maxtor 7.5Gb hard drive which spins at 7700 rpm. These impressive specifications, together with the excellent software configuration, produced some very impressive results when tested, falling down only on the overall Final Reality marks, perhaps because the graphics card has only 4Mb of RAM rather than 8Mb. The display was provided by a Diamond Viper 330 video card built around nVidia's Riva 128 chipset. As the Viper has optimised drivers for the K6-2 processor, it did not pose the same driver problems that we saw with some of the cards in other systems.

The Orchid NuSound 3D was one of the best sound cards in our group test. It is a PCI card which produced quite impressive results through the pair of Yamaha speakers. The Iiyama 8617 17in monitor is one of the most popular models on the market. It produces clear pictures at a resolution of 1024x768 at 70Hz, and has controls that are easy to access and use.

PCW DETAILS

Price *£1173.83 (£999 ex VAT)*
Contact *Panrix 01132 444958*
www.panrix.com
Good Points *Good components, excellent build, easily upgradeable.*
Bad Points *Average overall performance.*
Conclusion *A well-specified and constructed system at an attractive price.*

Build Quality	★★★★★
Performance	★★★
Value for Money	★★★★
Overall Rating	★★★★

POWER PACKS...

Protek **Ultra**
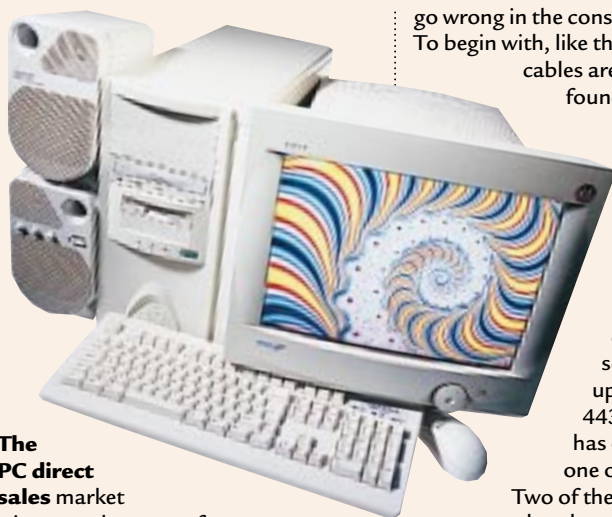
The PC direct sales market witnesses the entry of new contenders every day. With lower overheads, some of them are able to mount a strong challenge to the big players such as Dell and Gateway. Protek is one of these recent entrants. Unfortunately, the Protek Ultra, built around the Intel Celeron processor, has not made an auspicious start. Although easy to set up, its interior illustrates some of the things that can go wrong in the construction of a PC. To begin with, like the KT system, the cables are a mess. We found the CD-ROM cable twisted over the heatsink, while the EIDE cable from the hard drive dangled close to it. The Ultra also has extremely limited scope for upgrading. The Intel 443EX motherboard has only two PCI slots, one other being shared. Two of these slots were already occupied by the main graphics card and the 3Dfx board, leaving only one free slot. Similarly, only two DIMM slots were available, one of which was already occupied.

The dedicated 3D graphics Voodoo card is a first-generation card and not as powerful as the newer version that came with the KT system. The Ultra scored a disappointing 206 in our SYSMark test and 2.90 in Final Reality. The ATI Xpert@Play graphics card produces clear images on the Mag Innovision XJ717 monitor. Although the monitor did not achieve outstanding results, it was able to handle a resolution of 1024x768 at 85Hz. The display is sharp and the controls are easy to use.

PCW DETAILS

Price £997.58 (£849 ex VAT)
Contact Protek 0800 458 0533
Good Points Low price, large ATX case.
Bad Points Shoddy construction, poor performance, poor upgradeability options.
Conclusion Not recommended unless you're on a very tight budget.

Build Quality	★★
Performance	★★
Value for Money	★★★
Overall Rating	★★

Roldec **Pro 2**

Roldec's Pro 2 is built around the Celeron processor which in turn resides on a BX motherboard. As a result, in common with the Mertec and Actinet's Netrunner systems, the Pro 2 is easily upgradeable, and this alone makes the system more appealing than many others. The motherboard comes with some useful connectors for the IDE and floppy cable, with clamps on both sides to ensure a safe connection. It also has five PCI slots — two of which are occupied — and three DIMM slots. Like the Elonex system, the Pro 2 came with a PCI modem which offers only slight speed benefits over an ISA modem. The RAM came in a single DIMM module. Perhaps the most unusual component in this system is the Matrox Millennium G200 video card. There are, of course, no driver problems with the Intel-based Roldec system.

There is an extra plastic tray inside the system, which Roldec could have used for the Seagate Medalist hard drive, saving a valuable 3.5in bay.

The Pro 2 has a 32X Teac CD-ROM, and the sound is provided by an AWE 64 Value sound card. The Arowana speakers, despite their size, produced quite impressive results.

The Pro 2 comes in a large ATX case with most of the wires tucked well away. This, along with the unit's large size, provides adequate ventilation. The Microsoft ergonomic keyboard is another welcome difference from other systems.
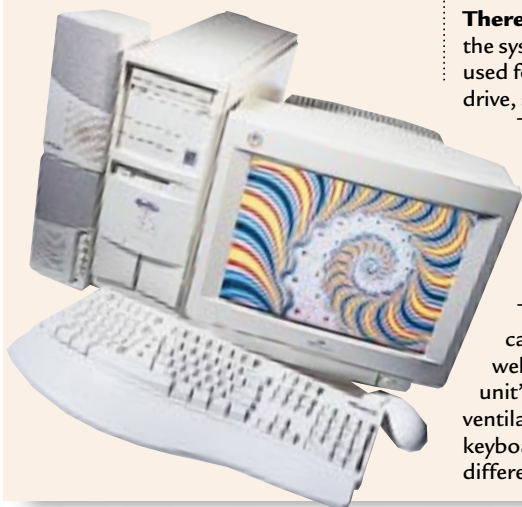
The ADI 5GT monitor, which is identical to those with the Actinet and Mesh systems, was the best in the group test. Able to support high resolutions of up to 1600x1200 at 75Hz, it produces excellent images supported by the Matrox card.

PCW DETAILS

Price £1060.375 (£895 ex VAT)
Contact Roldec 01902 456464
www.roldec.com
Good Points Good components and build, excellent speakers and monitor.
Bad Points Average overall performance, wasted PCI slot.
Conclusion A well-constructed system with a few wasted resources.

Build Quality	★★★★
Performance	★★★
Value for Money	★★★
Overall Rating	★★★

PCW Labs Report

SYSMark 95 scores

System	Score
ACTINET	213
CARRERA	296
DABS DIRECT	224
ELONEX	284
KT	288
MERTEC	210
MESH	318
PANRIX	308
PROTEK	206
ROLDEC	218
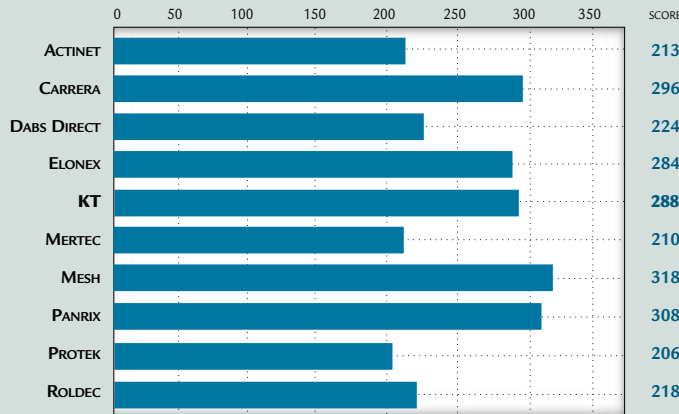
◄ The performance advantage of the K6-2 3D Now! is clear to see when running office applications, giving gains of around 20 percent

► Final Reality scores are closer-run between the K6-2s and the Celerons. Although the K6-2 has new 3D instructions, Final Reality is not written to take advantage of them. Equally, few graphics cards currently have drivers for the K6-2. The Celeron, meanwhile, has mighty FPU strength, giving it the edge when playing games

Final Reality scores

System	Overall (Black)	3D (Red)
ACTINET	3.29	3.2
CARRERA	2.86	3.16
DABS DIRECT	3.17	3.01
ELONEX	2.6	2.9
KT	2.74	3.1
MERTEC	3.13	3.01
MESH	2.99	3.45
PANRIX	2.81	3.24
PROTEK	2.9	2.9
ROLDEC	3.13	3.17
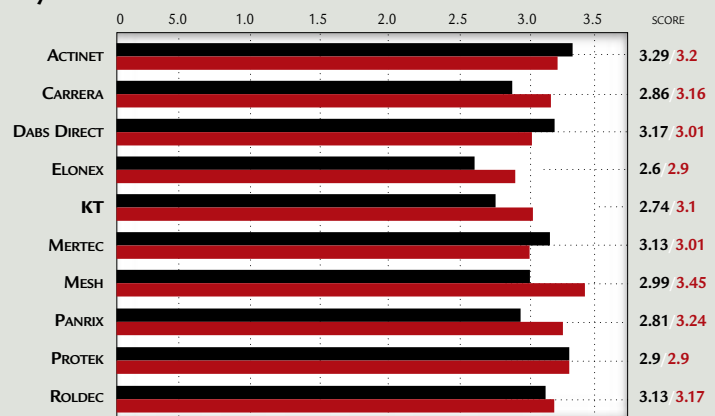
Key: Black = overall scores Red = 3D scores

How we did the tests

The SYSmark test we run on every PC in the group test is provided by BAPCo (Business Applications Performance Corporation). Its members include industry heavyweights like Intel, Compaq and IBM. The BAPCo SYSmark tests measure the speed of the computer running a series of eight common office applications: Microsoft Word 7, Lotus WordPro 96, Microsoft Excel 7, Borland Paradox 7, CorelDraw 6, Lotus Freelance Graphics 96, Microsoft Powerpoint 7, and Adobe Pagemaker 6. The test measures the time taken by the PC to perform a variety of tasks in each application, and each test is performed three times to ensure the results are consistent. The performance depends on a variety of factors; processor speed, RAM, graphics card and disk I/O. As the tests are based on business software packages, the result reflects of how the PC will perform in a real-world situation. The better the score, the longer the bar on the graph. Final Reality is a suite of graphical tests

designed to examine the processing power of the 3D accelerator on your graphics card, 2D image processing and AGP. It runs under Windows 95 and DirectX 5 and uses a 3D engine developed by Remedy. It supports Direct3D, a 3D standard designed by Microsoft, and looks at how the graphics accelerator handles the kind of data it would have to process when you are playing a game. Final Reality tests both the speed of the processor and visual appearance — how the card handles techniques like transparency, fogging, and alpha blending. It tests all these features at different points during the benchmark test, and performs the tests simultaneously, just as in a real game. The visual appearance factors are weighted in importance and combined with the overall processing speed to produce an overall mark. Again, the higher the score, the better the result. Final Reality can be downloaded from www.vnu.co.uk. Monitors are scrutinised using Display Mate for Windows, and tested at a number of resolutions and colour depths.

Table of features

Manufacturer	Actinet	Carrera Technology	Dabs Direct	Elonex	KT Computers
Model Name	Netrunner	Power Media K6-2 300	Dabs CE 300	MCX-6300AX	KT Star 3D Power
Price (ex VAT)	£1079	£1099	£899	£719.15	£1049
Price (inc VAT)	£1267.62	£1291.33	£1056.33	£845	£1232.58
Telephone	01952 270 703	0171 830 0486	0800 558866	0181 452 4444	0181 961 8897
Fax	01952 270 090	0171 299 6600	0870 129 7000	0181 452 6422	0181 961 7498
Web Address	www.actinet.co.uk	www.carrera.co.uk	www.dabs.com	www.elonex.co.uk	www.ktcomputers.co.uk
Standard Warranty	1 yr On-site, 4 yrs RTB	1 yr Parts, 3 yrs lbr	1 yr On-site, 5 yrs lbr	RTB 1 yr	1 yr Parts, 5 yrs lbr, RTB
Warranty Options	3 yrs Onsite	Onsite Maintenance	24 hr Response OSM		1 week, 8 hr Repair
Technical Support	01952 270 708	0171 830 0386	0870 129 3350	0181 452 6666	0181 961 8897
Hardware Specs					
Processor	Intel Celeron 300MHz	AMD K6-2 300MHz	Intel Celeron 300MHz	AMD K6-2 300MHz	AMD K6-2 300MHz
RAM/Type/No of DIMMs	64Mb/SDRAM/1	64Mb/SDRAM/1	64Mb/SDRAM/1	64Mb/SDRAM/1	64Mb/SDRAM/1
Hard Disk	Seagate Medalist Pro	Maxtor Diamond Max	Seagate ST36530A	Fujitsu	Seagate Medalist Pro
Size/Interface	6.4Gb/UDMA	10 Gb Ultra EIDE	6.5 Gb/UDMA	8.4 Gb/UDMA	6.4 GB/UDMA
Motherboard Components					
Motherboard Manufacturer	Abit	Epox	Supermicro	FIC	Microstar
Model/Chipset	i440BX	MVP3/i430TX	P6-58A 440BX	VA 503T	MS-5169/i440BX
L2 Cache	512Kb	1Mb	256Kb	512Kb	512Kb
Expansion and I/O					
No. of Free 3.5/5.25in Bays	1/2	1/2	2/2	2/1	0/2
AGP Slot	1	1	1	on-board	1
No of PCI/ISA/Shared Slots	4/3/1	3/2/1	4/3/1	2/0/1	3/2/1
No of USB/Serial/Parallel/PS2	2/2/1/2	2/2/1/2	2/2/1/1	2/2/1/1	2/2/1/2
Multimedia					
CD-ROM Manufacturer/Model	A-Open	ATISoft DVD ROM	Asus CD5340	Vuege 632A	Asus 34X
CD-ROM Speed/Interface	32x/IDE	24x/IDE	34x/IDE	32x/IDE	34x/IDE
Sound Card Manufacturer	Creative Labs	Videologic	Pine	Sonic Storm	Creative Labs
Sound Card Model	AWE64 Value	Sonic Storm PCI 3D	Schubert 32 PCI	PCI Sound	AWE64 Value
Speakers	Surf Sound	Altec Lansing ACS45	Labtec LCS-1020 ION	CSW100	Aiwa TS-CD20
Graphics Card	Intel i740	ATI Xpert@Play	ATI Xpert@Play AGP	ATI 3D Rage Pro	ATI All-in-Wonder Pro
RAM/Type	8Mb	4Mb/SGRAM	4Mb/SGRAM	4Mb/SGRAM	8Mb/SGRAM
Graphics Card Interface	AGP	AGP	AGP	AGP	AGP
Monitor/Model/Size	ADI 5GT 17in	LG 77T 17in	ADI 5P 17in	Elonex 17in	CTX 1792 SE 17in
Max Refresh Rate@1024x768	92Hz	75Hz	85Hz	85Hz	75Hz
Other Information					
Modem Speed	56K	56K	56K	56K	56K
Misc Hardware		Iomega Zip Drive			Diamond Monster II 8Mb
		+ 1 cartridge			Iomega Zip Drive
Other Extras	Lotus SmartSuite 97	MS Home	Lotus SmartSuite 97	Lotus SmartSuite 97	Lotus SmartSuite 97
	IBM Simply Speaking	Essentials 98	Dabs mm Bundle		World Cup 98
	Ultra pack software				F1

Table of features

Manufacturer	Mertec	Mesh Computers	Panrix	Protek Europe	Roldec Systems
Model Name	**Home Media**	**Elite K6 3D 300A**	**Nitro 3D**	**Ultra**	**Pro 2**
Price (exVAT)	£999	£1020	£999	£849	£895
Price (inc VAT)	£1173.83	£1198.50	£1173.83	£997.58	£1,060.38
Telephone	01792 473700	0181 452 1111	01132 444958	0800 458 0533	01902 456464
Fax	01792 473887	0181 208 4493	01132 444 962	0800 458 0511	01902 452 592
Web Address	www.mertec.co.uk	www.meshplc.co.uk	www.panrix.com		www.roldec.com
Standard Warranty	2 yr RTB Parts & lbr	2 yr RTB	1 yr Parts & lbr RTB	1 yr RTB	3 yr Std Warranty
Warranty Options	1 yr 24 hr Response	Lifetime Tel Support	24/12 Month OSW	4 yrs lbr only	2 yrs Parts & lbr
Technical Support	01792 473888	0181 208 2028	01132 444948	01884 822302	01902 456464
Hardware Specs					
Processor	Intel Celeron 300 MHz	AMD K6-2 300MHz	AMD K6-2 300MHz	Intel Celeron 300MHz	Intel Celeron 300MHz
RAM/Type/No of DIMMs	64Mb/SDRAM/1	64Mb/SDRAM/1	64Mb/SDRAM/1	64Mb/SDRAM/1	64Mb/SDRAM/1
Hard Disk	IBM	Seagate Medalist Pro	Maxtor 90750D6	Fujitsu	Seagate Medalist Pro
Size/Interface	6.4 Gb/UDMA	6.5 Gb Ultra ATA	7.5 Gb/UDMA	4.3 Gb/UDMA	4.5 Gb/UDMA
Motherboard Components					
Motherboard Manufacturer	Chaintech	Epox EP/51MVP3E-M	Microstar	QDI	Elitegroup
Model/Chipset	6BTM/440BX	VIA	MS5169 ALI	Excellent 1443EX	P6 BX/A440BX
L2 Cache	0Bb	1Mb	512Kb	0Kb	0Kb
Expansion and I/O					
No of Free 3.5/5.25in Bays	1/2	1/2	1/2	2/2	1/2
AGP Slot	1	1	1	1	1
No of PCI/ISA/Shared Slots	3/2/1	3/2/1	4/3/1	3/3/1	4/1/1
No of USB/Serial/Parallel/PS2	2/2/1/2	2/2/1/2	2/2/1/2	2/2/1/2	2/2/1/0
Multimedia					
CD-ROM Manufacturer/Model	Creative DVD	Asustek CD-5400	Asus CD-5400	Samsung SCR-3231	Teac
CD-ROM Speed/Interface	2x DVD, 20x CD/EIDE	40x/EIDE	40x/IDE	32x/IDE	32x/IDE
Sound Card Manufacturer	Creative Labs	Creative Labs	Orchid	Creative Labs	Creative Labs
Sound Card Model	AWE64 Value	AWE64 Value	NuSound 3D	AWE64 Value	AWE64 Value
Speakers	Labtec LC52420	Teac PowerMax1000	Yamaha M20	Firestorm 240W	Arowana
Graphics Card	ATI Xpert 98	Diamond Viper 330	Diamond Viper 330	ATI Xpert@Play	Matrox Productiva G200
RAM/Type	8Mb/SGRAM	4Mb/SGRAM	4Mb/SGRAM	4Mb/SGRAM	8Mb/SGRAM
Graphics Card Interface	AGP	AGP	AGP	AGP	AGP
Monitor/Model/Size	ADI 5P 17in	ADI 5GT 17in	Ilyama MF-8617E 17in	MAG XJ717 17in	ADI 5GT 17in
Max Refresh Rate@1024x768	8Hz	92Hz	105Hz	85Hz	92Hz
Other Information					
Modem Speed	56K	56K	56K	56K	56K
Misc Hardware	DVD Decoder Card			Innovision 3Dfx Card	
	Iomega Zip Drive				
Other Extras	Lotus SmartSuite 97	Simply Speaking	Lotus SmartSuite 97		Microsoft Home
		Lotus SmartSuite 97			Essentials 98
		Serif 5			

Editor's **Choice**

The winners of our awards offer top price/performance **and solid upgradability.**

In a market ruled by Intel, it is not very often that a processor comes up with much better performance at a comparable price. Considering the bad publicity that the Celeron received even before its launch, perhaps it was not entirely surprising that two AMD systems appeared in our awards list. However, one Celeron system receives our Highly Commended award. Our awards are based not only on performance; other equally important factors such as quality of construction, components

What sets the Panrix Nitro 3D apart is its build quality

and price are considered too. As PC hardware is a fast-changing environment, today's high-performance system might be the slowest in the market in a few years' time. Therefore, there is little point in having a high-performance system if you cannot upgrade easily.

The Panrix Nitro 3D with the K6-2 processor, which wins our **Editor's Choice** award, is upgradable well beyond its current speed. Although the Nitro 3D is not as cheap as the Elonex PT-6300/AX or as high-performing as the Mesh K6 3D 300A, its build quality sets it apart. Bordering on the finicky, this system is an excellent choice for anyone who intends to add more components like a dedicated 3D graphics card or a video-capture board which takes advantage of the K6-2 processor's 3D Now! functions. Another merit of the system is its massive 7.5Gb Maxtor hard drive. A high-speed drive, it is gigantic enough to gobble the increasingly fat software that is hitting

▲ **MERTEC'S HOME MEDIA SYSTEM**
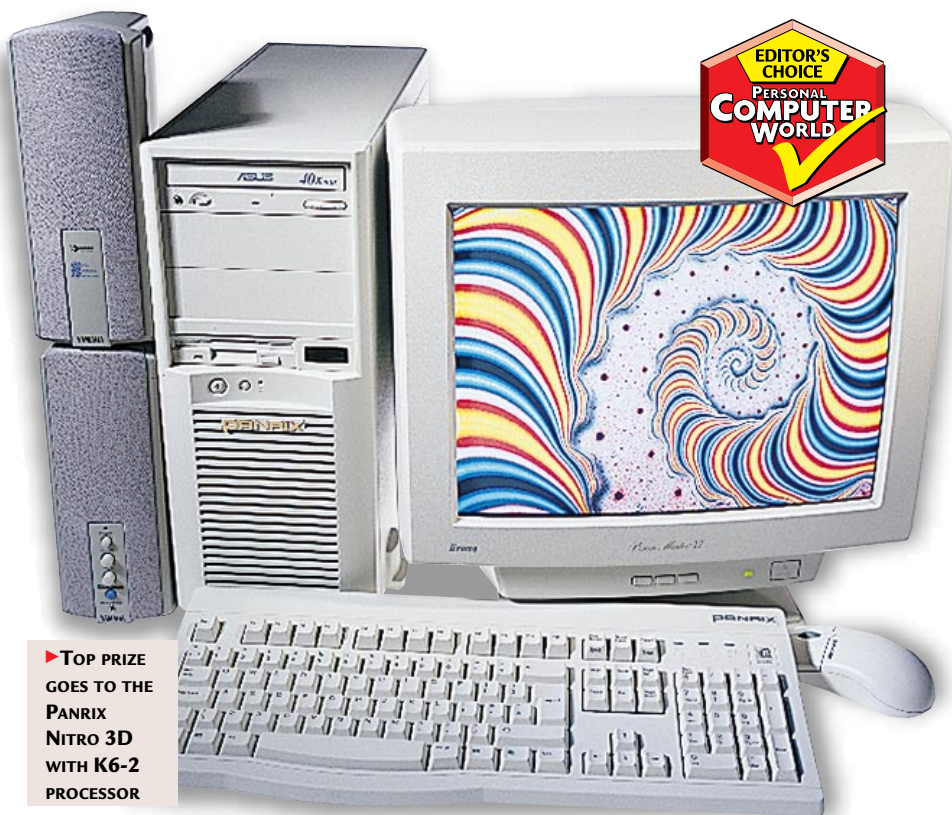
▶ **TOP PRIZE GOES TO THE PANRIX NITRO 3D WITH K6-2 PROCESSOR**

the market. And the Diamond Viper video card was the only one in our group test that had optimised drivers for the K6-2 processor. In addition to all the appreciable features mentioned here, the Nitro 3D also had the best sound card in the group test.

The Mertec Home Media is the only Celeron system to win an award. Coming with a second-generation DVD drive, the Home Media, like the other two award winners, is easy to upgrade because it has a BX motherboard. This makes it compatible with faster processors like the Pentium II. The Creative Labs DVD is able to read DVDs and all varieties of CDs without any problem. There is no loss of image quality. The Mertec system is also exceptionally well built, making access to the internal components very easy. The Iomega Zip drive is useful for archiving data and

▼ **MESH K6 3D 300A AMD SYSTEM**

transferring large multimedia files.

The Mesh K6 3D 300A is another well-built AMD system. Scorching ahead of the rest with a SYSMark score of 318, it was the fastest in the group, with a result comparable to that of a corresponding Pentium II. Mesh has equipped it with a six-speaker set that makes it a good choice for converting into a home theatre. It also has 1Mb of cache on the motherboard, which boosts performance, while its ADI 5GT monitor produced the best results in our tests.

PiCasso
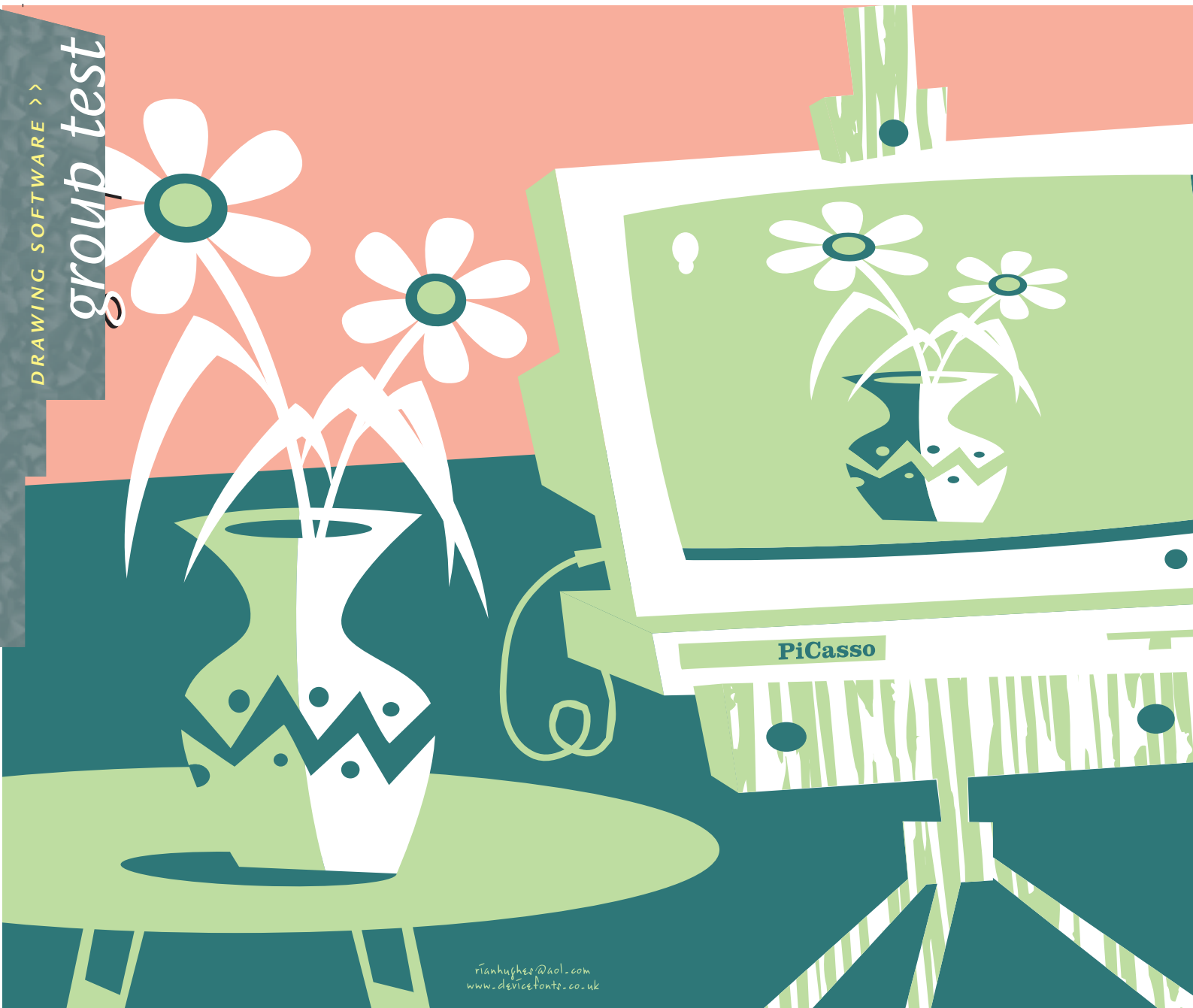
rianhughes@aol.com
www.devicefonts.co.uk

Art of the matter
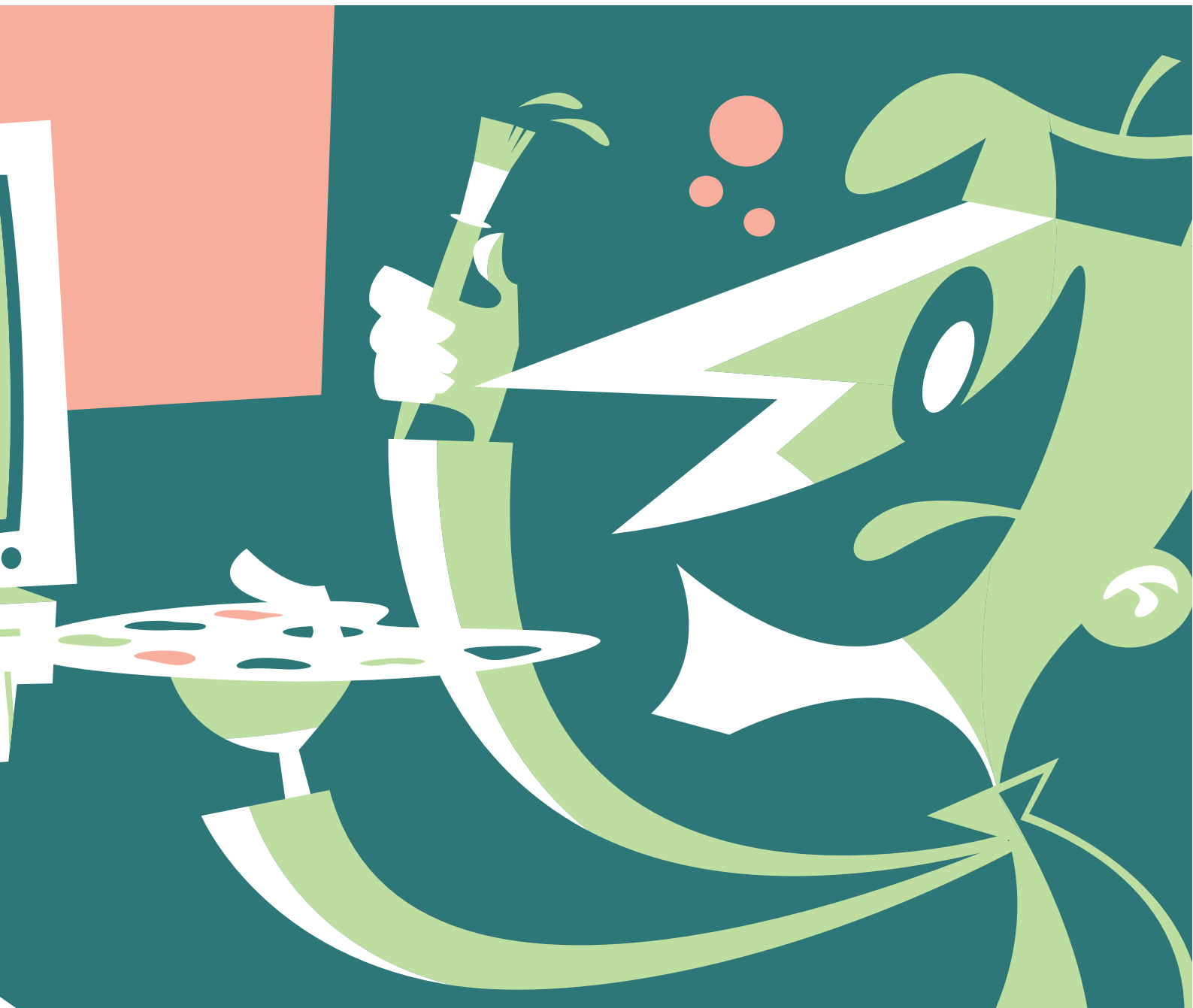
Seven general illustration packages are laid **ON THE DRAWING BOARD** and assessed by tim nott. he gets technical, too.

Unlike image-processing applications such as Photoshop, which deal mainly with photographic images (or bitmaps) on a per-pixel basis, drawing software deals with vector objects — shapes that are mathematically defined and are independent of the background. They are always editable, unlike parts of a photo or paintbrush strokes that are "stuck down" on the electronic canvas. They are also device independent, which means they always appear according to the best quality of the output device, be it a VGA monitor or a 2400dpi imagesetter, and can be enlarged without looking jagged or pixellated. Recently, however, the distinction has become blurred, as many image-processing applications support "floating" objects, and most drawing applications can not only include bitmaps, but apply basic image processing to them in-place. Vector drawing software is used for everything from advertisement and packaging design (it's particularly good at creating special effects with text) to technical drawing. In this feature we look at seven general illustration packages, ranging in price from under £40 to over £400. Most come with a bundle of resources that include ready-made clip-art images and a selection of fonts. We also have two special sections on technical drawing or CAD (computer aided design) and flowcharting, featuring eight more products.

Adobe Illustrator 7.01

The graphic designer's old favourite is making a difficult adjustment to life on the PC.

For a long time Adobe Illustrator running on the Apple Macintosh was the definitive vector drawing application, and its Botticelli Venus logo inspired a generation of graphic artists. Eventually it was ported to the Windows platform, but development of the PC version lagged behind that of its Mac counterpart until last year, when the 32-bit version 7 appeared. It represented a great leap forward, both in features and in interface design, and this version embraces some of the Windows 95 look-and-feel. There are, at last, proper right-mouse-button context menus, but we're still waiting for such essentials as a standard windows button bar with the normal save, open, undo, clipboard and other common commands. A vast improvement is that the old menu/dialog box method of editing object attributes has at last been replaced by Photoshop-style modeless (open all the time) palettes. Practically all the settings you could want are accessible from these — text, lines, fills and layers. The palettes can be shrunk into their own title bars and stacked together, so one palette can contain tabs for, say, colour swatches, colour gradients and the colour mixer.

The swatches palette is particularly effective. Although you can apply colours straight from the mixer, if you drag them into the swatches palette first you have much better management and can make global changes to all instances of a colour and its tints in a drawing. This palette can also be used to store gradients and pattern fills; you are limited to radial and linear gradients, but these can be multi-coloured. There is an interactive gradient tool, but it can only be used to modify existing fills, not to create new ones. Text-tweaking, though improved, is similarly limited. You can flow text into containers to give shaped paragraphs and you can align it to a curved path, but there are no facilities for distorting the envelope of text, nor
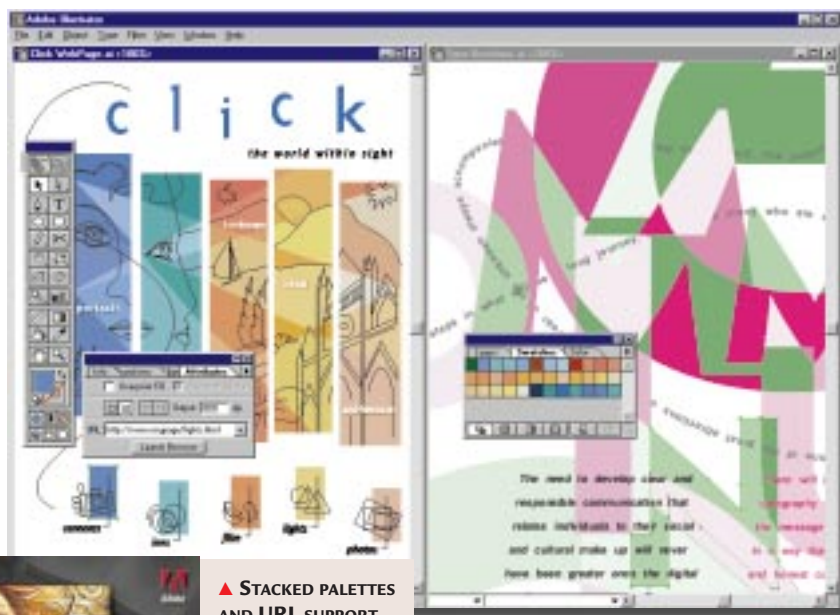
▲ **STACKED PALETTES AND URL SUPPORT IN ILLUSTRATOR**
◄ **ILLUSTRATOR COMES WITH AN INSPIRING COLLECTION OF TOURS, TUTORIALS AND SLIDE SHOWS**

any special effects such as 3D extrusions. The drawing tools, are, as ever, precise and delicate, with support for pressure-sensitive devices to create calligraphic strokes. There are some awkward corners. For example, moving, resizing or rotating objects requires separate trips to the toolbar, rather than the one-stop arrow tool approach of Corel and others. But for ultra-precise placement there is a Transform palette that accepts numeric input for size, place and angle.

Like most other Adobe applications, Illustrator supports plug-ins — Adobe or third-party add-ons. Those shipped with the product include special tools for distorting objects with scribble, twirl and other effects, as well as a knife tool for slicing objects, a drop shadow effect and many practical utilities such as those for creating crop-marks or converting colours. In addition, Illustrator supports PhotoShop plug-ins for in-place use on imported bitmapped images. Here you have an impressive range of filters, from simple colour control to fancy effects

such as radial blur and neon glow. Professional colour support is excellent, with standard libraries, separations and hardware profiles.

There isn't a great deal here for web designers but you do have the option of attaching URLs to objects, then exporting the picture as a GIF image map. But you'll need additional software to create a web page. On a brighter note, you can save Illustrator files directly into PDF format where they can be read with the (free) Acrobat viewer.

Finally, you get 302 fonts (only in PostScript format) but the clip-art consists mostly of copyrighted sample files. A second CD-ROM contains a well-produced collection of tours, tutorials and slide shows.

PCW DETAILS

★★

Price £351.32 (£298.99 ex VAT)
Contact Adobe 0181 606 4000
www.adobe.com
System Requirements Windows 95 or NT4.
Good Points Interface has greatly improved since version 4.1.
Bad Points Lags behind the competition's feature lists and performs slowly.
Conclusion The least compelling of the high-enders.

Corel Draw 8

A confusing interface can't mask the numerous abilities of this veteran package.

When Corel Draw first appeared in 1989, running under what was then an obscure graphical user interface called Windows 286, it was the first program of its kind on the PC. At the time of writing, a Mac version is imminent. Since its pioneering use of CD-ROM as an installation medium with version 3, Corel has always offered an abundant package. This time we have three CD-ROMs, encompassing the eponymous drawing package, the PhotoPaint image processor and Dream 3D as the main components. There are numerous extras and utilities covering hardware colour management, bitmap tracing, optical character recognition, scripting, texture creation, font and media management, screen capture and a variety of third-party plug-ins. Finally, there are more than 40,000 clip-art items, photo-images and other objects, and 1000 fonts in both TrueType and PostScript flavours.

For the sake of simplicity I shall confine my attention to Draw. The executable runs to over 11Mb of code (it still loads in a third of the time of the 4.5Mb Illustrator) and a lot is new. First, there has been a general overhaul of the interface. Some of the changes, such as the Office 97 flat-button look, are merely cosmetic, but others are more far-reaching. Corel has long had roll-ups — floating palettes like Illustrator's that provide modeless access to options and attributes. They can save space by rolling-up into their own title bars, but they don't have the stacking capabilities of Illustrator or Freehand.

Corel has attempted to rectify this shortcoming with "dockers" for access to things such as view management, styles, clip-art and symbols. These stack into tabbed pages, and can also be docked at the side of the screen — the image area is automatically resized, so they are never in

▲**DRAWING A BEAD: INTERACTIVE FILLS IN ACTION**

the way.

In practice, however, it can be difficult to arrange the dockers as you want and they often end up taking a ridiculously large amount of precious screen space. One docker that certainly earns its keep is the scrapbook. This serves as a thumbnail browser, not just for the vast clip-art collection but for any files on your hard disk or network. It also doubles as a storage area for scraps of artwork and favourite fill and line styles. Another docker provides HTML-based hands-on tutorials. These, however, will disappoint many learners, as several of the "cool effects" seem to miss out several essential steps.

One very productive feature is smart selection. Having drawn a rectangle, say, you can immediately edit it by clicking on a handle without having to change to the selection arrow tool; clicking elsewhere carries on drawing rectangles. It saves tremendous mouse mileage. Another improvement is the way you select from overlapping objects. This was always something of a nightmare, but now Alt+ clicking drills down through the stacked objects, selecting each in turn. The killer features introduced in version 7

were the interactive tools with which you could create gradients and shaded transparency by manipulating handles and dropping colours directly onto objects, instead of using dialogues. Version 8 goes further, with direct manipulation of text envelopes, 3D extrusions, blends, shadows and a fascinating distortion tool.

For web design Corel outclasses the competition once again. You can output directly to HTML or Corel's enhanced Barista. There's shortcut access to FTP sites from the scrapbook, support for Java scripts, and a clever "Make HTML compatible" feature which adjusts layouts and formatting likely to cause problems with web browsers.   ◊

PCW DETAILS

★★★★

Price *£464.13 (£395 ex VAT)*
Contact *Corel 0800 581028*
www.corel.com
System Requirements *Windows 95 or NT4.*
Good Points *Huge feature list, vast resources and some genuine productivity enhancements.*
Bad points *A crowded and obtrusive interface.*
Conclusion *Not a great vintage for Corel, but still comfortably out-features the opposition.*

Macromedia Freehand 8

Not always friendly, but Mac and PC versions offer a host of features for the professional.

Developed by Altsys for Aldus, Freehand started its career as a Mac application. When Aldus merged with Adobe, the owner of Illustrator, the product reverted to Altsys and was promptly snapped up by Macromedia, noted at the time for its multimedia authoring and 3D modelling software. Unlike Illustrator, Freehand comes with PC and Mac versions in the same box. For an extra £100, the Design in Motion suite adds Flash2 and Insta.HTML. Flash2 is a vector-based web animation program which can either function as a standalone or from key frames created in Freehand. Insta.HTML adds HTML export to Freehand's capabilities. Both versions include a 10,000-piece clip-art library, with an excellent browser, and 500 fonts are supplied in both PostScript Type 1 and TrueType. Freehand is aimed squarely at design professionals. It is not bulging with user-friendliness, but you do get a selection of templates and wizards to get you started. The interface is comparatively uncluttered, with a series of floating palettes and Inspectors which provide one-stop modeless attribute settings. They work in a very similar way to Illustrator's palettes, in that you can drag tabbed pages in and out of them. You can also customise the toolbars and shortcut-key settings.

Productivity leaps ahead of Illustrator, with interactive transform handles as in Corel; no longer do you have to traipse to and from the toolbox to rotate, resize or move objects. A new fast mode speeds up screen redraws dramatically at the expense of display detail. It doesn't affect the print quality, and you can drop back into preview mode at will. The freeform tool is a valuable addition. Though all drawing software will let you node-edit the outline of shapes, this takes a more plastic approach, and you can push and pull at a shape as if it were made of clay. Holding down the arrow keys changes the size of the pusher, with more precise
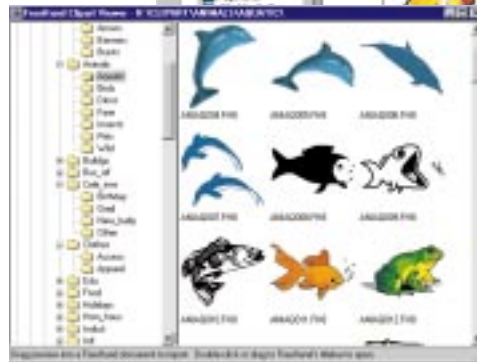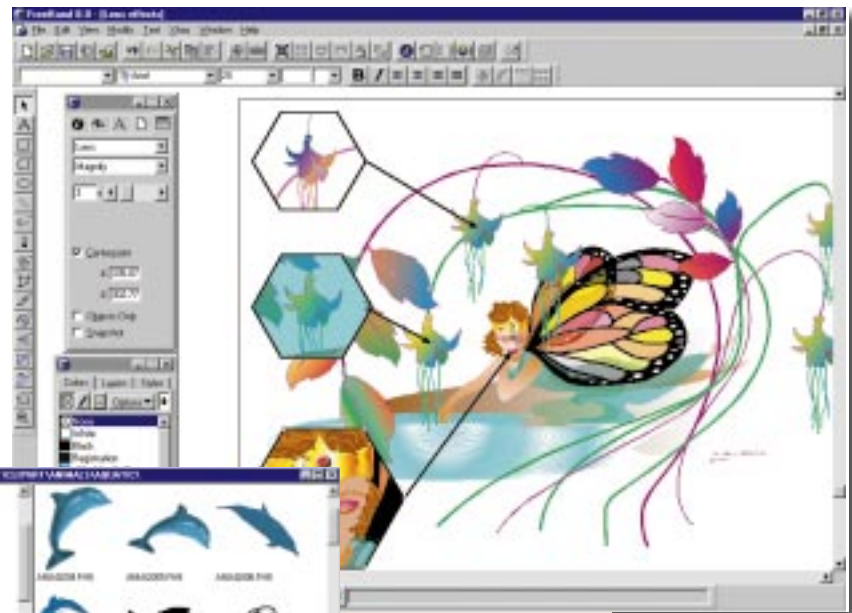
▲ **FREEHAND'S NEW LENS EFFECTS. FROM TOP: INVERT, TRANSPARENCY AND MAGNIFY**

◄ **FREEHAND INCLUDES AN EXCELLENT CLIP-ART BROWSER**

control available by double-clicking the tool button. Another neat trick is the way blends, a succession of intermediate objects created from start and end objects, can be released to layers as a simple animation.

Lenses are another new drawing feature. By giving a shape a lens fill you can lighten, darken, magnify, invert or render monochrome whatever lies beneath it. A particularly useful touch is that you can separate the lens from its target by moving the centrepoint. Hence you could, for example, create an enlarged detail of a drawing alongside the main view. Lenses can also be given a transparent fill, but unlike those in Corel, this can't be graduated, so subtleties such as the shading in the tutorial wineglass project have a flat look.

Macromedia has added "Xtras" to the core product. The most unusual is the graphic hose which lets you spray the screen with a variety of predefined objects, such as leaves, in an adjustably random assortment of sizes and angles.

There are also Xtras for drawing spirals, 3D rotation effects and shadows, for cutting or joining objects, and more. Though Freehand lacks the in-place image processing of its rivals, it has a useful eyedropper tool for extracting colours from imported bitmaps into the main palette.

Despite the customisable interface, it seems impossible to integrate the Xtras into more relevant toolbars. We couldn't, for example, get the hose or drop shadow tools out of the Xtra tools palette into the main toolbox.

PCW DETAILS

★★★

Price £327.82 (£278.99 ex VAT); Design in Motion Suite, £445.32 (378.99 ex VAT)
Contact Macromedia 01344 458600 **www.macromedia.com**
**System Requirements** Windows 95, Windows NT, Mac.
Good Points New lenses and creative effects, with web extras in the Suite version.
Bad Points The Xtras could be better integrated, and it doesn't match Corel's feature list.
Conclusion Much the better of the two Mac-originated stalwarts.

Metacreations Expression

Vector technology with a difference: an impressive 'stroke' palette for enhanced creativity.
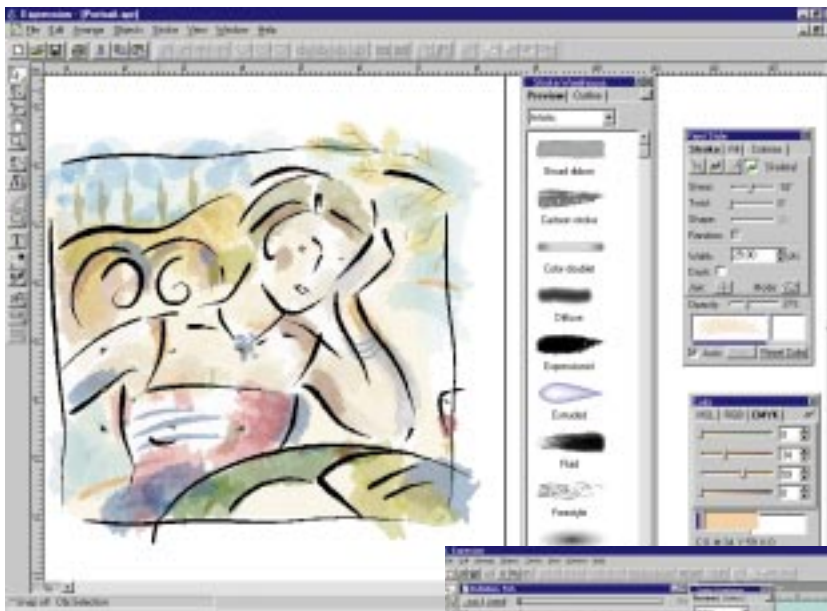
Created by Fractal Design, the people who pioneered Natural Media with Painter, and now part of Metacreations Corporation, Expression is a drawing application that thinks it's a painting program. Unusually, you don't get any fonts or clip-art with the package, but in fairness it isn't really intended as a one-stop solution to your drawing needs. When you run the program, it looks like most other drawing applications. It has a toolbar for creating the usual lines, text and other shapes; the usual transformation tools for rotation and resizing; tabbed palettes for controlling the fill and stroke; and further palettes for mixing colour and defining gradients.

What sets this application apart, however, is the stroke warehouse palette. Those who have used Painter (and most bitmap-editing software) will be familiar with natural media brushes that can simulate the grainy effect of charcoal, or the way watercolours bleed and oils mingle. This is all done with clever use of bitmap technology; once a stroke is laid down, it can't be edited. Expression brings something similar to vector technology. Each stroke in the warehouse palette is a complex vector object in its own right — a picture, if you like. When you use a stroke to draw with, although you may be using

a conventional line, shape or freehand tool, what you are actually constructing is the skeleton of a stroke. This skeleton remains an independent object (seen in non-printing red), just as any other vector, and can be resized, moved and node-edited as normal. Fleshing out the skeleton is the stroke itself, which, depending on the stroke properties, can behave in a number of ways.

The easiest way to explain this rather strange concept is by example. Select the thick soft oil stroke, and you'll get a stroke of even width with rather jagged ends. The colour will vary across the stroke, in shades of the current active line colour. Select the pointed soft stroke and you'll get a multi-shaded tapering effect.

You can add further variety by specifying the width of a stroke and adding shear or twist effects. And since a stroke is a vector object in its own right, it doesn't have to be brush-like. You can "paint" with any drawing — an arrow, a leaf, or even a fish. Expression comes with 500 predefined strokes, but you can create your own. You use the normal tools, then with the sroke definition tool, draw a marquee around the objects. This puts them into a new stroke definition window, and you then have a number of options. For example, you can anchor regions of the stoke: these won't be stretched proportionally, so you could preserve the size of the head and tail of an arrow or snake. Only the unanchored middle portion will be stretched when used. Another possibility is to make a stroke repeating in the same proportions. So instead of, say, one long thin fish, you'll get a succession of small ones. Use it with a flower and the rectangle tool and you'll get a border of blossoms. Finally, there's an option to create multi-view strokes. This combines different edited versions of the same objects as frames of a single stroke. You can paint with different shaped or coloured versions of the same object; so, in a few brush strokes you could create a shoal of varied fish. As a final touch, not only do the stroke thumbnails animate in the warehouse palette, but multi-view strokes can be exported as standalone AVI animations.

PCW DETAILS

★★★★

Price £175.07 (£148.99 ex VAT)
Contact Computers Unlimited
0181 200 8282 www.metacreations.com
System Requirements Windows 95.
Good Points Wonderfully creative, and now more sensibly priced.
Bad Points Not intended as a drawing all-rounder.
Conclusion An excellent addition for the professional artist

GSP Designworks 3.5

Some surprisingly powerful features in a professional but budget-priced package.

The CD-ROM gives you a choice of English, French or German versions. It also includes version 3 of the product, which runs under Windows 3.1, as well as 1200 clip-art pictures and 54 fonts, together with clip-art and photo browsers, a keypad utility for inserting symbols, a font manager and a screen capture utility. The interface is refreshingly simple, with the basic drawing tools to the left and commands at the top. The colour palette is at the bottom, and at screen right are a series of quick transform tools that, for example, will rotate or resize an object in preset

▲ **DESIGNWORKS' NAMED STYLES AND MULTIPLE DRAWINGS**

steps. The toolbars can be set to float free, expanded to show all possible tools or contracted to show the essentials. Instead of wizards, Designworks has PagePilots. Although these are limited to cards, certificates and logos, further assistance is on hand to help you complete the project via the cue cards

Despite the budget price, this package boasts some professional features, such as Pantone libraries, colour separations and up to 200 layers. There are facilities to save named line and fill styles, and the colour palette offers the same facility as the high-end packages to globally change a colour and

all its tints. Typographic control is generally good. The small collection of fonts are own-brand and the clip-art library isn't of brilliant quality — the CGM format doesn't permit fine editing of the images. On the other hand, unlike PagePlus, the program lets you have more than one drawing open at a time.

PCW DETAILS

★★★

Price _£39.95 (£33.61 ex VAT)_
Contact _GSP 01480 496575_
www.gspltd.co.uk
System Requirements _Windows 95, Windows 3.1._
Good Points _Easy to use, but with some surprisingly powerful features._
Bad Points _Meagre and poor-quality selection of fonts and clip-art._
Conclusion _A budget application more suited to the serious artist than to those wanting instant results._

Micrografx Windows Draw 6 Premier Edition Print Studio

Great value for money for both novices and power users.

There's a lot in this box, with 200 quality fonts, 20,000 pieces of clip-art (together with a Media Manager), as well as a well-featured image processor and 3D effects applications. Instant 3-D is a very easy way of creating 3D effects from text or the supplied object library. However, you can't create your own objects or have more than one in the same scene.

The emphasis in Draw is very much on ease of use, with wizards available to tackle everything from setting up the sheet size to creating ready-made projects. A further helpful innovation in this version is the visual toolbar, which combines the functions of a help panel with a conventional toolbar. You can access practically any command

from here, without ever having to visit the menus. The third contender in the make-it-easy stakes is the style gallery. This lists a huge range of preset options and effects, including text styles, fills, outlines, shadows, and so on, all presented as thumbnail samples. Experienced users can adopt a more conventional interface. They will discover an impressive set of power features. There's a full range of drawing tools, including predrawn shapes and smart connector lines that stay attached when the connected objects are moved around. There's also good web support, and you can input HTML code directly. Finally, there's a toe-curlingly awful multimedia demo that doesn't do the product any justice at all.

▲ **THE VISUAL TOOLBAR AND STYLE GALLEY MAKE LIFE EASIER**

PCW DETAILS

★★★★★

Price _£49.95 (£42.51 ex VAT)_
Contact Micrografx _01483 747526_
www.micrografx.com
System Requirements _Windows 95._
Good Points _Easy to use for the beginner, but plenty for the power user too._
Bad Points _Avoid the demo tour._
Conclusion _Absolutely brilliant value for money._

Serif Draw Plus 3

An easy-to-use package with plenty of drawing power.

Serif applies the Corel approach to the lower end of the market, offering plenty of value. As well as the drawing program there is an applet that offers in-place image processing, a clip-art browser, 400 fonts and more than18,000 clip-art and photo images. There's both printed and electronic documentation, and templates cover everything from greetings cards to employment resumés.

The interface is simple and uncluttered, with a MS Office look. Left is a simple set of drawing tools, which expand to give quick shapes such as stars, spirals and speech bubbles. The colour palette at the right has two useful touches: a sub-palette of ten shades of the selected colour is shown, and the main palette can contain gradients as well as flat fills. At the bottom of the screen are the navigation controls, with

toolbars above for performing the standard Windows operations, rotating and stacking objects, and specifying fonts and line attributes. There's abundant help, with wizards everywhere and plenty of pop-up hint panels. All these aids can be turned off as you grow more confident. More unusual wizards are available to create borders, backgrounds, watermarks and even cartoon faces. The templates tend to the bright and brash, rather than the award-winning. The fonts are own-brand and as the clip-art is in WMF format, you can't really edit it: circles, for example, are composed of many short, straight line segments. Despite these limitations there is still plenty of drawing power for the more ambitious user, with layers, multicolour fills, blends, and envelope editing. Although version 4 wasn't available at the time of writing, we are
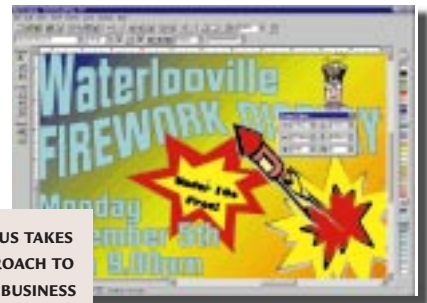
promised a tabbed studio that holds fill, line and font styles for drag-and-drop formatting; anti-aliased display; transparency; more fills; easier curve editing; and output of animated and transparent GIFs.

PCW DETAILS

★★★

Price *£39.95 (£34 ex VAT)*
Contact *Serif 0800 376 7070*
www.serif.com
System Requirements *Windows 95.*
Good Points *Easy to use and excellent value.*
Bad Points *Poor-quality clip-art and fonts.*
Conclusion *Wait for imminent version 4 before buying.*

Editor's Choice

How the winners and runners-up qualified for their PCW awards.

At the high end, **Corel Draw 8** comfortably beats the opposition, both in terms of features and value. Features such as graduated transparency and a huge range of fills are unmatched elsewhere. The workspace is sometimes unpleasantly crowded, but the dockers are a step in the right direction. The interactive controls are far speedier and more intuitive than the old dialogue-based methods, and minor enhancements such as automatic selection are genuine time-savers. Adding to this the huge range of fonts, quality artwork and other extras makes it unbeatable, and our **Editor's Choice**.

We have two Highly Commended awards to dispense, one for the high-end runner up and one for the best of the budget applications. Compatibility is an important issue, and whereas Corel 8 was, at time of writing, about to be

launched for the Mac, both Illustrator and Freehand are long-established on both platforms. Of these two, **Macromedia Freehand** comfortably outperforms its rival, as well as offering more in terms of resources. It easily wins the first of our Highly Commended awards.

Competition is hot at the lower end of the market, with both Serif DrawPlus and GSP DesignWorks offering a great deal at a rock-bottom price. However, for an extra £10, **Micrografx Windows Draw 6 Premier Edition Print Studio**

▶ COREL'S FEATURES AND FILLS COMFORTABLY BEAT THE OPPOSITION
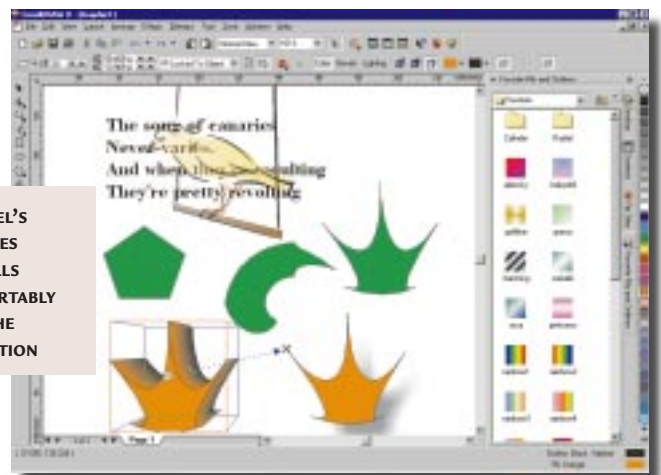
offers greater ease of use than either**,** more features for the power user, and higher quality fonts, clip-art and templates. The extra image processing and 3D applications are another advantage. So it wins our second Highly Commended award. ⇨

Technically speaking

Take that, you CAD! Here's a round-up of some of the best technical drawing packages around.

Technical drawing, as practised by engineers and architects, has to meet an entirely different set of criteria. CAD packages usually offer fewer fills, blends and fancy artistic effects, but more precision and drawing aids. The contrast is much the same as in manual drawing, for which the artist relies on the eye and the draftsperson on the compass, rule and T-square. CAD software, therefore, usually provides several ways of creating an object. A circle, for example, can be defined by its centre and radius, or diameter, or a tangent and radius, or two tangents or three points, each being appropriate to different situations. It's also essential that it should be easy to input points precisely, either by specifying numeric co-ordinates or by snapping to existing objects such as the ends or midpoints of a line, the centre, quadrant or tangent of a circle, the intersection of two lines, and so on. Layers, which were first seen in CAD but are now commonplace in illustration software, are another essential. They enable the draftsperson to hide unnecessary detail — for example, to take off the roof of a house to work on the detail inside. They can also serve to create multiple versions of the same drawing — for example, a house plan with layers for the bricklayers, carpenters, electricians and plumbers. Clip-art, in the CAD world, is replaced by symbol libraries of objects that will be used over and over again, such as nuts and bolts or doors and windows.

For 3D modelling the situation becomes more complicated. Accuracy is vital, and the user needs to be able to view the model from different angles, not just in simple plan view. You also have to be able to construct 3D objects. At the simplest level, a line can be given height, usually (and rather confusingly) known as thickness. A line with a wi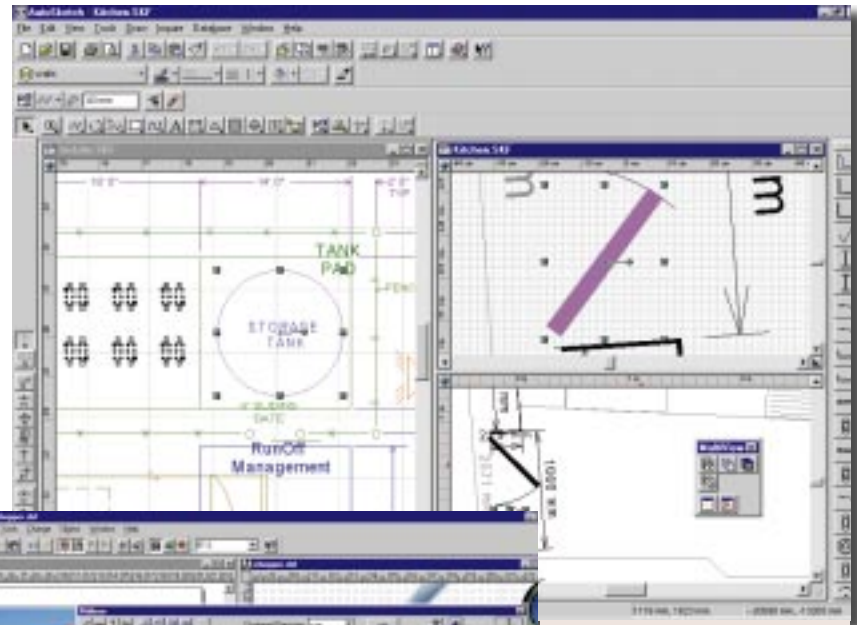dth of 100mm and a thickness of 2500mm, for instance, will appear as a solid wall when seen in isometric view. Next come

▲**AUTOSKETCH (FORMERLY DRAFIX): GOOD FOR BEGINNER**
◀**MICROGRAFX DESIGNER IS AIMED MORE AT TECHNICAL ILLUSTRATION THAN CAD**

3D primitives — simple shapes such as boxes, spheres and cones. After that come solids and surface created by manipulating 2D objects: a cylinder, for example, can be created either by extruding a circle along its axis or by rotating (or sweeping) a rectangle around one edge. More complex surfaces can be generated by creating smooth "meshes" between curves — rather like stretching a rubber sheet over a wire frame. More powerful 3D CAD software will incorporate Boolean operations: in other words, add or subtract 3D shapes. If you want to show a hole drilled in a block, for example, the simplest way is to draw the block, draw a cylinder passing through it, then subtract the cylinder from the block to create the hole. Another asset is the facility for user co-ordinate systems (UCS). Defining a UCS is rather like placing the drawing

sheet anywhere, and at any angle, in the model. So, for example, if you want to draw a skylight in a pitched roof, you can actually work on the roof rather than have do the awkward arithmetic of calculating the distance and angles from the ground plane.

Having created a wireframe 3D model, it is important to be able to visualise the finished product. At the simplest level, the software should be able to remove hidden lines, such as the back edges of a box. Shading will let you assign colour to surfaces and specify light sources and a view point. Rendering will allow the mapping of textures, such as brick or steel, to each surface, and generate realistic reflections, shadows and highlights.

Much CAD work is repetitive or specialised, and much can be done to automate productivity. This can be in the form of a simple, recordable macro system, but more advanced systems will allow third-party development in other languages such as Lisp or Visual Basic. High-end dedicated CAD software such

as AutoCAD or Microstation can cost several thousand pounds, but we've rounded up some cheaper products. For simple 2D work, Autosketch 5 (formerly Drafix) provides a good entry point for beginners, and has the added bonus that it supports non-graphic data that can be exported to a spreadsheet or database. Micrografx Designer sits rather uneasily between the artistic and technical camps. It is available only as part of a graphics suite, but you get Flowcharter (*below*) in the bundle. If AutoCAD compatibility is important, then AutoCAD LT uses the same file format and interface, and can view (but not create) 3D models. Intellicad is a file-compatible near-clone of LT, but offers 3D drawing as well. For low-cost 3D work DesignCAD 97 is an excellent introduction, as is the latest version of TurboCad. ❑

PRODUCT	AUTOSKETCH 5	AUTOCAD LT 97	DESIGNCAD 97	DESIGNER 7	INTELLICAD	TURBOCAD 5	TURBOCAD PROF
CONTACT	AUTODESK	AUTODESK	BVG	MICROGRAFX	VISIO INT'L	IMSI	IMSI
Tel No	01483 303322	01483 303322	01874 611633	01483 747526	01372 227900	0181 581 2000	0181 581 2000
URL	www.drafix.com	www.autodesk.co.uk	www.viagrafix.com	www.micrografx.com	www.visio.com	www.imsiuk.co.uk	www.imsiuk.co.uk
Price inc VAT	£116.32	£699.12	£176.19	£292.57	£292.57	£116.32	£270.25
Numeric input	✔	✔	✔	✔	✔	✔	✔
Object snaps	✔	✔	✔	✗	✔	✔	✔
3D viewing	✗	✔	✔	✗	✔	✔	✔
3D creation	✗	✗	✔	✗	✔	✔	✔
Full AutoCAD compatibility	✗	✔	✗	✗	✔	✗	✗
Boolean operations	✗	✗	✔	✗	✗	✔	✔
Development tools	✗	✔	✔	✗	✔	✗	✔
UCS	✗	✗	✔	✗	✔	✔	✔
Rendering	✗	✗	✔	✗	✔	✔	✔

Going with the flow

Diagrams, rather than drawings, are the end product of flowcharting. The two applications featured here, Visio and Micrografx Flowcharter, can be used to create all sorts of business diagrams, including timelines, process maps, network diagrams, organisational charts and more. Both work by dragging and dropping smart shapes from a library palette onto a grid. The shapes resize without distorting, and have placeholders that automatically format their text labels to suit. Smart connector lines stay attached to the shapes when they are moved about. Users can create shapes and add data attributes or hyperlinks, and even program them to carry out actions or make decisions. Flowcharter's CoolSheets provide templates and its Living Flowcharts can route user input through a decision-making tree. Visio also bills itself as a general-purpose drawing tool for maps, floor plans and other simple drawings. For example, Visio's boundary line shape displays the length and angle alongside the line, and the filing cabinet shape has a drawer that opens to check for clearance in an office plan.

Both products are open to development, with support for Visual Basic, and can be linked to databases.
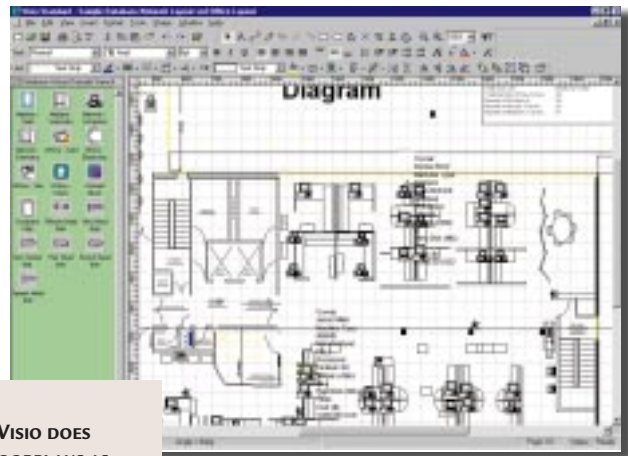
▲ **VISIO DOES FLOORPLANS AS WELL AS CHARTS**
▼ **FLOWCHARTER'S SHAPES CAN CARRY HYPERLINKS**
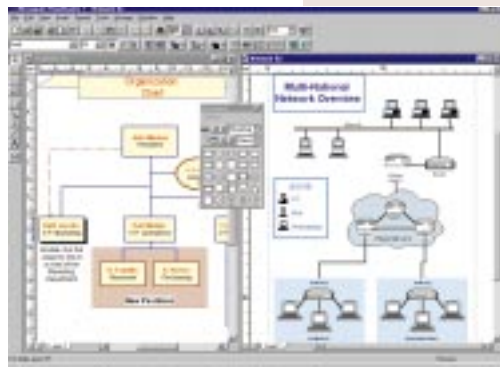
PCW DETAILS

Flowcharter 7
Price *£199 (ex VAT); Graphics Suite 2 Enterprise Edition includes Designer, Picture Publisher and Simply 3D for £248.99 (ex VAT)*
Contact *Micrografx 01483 747526*
www.micrografx.com

PCW DETAILS

Visio 5
Price *Standard version £98.99 (ex VAT); Prof. and technical versions £248.99 (ex VAT)*
Contact *Visio International 01372 227900*
www.visio.com

Table of features

PRODUCT	ILLUSTRATOR 7	COREL DRAW 8	FREEHAND 8	EXPRESSION
CONTACT	ADOBE	COREL	MACROMEDIA	COMPUTERS UNLIMITED
Tel No	0181 606 4000	0800 581028	01344 458600	0181 200 8282
URL	www.adobe.com	www.corel.com	www.macromedia.com	www.metacreations.com
Price inc. VAT	£351.32	£464.13	£327.82	£175.07
Integrated browser	✗	✔	✔	✗
Colour separations	✔	✔	✔	✗
Colour libraries	7	11	18	✗
Colour group management	✔	✔	✔	✗
Colour hardware matching	✔	✔	✔	✗
Multiple pages	✔	✔	✔	✗
Pressure-sensitive pen support	✔	✔	✔	✔
Scripting	✗	✔	✔	✗
Transparency	✗	✔	✔	✔
HTML output	✗	✔	Extra	✗
In-place image processing	✔	✔	✔	✔
Fonts	302	1,000	500	0
Clip-art	1,000	40,000	10,000	0
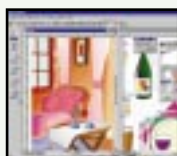
PRODUCT	DESIGNWORKS 3.5	WINDOWS DRAW 6	DRAWPLUS 3
CONTACT	GSP	MICROGRAFX	SERIF
Tel No	01480 496575	01483 747526	0800 376 7070
URL	www.gspltd.co.uk	www.micrografx.com	www.serif.com
Price inc. VAT	£39.95	£49.95	£39.95
Integrated browser	✔	✔	✔
Colour separations	✔	✗	✗
Colour libraries	4	✗	✗
Colour group management	✔	✗	✗
Colour hardware matching	✗	✗	✗
Multiple pages	✗	✗	✗
Pressure-sensitive pen support	✗	✗	✗
Scripting	✗	✗	✗
Transparency	✗	✗	✗
HTML output	✗	✔	✗
In-place image processing	✗	✔	✔
Fonts	54	250	400
Clip-art	1,200	20,000	18,500

Picturing the future

AT THE DAWNING OF THE NEW DIGITAL AGE, ADELE DYER, NIK RAWLINSON AND PAUL TRUEMAN FOCUS ON SOME OF THE MOST ADVANCED CAMERAS THAT ARE POISED TO MAKE FILM A THING OF THE PAST.
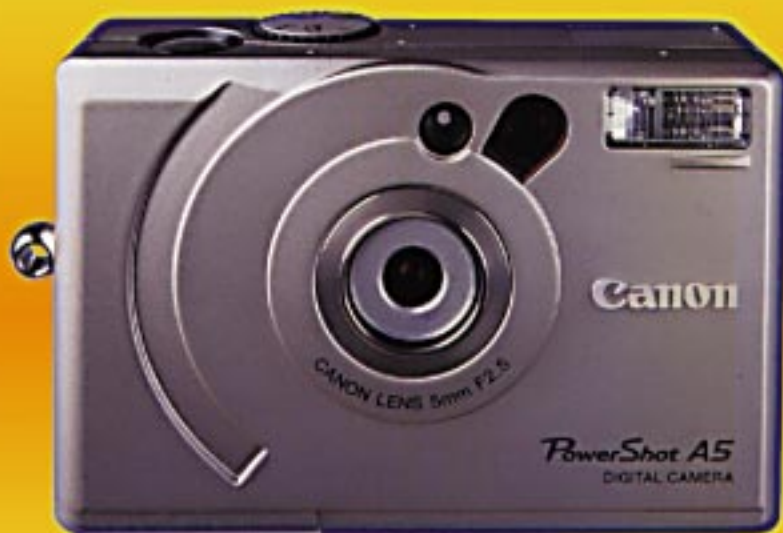
Film is dead. Long live digital. Well, perhaps we're getting squiffy on the funeral sherry before the corpse is cold, but we're a lot closer to that day than we were a year ago. Then, most digital cameras had a maximum resolution of just 640x480 pixels: fine for photographs on web sites, but too small to give satisfactory results on paper. The cameras we looked at this

time all had a resolution of at least 1024x768, with many of them being megapixel cameras. The colours they produce have improved, as have their functionality, but they do not cost any more than they did this time last year.

The increase in quality along with a drop in price is partly a result of digital cameras being this year's must-have gadget. If you don't have one,

you're just not a sorted consumer.

This year we've rounded up the cream of the digital cameras. We were going to stick to megapixel cameras, but decided to drop our criteria to include those cameras with resolutions of 1024x768. So, we have 15 cameras costing from as little as £300, with something to suit every taste — and every idea of a snappy little snapshot.

Agfa ePhoto 780

Small, and about the same weight as a conventional camera, this Agfa has a maximum interpolated resolution of 1024x768 pixels. At this resolution, the standard 2Mb SmartMedia card supplied will hold 12 images, but three lower-resolution modes, down to a minimum 320x240 resolution, will take the capacity up to 96 pictures with JPEG compression. Aimed at the first-time digital camera user, it is a simple point-and-click model, with two unlabelled buttons on the top to operate the controls for flash and image quality and a single button to activate the shutter.

The bundled PhotoWise image management software was a breeze both to install and use. Double-clicking the icon allowed us to open the images on the camera and perform very basic editing, such as rotation and resizing. The snap-shut cover on the front is a welcome addition, keeping the lens, equivalent to a 33mm lens on a 35mm camera, clean and protected from scratches. It also turns the camera on and off. The on-screen display is basic but gives access to the self timer, as well as providing the ability to delete photographs. The LCD is "off" by default, to save on battery power, but can be activated with a single button. There is no zoom, although a macro feature allows the camera to take close-ups.

PCW DETAILS

★★★

Price *£351.33 (£299 ex VAT)*
Contact *Agfa 0181 231 4906*
www.agfa.co.uk
Good Points *Small, light, easy to use.*
Bad Points *No zoom, disappointing picture quality.*
Conclusion *A good introduction to digital cameras.*

Agfa ePhoto 1280

The 1280 was released at the start of the year, since when it has garnered praise from technical reviewers. At first glance it is hard to see why, but after just five minutes with the 1280, it wins you over. An undoubtedly ugly, plastic, brown lump of a camera, it resembles the kind of product you would imagine designers coming up with if they were targeting the pre-teenagers.

Part of the reason for its dreadful aesthetics is that there are hardly any buttons to worry about, other than the shutter button, the rec/play dial and menu dial. With five different-quality options available, from 640x480 to 1280x960 interpolated (both offered with two levels of JPEG compression), an optical zoom that gives the Agfa 1280 the equivalent of a 38-114mm lens on a 35mm camera, and aperture sizes from f2.8-9.1, this camera is deceptively and brilliantly complex in terms of functionality, yet simple in design. The menu offers the user the ability to set everything from a self timer to exposure and focus, or simply leave everything to the camera.

The LCD was one of the best we saw, offering a sharp, colourful and fluid picture across its 2in TFT screen. The 1280 comes with a 4Mb CompactFlash that can store about six shots at the best image-quality setting, but 60 if you set it to 640x480 at a standard level of compression.

PCW DETAILS

★★★★

Price *£762.57 (£649 ex VAT)*
Contact *Agfa 0181 2314906*
www.agfa.co.uk
Good Points *Excellent functionality combined with user-friendly design.*
Bad Points *Ugly. Colours not well resolved.*
Conclusion *You'll learn to love it.*

Casio QV-5000SX

Casio was one of the first companies to produce a digital camera for the masses and its cameras are now well known. The QV-5000SX is something of a departure for Casio in that it is the company's first mega-pixel digital camera, with a maximum resolution of 1280x960 pixels.

The camera has 8Mb of memory, which sounds generous. However, this is internal memory only, so unlike all the other cameras in the test it cannot be expanded with the use of removable memory cards. You are therefore limited in the number of high-resolution images you can take at one time — up to 17 — before you need to go back to your PC. The other annoying consequence is that you cannot then use something like a FlashPath drive for quick and easy downloading. Instead, you have to use the download software and serial cable. The lens is equivalent to a 35mm lens on a 35mm camera. There is X2 and X4 zoom, but this is digital only and drops the resolution down to 640x480, which results in poor-resolution, ill-focused images. Finally, the software is skimpy, with panorama stitching software and only basic image editing.

There are some good points, such as the movie play, which records shots at the rate of 10 frames a second — but again, at a low resolution. These shots can be played back as (rather jerky) QuickTime movies.

PCW DETAILS

★★

Price *£499.99 (£425.52 ex VAT)*
Contact *Casio 0181 450 9131*
www.casio.co.uk
Good Points *High-resolution images. Movie play feature.*
Bad Points *No external memory. No optical zoom.*
Conclusion *Poorly-featured for the price.*

Canon PowerShot A5

With the PowerShot A5, Canon has produced a digital camera that is much closer in look and feel to a traditional point-and-shoot film camera. It's small and neat and bears a striking resemblance to Canon's IXUS ASP camera. A dial on the top and a short menu on the LCD lets you select your options quickly. The PowerShot A5's functionality is limited to date- and time-stamping your photographs and choosing the resolution — either 1024x768 or 512x384.

At the lower resolution and the highest of three levels of compression you can fit an amazing 236 shots onto the 8Mb CompactFlash card supplied. At the higher resolution you can print photographs to A5 size on an inkjet printer, hence the name.

The lens is fixed at the equivalent to a 35mm lens on a 35mm camera. Auto-focus and auto-exposure make it even easier to use. If you half press the shutter button to focus on one object, you can then move the camera, allowing you to focus on an object even if it's not in the centre of the frame. Some people may find the level of nannying annoying, but this camera is aimed squarely at the home snapper, not at business users or photography enthusiasts.

The A5 uses a Lithium battery rather than AA batteries, which lasts longer than conventional batteries but needs a recharger, which comes in the box.

PCW DETAILS
★★★
Price £645.08 (£549 ex VAT)
Contact Canon 0121 680 8062
www.canon.co.uk
Good Points Small, neat, easy to use.
Bad Points Not much more than a point-and-shoot.
Conclusion Fun, but picture quality isn't great.

Epson PhotoPC 700

Epson is not a company you might associate with photography, but it is keen to embrace the idea of digital imaging. Not surprisingly, the PhotoPC 700 will print directly to all of Epson's photo printers, and some of its small business printers, without the need to boot up your PC. Not only can you print directly in the 4x6in format, but also 5x7in, contact sheets and photo stickers.

Following on from last year's PhotoPC 600, the 700 represents a number of improvements rather than a complete overhaul. The resolution is up to 1280x960 pixels, with two levels of compression. You can also shoot at 640x480 resolution, notably when you use the 2X zoom. There is even an option to shoot in black-and-white.

At the highest resolution and least compression you should be able to fit 40 shots on the 4Mb of internal memory. However, the 700 also has a CompactFlash slot, though no cards are supplied as standard, so you can expand the memory in future.

There is still an LCD and a viewfinder, but the viewfinder now has a crosshair in the middle and lines at the corners to help you line up your shots. The lens is equivalent to a 36mm lens on a 35mm camera, but there is an adapter on the front which allows you to fit other, Tiffen lenses, sold separately.

PCW DETAILS
★★★★
Price £587.50 (£500 ex VAT)
Contact Epson 0800 289622
www.epson.co.uk
Good Points Panoramic mode (1280 x 480), continuous shot.
Bad Points Digital zoom only.
Conclusion Excellent picture quality at a reasonable price.

Fuji DS-300

Fuji supplied two cameras suitable for this group test, but in terms of aesthetics they couldn't be more different. Next to its slinky, silvery MX-700 companion, the DS-300 looks unappealingly angular and chunky. The DS-300 isn't aimed at gadget-heads or even people who quite like cameras and have some spare moolah to throw about; at £1500, it's really for those who make their living from photography.

Capable of two resolutions, 640x480 or 1280x1000, and four types of compression (from "Basic" compression of 1/16 JPEG to an uncompressed "Fine" TIFF file), the DS-300 is fitted with a 10Mb PCMCIA memory card that can fit straight into a notebook. There is an optical as well as X2 digital zoom option, with the Fujinon lens offering the equivalent of a 35mm-105mm lens on a conventional 35mm camera.

Given that the user has total control of the shot, from the white balance to the shutter speed, as well as being able to choose the file size and whether to take a colour or b/w shot, it takes a while to find your way around the wealth of functions, as user-friendly as the controls are. There is an extension unit that attaches to the base of the camera, making it even heftier, but there is a SCSI interface on the extension unit for faster file transfer times if hooked up to a SCSI port on a PC.

PCW DETAILS
★★★★
Price £1756.63 (£1495 ex VAT)
Contact Fujifilm 0171 586 5900
www.fujifilm.com
Good Points Excellent functionality and picture quality.
Bad Points The size of the camera and its price tag.
Conclusion A good bet for the professional.

Fuji MX-700

The MX-700 is a clear indication that companies are now marketing digital cameras as highly desirable pieces of kit. Coated in a silver matt finish, the MX-700 combines thorough functionality with impressive miniaturisation. Equipped with Fuji's own Fujinon lens, with a focal length equivalent to a 35mm lens on a 35mm camera, the MX-700 has two set resolutions: the lower takes pictures at 640x480 pixels, the higher at 1280x1024 pixels. While there isn't an optical zoom, there is a digital zoom capable of 2X magnification. However, we couldn't help thinking that a lens cap might have proved worthwhile to protect the integrity of the lens. In some reviews of this camera, the controls have been criticised for being fiddly. We liked the rotating dial on the top right of the back of the camera, and the four buttons over the LCD aren't easy to confuse. The dial is perfectly placed if the camera is placed in the right hand because the thumb rests naturally on the dial. The same dial can be used to select which photos to preview on the LCD. The LCD is excellent, bright and clear, and there is an option to switch it off and use the small viewfinder in order to save the batteries. The only real drawback is the amount of memory that comes in the SmartMedia card, a mere 2Mb that can't store more than two or three images at the highest resolution.

PCW DETAILS

★★★★

Price £649.99 (£553.19 ex VAT)
Contact Fujifilm 0171 586 5900
www.fujifilm.com
Good Points All your chums will want one.
Bad Points All your chums will want to play with it.
Conclusion The choice of the FHM reader.

Kodak DC220

The DC220 follows closely on the heels of the DC210. Like the DC210, the 220 has a 2X optical zoom and two resolutions: 1152x864 pixels and 640x480 pixels, with three levels of image compression. The lens on both is equivalent to a 29-58mm lens on a 35mm camera. However, the difference between them is in the finer detail. The 220 also has a 2X digital zoom [see p233 for more on digital zoom] and an 8Mb, rather than just 4Mb, CompactFlash card which stores 26 images at the highest resolution and the least compression. The design of the DC220 has obviously been carefully considered: there are nice touches like a lens cap, a double cover over the four AA batteries, and indentations which make it easier to hold the camera without getting your fingers in the way of the lens. The buttons and the multicolour menu system are easy to find your way around, and to make it seem more like a film camera, it clicks and whirrs when you take a shot, as if the shutter is snapping and the film winding on. Like the DC260, it also has a time lapse setting and burst mode settings, both of which let you take pictures at designated intervals.
Other points are less well thought out, though, notably the zoom button which can be hard to adjust to the desired degree.

PCW DETAILS

★★★★

Price £699 (£594.90 ex VAT)
Contact Kodak 0800 281487
www.kodak.com
Good Point Well designed, generally easy to use.
Bad Point Zoom hard to position correctly.
Conclusion A smart point-and-shoot camera.

Kodak DC260

This is an enhanced version of the DC220 save that, curiously, it lacks that model's macro mode for close-ups. Kodak claims it is the first sub-£1000 camera with 1.6 megapixel sensor, giving a resolution of up to 1536x1024 in 24-bit colour — enough for high-quality 8in by 10in prints. The extra pixels also give more scope for cropping because you can halve the area and still have a full-colour full-screen VGA image.
The DC260 offers a 3X rather than 2X zoom, with a 2X digital zoom kicking in automatically to give a total 6X. You can opt to use external lighting rather than the internal flash, and to focus onto a single point, a general scene, or at a specified distance. The bundled 8Mb CompactFlash card can store around 16 hi-res pictures. Transferring them to a PC can take half an hour or more via a standard serial port, or a few seconds via the alternative USB. A fast infra-red port is also provided, and you can view pictures through a TV.
A script language allows you to configure both the 260 and 220 for specific tasks, and even create wizards to guide users via the rear LCD panel. You might, for instance, use a script to take "bracket" shots at two or more f-stops to ensure a good exposure. You need a CompactFlash drive to load a script.

PCW DETAILS

★★★★★

Price £899 (£765.11 ex VAT)
Contact Kodak 0800 281487
www.kodak.co.uk
Good Point Desirable, versatile and smart (in both senses).
Bad Point A dollar equals a pound, judging by the US and UK prices.
Conclusion Shows the digital camera at last approaching the quality, features and value taken for granted in good traditional cameras. Expect prices to fall.

Nikon Coolpix 900

Rotatable camera lenses are all the rage nowadays, and Nikon has fitted an eyecatching lens to the side of the Coolpix 900 that can swivel through 270 degrees. Matt silver finish is obviously *in* this season for mega-pixel digital cameras, and the Coolpix 900 is a great example of an attractive gadget that everyone will want to play with.

It offers both optical and digital zoom, with a lens equivalent to a 38-115mm lens on a 35mm camera. The CCD can take photographs of resolutions up to 1280x960 pixels. The 4Mb Nikon CompactFlash memory card, meanwhile, can store up to six pictures at the fine setting, 12 normal and 24 basic, and optional extras include memory cards with up to 24Mb of memory.

The Coolpix 900 is one of the few cameras not to come with a power adapter connection cable to enable the user to save battery life. The camera takes four conventional AA batteries and there is no recharger, so you must simply buy new batteries when they run out. There is a "Premium" pack available for an extra £100 that includes the power adapter and 12Mb memory card.

On the other hand, the 900 had some of the best software we saw, with NikonView 900 creating a virtual drive, and photos kept there ready to be dragged and dropped like any other Windows file.

PCW DETAILS

★★★

Price £759 (£645.96 ex VAT); *Premium bundle £859 (£731.06 ex VAT)*
Contact *Nikon 0800 230220*
www.nikon.co.uk
Good Points *Great LCD, pictures easily transferred to the PC.*
Bad Points *Rather stingy basic package.*
Conclusion *Would be a contender if the images were better.*

Olympus Camedia C-840L

The worst thing we could find to say about this camera was that it had no zoom, which is hardly a fault and not a criticism. It was small and neat and far from greedy with the batteries, even though we used the LCD instead of the viewfinder to take almost every picture. A snap-shut cover turns the camera on and off and, as well as protecting the lens, is the housing for the built-in flash. External connectors include ports for the power supply, PC interface and PAL video out. The maximum resolution of 1280x960 was one of the highest we have seen in this class and the JPEG images can be electronically protected to prevent them from being unintentionally wiped from the camera. Coming with a 4Mb SmartMedia card as standard, the Camedia is capable of capturing between 9 and 60 images at highest (1280x960) and lowest (640x480) modes, respectively, straight out of the box.

A direct printing option lets you output images to the Olympus P-300E and P-150E printers without a PC, while a "mirror" option allows images to be flipped while still in the camera so that the printed images are suitable for ironing onto T-shirts. The utility software allows users to print single sheets containing up to 30 images for indexing purposes.

The OSD is limited, but the supplementary calculator-style display on top covers all necessary functions.

PCW DETAILS

★★★★

Price £599.99 (£510.63 ex VAT)
Contact *Olympus 0800 072 0070*
www.olympus-europa.com
Good Points *Small. High resolution. Good LCD.*
Bad Points *A little on the pricey side.*
Conclusion *Good camera, but images are too pixelated.*

Olympus C-1400 L

The SLR design of this Olympus meant that it wasn't necessary to use the 1.7in LCD to see exactly what would be in your finished picture. Instead of using a mirror, it incorporates a prism that passes 40% of the incoming light to the viewfinder and the remainder to the CCD. White balancing is automated, while aperture settings range from wide f2.8 and f5.8 to telephoto f3.9 and f7.8. We were impressed by the inclusion of two 4Mb SmartMedia cards, each giving room for 49 standard-quality images at 640x512 pixels but only four 1280x1024 high-quality images using JPEG baseline compression. With a lens equivalent to 36-110mm, it has a 3X zoom. The built-in flash folds down when not in use and incorporates the now almost standard red-eye reduction. A 12-second self timer, meanwhile, let us appear in our own photographs. Exposure was automatic but seven settings allow users to adjust this to suit their particular requirements. Although the camera uses four AA batteries, we soon had to resort to the external power supply. External connections allow for hooking up to Olympus' own dye-sub printer to output images directly at a rather obscure 306dpi without downloading to a PC.

The supplied PC utility software is supplemented by a TWAIN driver for extra flexibility.

PCW DETAILS

★★★

Price £999.99 (£851.06 ex VAT)
Contact *Olympus 0800 072 0070*
www.olympus-europa.com
Good Points *SLR. Direct print to Olympus printer. High resolution.*
Bad Points *Big and heavy. Greedy with the batteries. Expensive.*
Conclusion *It looks impressive, but there are better options out there.*

Panasonic NV-DCF5B

The Panasonic NV-DCF5B and the Coolpix 600 from Nikon are essentially the same camera. However, we chose to review the Panasonic because it comes with numerous add-ons that increase its functionality and, of course, its weight. At first glance this is one of the smallest cameras we have reviewed. The DCF5B has a maximum resolution of 1024x768 pixels at a "fine" setting, and 1136x640 pixels at the "widescreen" setting. The f5 lens is the equivalent of a 36mm lens on a 35mm camera, with an 2X digital zoom. This function can be used to enlarge on pictures already taken and viewed on the LCD.

LCDs represent a large drain on the camera battery, and it's always a good idea to find out whether there's an option to switch them off. The DCF5B allows the user to do just that, and use the viewfinder positioned over the LCD to still take photographs. If you wish to take shots using the "zoom" or "wide" setting, then the LCD will activate automatically to allow you to see the proposed shot.

The DCF5B comes with a lightweight flash that can be screwed onto the side of the camera, plus the Digital Still Camera Station that attaches to the bottom of the camera, which you will need to connect before downloading the pictures you have taken to a PC.

PCW DETAILS

★★★

Price *£549.95 RRP (£468.02 ex VAT)*
Contact *Panasonic 0990 357357*
www.panasonic.co.uk
Good Points *Pocket-sized. Easy on the eye.*
Bad Points *Too many add-ons needed for full functionality.*
Conclusion *A neat little camera, but images dark and lacking in detail.*

Ricoh RDC-4300

Ricoh's former digital cameras were always instantly recognisable by the flip-up LCD screens. The RDC-4300 looks more like a conventional camera, albeit one with a lens that will swivel through 180 degrees. The flash also swivels, but only through 90 degrees, so if you are pointing the camera at yourself to take pictures it will only flash light at the ceiling rather than the subject. However, the image on the LCD screen will automatically right itself to show the image the right way up, no matter what direction the lens is pointing, or indeed which way up the camera is. The zoom lens is equivalent to a 35 – 105mm lens on a 35mm camera. However, the zoom was a little clunky to use on the pre-production model we saw. As we moved the slider on the back, it grated and was a little jerky in its adjustments.

You can record sound with your images, or just sound on its own through a tiny microphone on the camera, so you can add notes to your pictures. You can record up to eight seconds with pictures, although be aware that this will eat into your 4Mb of SmartMedia.

In use the RDC-4300 is very easy to manage. The controls are all well set out and easy to navigate around. The image quality was one of the best we saw from any of the digital cameras in this test, including those costing considerably more. Colour reproduction was excellent.

PCW DETAILS

★★★★★

Price *£599 (£509.79 ex VAT)*
Contact *Ricoh 01782 753355*
www.ricoh.co.uk
Good Points *Rechargeable batteries and recharger as standard.*
Bad Points *Needs a second Lithium battery to record date and time.*
Conclusion *A nice camera to use, with good features and great output.*

Sanyo VPC-X300

Unique to this camera is the four seconds of audio that can be recorded with each photograph. On the downside, this dramatically decreases the number of pictures you can fit onto the standard 4Mb SmartMedia card.

The lens has a fixed optical focal length and is equivalent to a 36mm lens on a 35mm camera. The 3X digital zoom, however, slices off pixels from around the edge of the image in six increments, which takes the resolution down from 1024x768 to 640x480.

Two multiple-shot options will take nine images in rapid succession — at 0.1 second and 0.2 second intervals respectively. These can be played back as AVI files, but as all nine shots are fitted onto one 1024x768 pixels image, the resolution of each shot is very low. It takes a long time for the camera to write images to the card, so unless you are using the multiple photograph option you would not be able to take more than one picture without having to wait. This camera is very easy to use, with the OSD presenting a series of one-step options rather than asking the user to select from a succession of menus. Likewise, the software is friendly and idiot-proof, incorporating a quick download option to dump all images on the hard drive without displaying thumbnails.

PCW DETAILS

★★★

Price *£509.79 (£599 ex VAT)*
Contact *Sanyo 01923 246363*
www.sanyo.co.uk
Good Points *Multiple shots. Easy to use. Audio annotation.*
Bad Points *No power supply. Slow to write pictures.*
Conclusion *Some nice features, but it ultimately failed to impress.*

AGFA
ePhoto 780 (640x480)
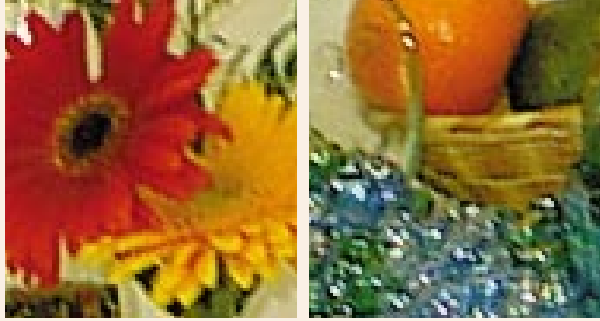
AGFA
ePhoto 1280 (1024x768)
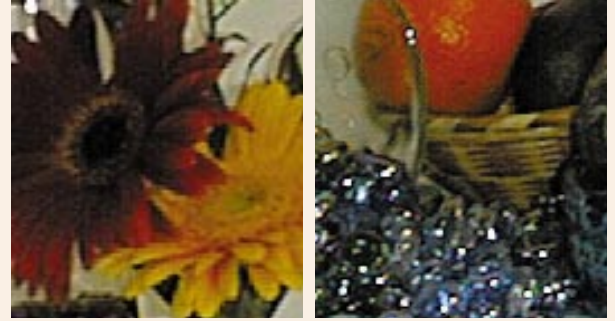
CASIO
QV-5000 (1280x960)

CANON
PowerShot A5 (1024x768)
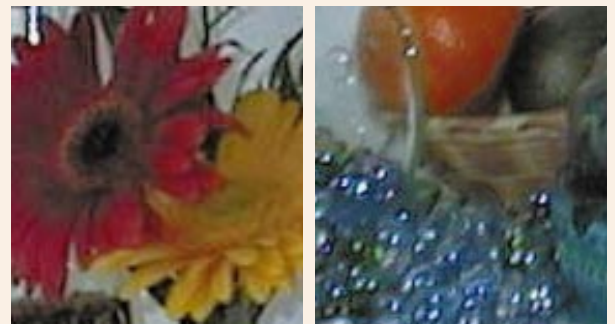
EPSON
PhotoPC 700 (1280x960)

FUJI
DS-300 (1280x1000)

FUJI
MX-700 (1280x1024)

KODAK
DC220 (1152x864)

KODAK
DC260 (1536x1024)

NIKON
Coolpix 900 (1280x960)

OLYMPUS
C-840L (1280x960)

OLYMPUS
C-1400L (1280x1024)

PANASONIC
NV-DCF5B (1024x768)
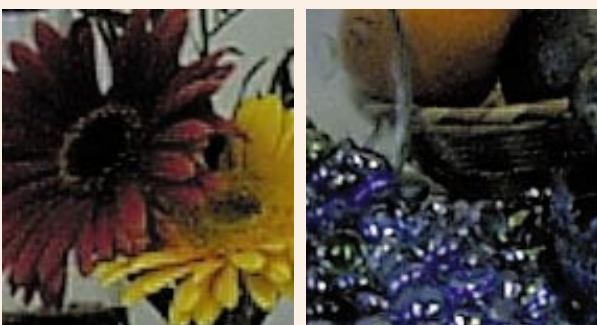
RICOH
RDC-4300 (1280x960)
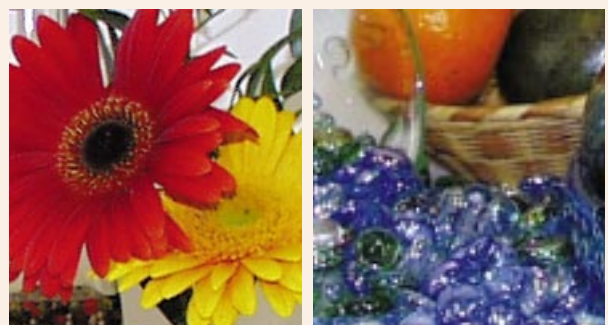
SANYO
VPC-X300 (1024x768)
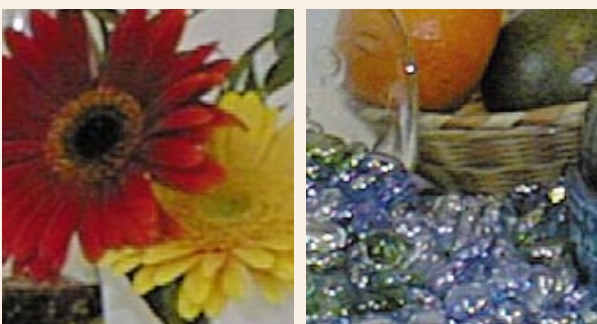
How we did the tests

All the cameras were set to their highest optical resolution [see page 233], with the least compression applied to the images. We used flash rather than photographic lighting as this is how cameras in this price range will most likely be used. As some of the cameras handled exposure automatically and others allowed adjustments to be made, to create a level playing field we took all the images using the default exposure settings. We have published small sections of the shots we took to give a better indication of close-up quality .

group test

Editor's **Choice**

Digital cameras have come a long way in a very short space of time. Here are three of the best.

All too often peripherals are all talk and no trousers, promising the earth but delivering results that are less than impressive. This year's batch of digital cameras, however, has been anything but disappointing. The most noticeable and obvious improvement has been in terms of resolution, which has leapt from an average of 640x480 to mega-pixels in a very short space of time. If this had meant prices going through the roof, we might have been less keen, but prices are little more than they were a year ago.

Image quality is far more important than gadgety extras

Numerous other factors favour this year's crop. More and more have zoom lenses, which increases their adaptability. More include functions to adjust such things as white balance and exposure, ensuring that you have the tools to overcome obstacles such as bad lighting. Add to this advanced functionality, such as the scripting capability on Kodak's DC260, and you have cameras which are much more than fun accessories — they can be a real business tool.

In making our awards, our prime consideration was to pick those cameras which produced the best images. While functionality is an added bonus, good image quality is far more important than gadgety extras. But we also took price into consideration, so there were several cameras which deserve a mention but just failed to win an award. For sheer image quality, the Fuji DS-300 and the Olympus C-1400L were both on a par with our Editor's Choice. The problem is, they are much more expensive than the other cameras in our test. If you have limited means, our other award winners

▲ **KODAK DC260**
▶ **RICOH RDC-4300**

are not far behind them in terms of quality. The first camera to win a **Highly Commended** award is **Epson's PhotoPC 700**. The image quality is exceptional for what is a relatively cheap camera. And although it doesn't have an optical zoom, you can add on third-party lenses. It has a resolution of 1280x960, 4Mb of internal memory with a slot for CompactFlash cards, and panoramic and continuous shot modes. It gives you the basics for a good price. The second **Highly Commended** award goes to the **Ricoh RDC-4300**. This camera also has a resolution of 1280x960 but comes with an optical zoom lens which can swivel through 180 degrees, as well as a sound-recording facility. Once more, it was the

▲ **EPSON PHOTOPC 700**

quality of its images that really caught our eye. But the **Editor's Choice** has to go to the **Kodak DC260**. Not only did it have the highest resolution, at 1536x1024, a 3X zoom and superb picture quality, but it also far outstripped any other camera in terms of features. Perhaps the most impressive of these was the scripting facility, which lets you set up various types of shots with details such as the resolution, compression rate and exposure settings without having to fiddle around with the menus for ages. You can even automatically place images in pre-specified positions in documents. In other words, it is the shape of digital cameras to come.

Camera **angles**

Digital cameras are strikingly different to traditional film models.

No matter how much manufacturers try to make digital cameras look like film cameras, there are numerous differences between them. First and foremost is the method of capturing the image.

Digital cameras use a CCD (charged couple device), much like that employed by scanners. The CCD consists of a grid of pixels, and the higher the number of pixels, the larger the resolution of the resulting image. So a grid of 1.3 million pixels will translate into an image size of 1280x960 pixels, given that the images created by pixels on the far edge of the CCD are often cropped off.

Each pixel in the CCD has a red, a green and a blue transistor. These are charged when light hits them, so the brighter the light, the higher the charge. This is converted into a digital value, and after passing through a DSP (digital signal processor) to adjust contrast and detail, the data is then sent to the storage medium.

Almost all digital cameras use flash memory, which is small, portable and non-volatile, meaning you don't lose your pictures if the battery goes dead. Most cameras use removable flash memory cards, either in the form of CompactFlash cards or SmartMedia cards. CompactFlash cards can be put into PC Card adapters to download images direct to a notebook. The smaller, slimmer SmartMedia cards can be slotted into what looks and behaves like a floppy drive for downloading direct to any PC. All this makes downloading images much faster than hooking up the camera to the serial port of your PC. Most digital cameras will compress the image before it is stored, and most offer you a choice of two or three levels of compression.

Compressing the image will reduce its size, so you'll be able to fit more images onto your media. However, note that image compression, especially the widely used JPEG format, will affect the quality of the image.

Image sizes can only get larger, especially with the explosion in resolution levels. Last year, only a few cameras pushed themselves over the 640x480 pixels limit. This year, the same amount of money can buy you a camera with double that resolution. Be aware, however, when choosing a camera that some manufacturers in this test, notably Agfa, may quote an interpolated, rather than optical, resolution. Obviously, an image at an interpolated resolution of, say 1024x768, derived from an optical resolution of 800x600, is not going to be as good as an image at an optical resolution of 1024x768.

The advantage of higher-resolution images becomes apparent when you come to print. When outputting to an inkjet printer, you can print digital camera images at as low a resolution as 150dpi and still produce reasonable, and quite large, results. When outputting to a typesetter, as magazines do, you need to budget for 300dpi. By looking at the number of pixels and dividing this by the number of dots per inch you are printing at, you can work out what size your image will finally be. So, for example, an image with a resolution of 1280x960 pixels can be output on an inkjet at 8.5x6.4in and on a typesetter at 4.26x3.2in. When taking your pictures, you are likely to have two ways of setting up the shot — using either a viewfinder or an LCD screen. Both have their disadvantages. As the viewfinder is to one side of the lens, the image you see through it is often just to one side of the image that will actually be captured. LCDs give you a more accurate report of what you will be taking, but are power mad and drain the battery at an

Most digital cameras compress the image before it is stored

▲ FLOPPY DISK ADAPTER
▶ SMARTMEDIA CARD
▼ COMPACTFLASH CARD

alarming rate. As the CCD is minute compared to film — closer to 1/3in than 35mm — the lenses used are much smaller and much closer to the CCD, with a focal length of around 8mm. So lenses are described not in their actual dimensions, but in comparative terms to lenses on 35mm cameras. Many cameras quote "digital zoom" as a feature. Effectively, all it does is take the middle out of the image, cropping off the outer pixels and presenting this as a closer view. As a result, the image's resolution often drops to just 640x480. Some cameras will then try to use interpolation to stretch the image, with mixed results. If your camera is able to take images at resolutions of over 1024x768, you are better off doing the cropping yourself.

Table of features

Manufacturer	Agfa	Agfa	Casio	Canon	Epson
Model	**ePhoto 780**	**ePhoto 1280**	**QV5000**	**PowerShot A5**	**PhotoPC 700**
Price inc VAT	£351.33	£762.57	£499.99	£645.08	£587.50
Phone	0181 231 4906	0181 2314906	0181 450 9131	0121 680 8062	0800 289622
URL	www.agfahome.com	www.agfa.co.uk	www.casio.co.uk	www.canon.co.uk	www.epson.co.uk
Focal length of lens	33mm	38-114mm	35mm	35mm	36mm
Digital zoom?	No	No	Yes	No	Yes
Macro mode	15cm - 40cm	40cm-75cm	10-30cm	9-50cm	10-50cm
No. of pixels in CCD	350,000	810,000	1,300,000	810,000	1,300,000
Max optical resolution	1024 x 768	1280x960	1280x960	1024x768	1280x960
Other resolutions	320x240, 640x480	640x480	640x480	512x384	1280x480, 640x480
Int/ext memory	None/2Mb	None/4Mb	8Mb/None	None/8Mb	4Mb/optional
Memory type	SmartMedia	SmartMedia	Flash memory	CompactFlash	CompactFlash
Images on int/ext mem	None/96	None/60	102/None	None/236	40/Optional
Native file format	JPEG	JPEG	CAM	CIFF	JPEG
Power adapter	Standard	Optional	Optional	Standard	Optional
Video out	NTSC or PAL	NTSC/PAL	NTSC/PAL	PAL	PAL
Image editing software	PhotoGenie	LivePix	QV-Link	PhotoImpact 4,	Hotshots, PageMill

Manufacturer	Fuji	Fuji	Kodak	Kodak	Nikon
Model	**DS-300**	**MX700**	**DC220**	**DC260**	**Coolpix 900**
Price inc VAT	£1,756.63	£649.99	£699	£899	£759
Phone	0171 5865900	0171 5865900	0800 281487	0800 281487	0800 230220
URL	www.fujifilm.co.uk	www.fujifilm.co.uk	www.kodak.co.uk	www.kodak.co.uk	www.nikon.co.uk
Focal length of lens	35mm-105mm	35mm	29-58mm	38-115mm	38-115mm
Digital zoom?	No	Yes	2X	2X	Yes
Macro mode	20-40cm	9-50cm	up to 20cm	No	8-50cm
No. of pixels in CCD	1,400,000	1,500,000	1,037,816	1,597,536	1,300,000
Max optical resolution	1280x1000	1280x1024	1152x864	1536x1024	1280x960
Other resolutions	640x480	640x480	640x480	1152x768, 768x512	n/a
Int/ext memory	None/10Mb	None/2Mb	None/8Mb	None/8Mb	None/4Mb
Memory type	Flash ATA	SmartMedia	CompactFlash	CompactFlash	CompactFlash
Images on int/ext mem	None/227	None/38	None/104	None/90	None/24
Native file format	TIFF/JPEG	JPEG	Flashpix or JPEG	Flashpix or JPEG	JPEG
Power adapter	Standard	Standard	Standard	Standard	Optional
Video out	NTSC/PAL	NTSC/PAL	NTSC/PAL	NTSC/PAL	NTSC/PAL
Image editing software	None	PhotoDeluxe 2.0	PhotoDeluxe	PhotoDeluxe	PhotoDeluxe 2.0

Manufacturer	Olympus	Olympus	Panasonic	Ricoh	Sanyo
Model	**Camedia C-840L**	**Camedia C-1400 L**	**NV-DCF5B**	**RDC-4300**	**VPC-X300E**
Price inc VAT	£599.99	£999.99	£549.95	£599	£599
Phone	0800 072 0070	0800 072 0070	0990 357357	01782 753355	01923 246363
URL	www.olympus-europa.com	www.olympus-europa.com	www.panasonic.co.uk	www.ricoh.co.uk	www.sanyo.co.uk
Focal length of lens	36mm	36 mm - 110mm	36mm	35 — 105mm	36mm
Digital zoom?	No	No - Optical	Yes	No	Yes 3x
Macro mode	10-50cm	30-60cm	3-70cm	8-40cm	20-50cm
No. of pixels in CCD	1,310,000	1,410,000	1,080,000	1,320,000	810,000
Max optical resolution	1280 x 960	1280 x 1024	1024x768	1280x960	1024 x 768
Other resolutions	640 x 480	640 x 512	512x384, 1136x640	640 x 480	640 x 480
Int/ext memory	None/4Mb	None/2 x 4Mb	None/4Mb	None/4Mb	None/4Mb
Memory type	SmartMedia	SmartMedia	CompactFlash	SmartMedia	SmartMedia
Images on int/ext mem	None/60	None/49	None/75	None/71	None/60
Native file format	JPEG	JPEG	JPEG	JPEG	JPEG
Power adapter	Optional	Optional	Standard	Optional	Optional
Video out	PAL	No	NSTC	NTSC/PAL	PAL
Image editing software	Utility software	Kai's Photo Soap	None	DU-4	MGI PhotoSuite

Toby Howard is spooked as computer-generated humans prepare to take over Hollywood.

Breeding like robots

Watch out, there's a Virtual Human about. Or there soon will be. According to the researchers who gathered at the Virtual Humans Conference recently held in California, v-humans may be the future of the human-computer interface and will revolutionise the entertainment industry. Also known as "digital people" or "avatars", v-humans are highly realistic computer-generated

Companies will offer to digitally preserve our dearly departed loved ones and sell us HIGHLY-REALISTIC WALKING, TALKING, DIGITAL GHOSTS

models of people, with faces which lip-synchronise with speech and show emotion. V-humans have only recently become feasible because of the sheer amount of computer power required to render them in real-time. In the movie industry, the use of entirely computer-generated actors, or "synthespians", is becoming big business. Many of the crowd scenes in the movie *Titanic*, for example, used only synthespians — not an extra in sight. But synthespians don't come cheap: the effects company responsible, Digital Domain <www.d2.com>, needed the computing power of a network of 160 433MHz DEC Alpha PCs.

Entrepreneurs have not been slow to realise the financial possibilities of v-humans. Virtual Celebrity Productions, a Los Angeles-based company which creates photorealistic digital reproductions of celebrities, has already signed up with the estates of stars including WC Fields and Sammy Davis Jr. Within three years, says founder Jeffrey Lotman, it will be possible to digitally graft a celebrity's synthetic face onto the head of a live actor so convincingly that it will be impossible to spot the digital fake. "Can you imagine doing a new film with Marlene Dietrich?" asks Lotman.

The thought that the dead can be recreated as digital mannequins is getting Hollywood hot under the collar, as the studios see the enormous commercial opportunities of making movies featuring stars of the past. One such film is already underway: later this year, George Burns

will rise digitally from his grave and star in another sequel to the film *Oh, God!*. But if you create a digital representation of a person, who owns the data? Questions like this are getting the lawyers excited. Nadia Thalmann of Geneva's Miralab was recently prohibited from using the likeness of Martina Hingis in a virtual tennis match against Thalmann's well-known computer-generated model of Marilyn Monroe <ligwww.epfl.ch/~thalmann>. V-human products are already on offer for the home market. Virtual Personalities sells "verbal robots" or "verbots"<www.vperson.com>, while Haptek offers a fully 3D "virtual friend" for your desktop <www.haptek.com>. In time, companies will no doubt spring up offering to digitally preserve our departed loved ones. Supplied with voice samples and home videos from which body shapes and gaits can be extracted, the digital cloners will sell us highly-realistic walking, talking, digital ghosts.

As new display technologies emerge we'll have life-sized portraits hanging on the wall — but the canvas will be an ultra-thin, high-res computer display and the image will be "alive". When the true 3D display finally arrives, capable of creating a solid image anywhere in space, these digital spectres will walk around and sit with us. And then things will get really spooky.

▲ SYLVIE, VIRTUAL PERSONALITIES' 'VERBALLY ENHANCED ARTIFICIALLY INTELLIGENT ENTITY' ▼ NEED A VIRTUAL FRIEND? HAPTEK WILL OBLIGE

VIRTUAL FRIEND 1.0 - Enabler Option

JUST ASK JAKE

Soon, says Roger Gann, you won't be able to tell if it's a person or a machine on the end of the line.

Who said that?

In the next few years we will be chattering away not only to our PCs, but to a whole range of domestic devices – not to mention automated telephone services. When people call their bank, airline reservations centre or even BT, it will be hard to tell if a human is on the other end of the phone line or some fiendishly clever interactive voice-response system. Recently, IBM and Voice Control Systems together announced a range of development tools to further this aim of eventually replacing touch-tone voice systems. The prospects are fascinating. When you call your tour operator to book a holiday, you'll be greeted by an intelligent, computer-based agent. It might use a range of phone voice services, from limited vocabulary applications that recognise every word, to programs able to enter into complex conversations featuring natural language understanding, built-in intelligence and contextual memory. Such programs can improve the efficiency of an automated phone system and make it easier for remote workers to access phone registries, report generators and third-party phone systems. They have a useful role to play in businesses where customer service is critical, such as call centres. And the cost savings can be huge. AT&T's directory service has an automated voice operator that asks a directory enquiries caller "What city? What listing?" before connecting to a human operator. This saves AT&T $200 to $300 million a year in labour costs.

BT has been trialling Brimstone, a prototype corporate directory application, in its Martlesham Heath speech-recognition labs for some time. The system was developed to allow voice access to a subset of the BT corporate internal telephone directory, Interview. This corresponds to approximately 5000 entries, resulting in a vocabulary of about 3000 surnames and 900 first names. The database and associated vocabularies are automatically updated from the central repository. Early research has shown that it may be fruitless to ask the computer to recognise every word and proceed from there to an understanding of what was intended.

A better solution is to let a dialogue system recognise as many words as it can, but formulate its responses on the basis of key words in a sentence. In effect, it looks for the words that convey context-sensitive meaning. Airline ticket booking is one obvious application. A caller can say the same thing several different ways, and still the meaning will be grasped. The system might return prompts such as "Day of travel?" "What time?" and "Which class?", progressively narrowing the focus in a way which makes the dialogue easy for the computer to master.

Speech recognition software can also be used for speaker verification. Voice Control Systems has developed SpeechWave Secure, which can recognise and verify a single, naturally spoken string of digits, allowing any application using continuous digit recognition to add speaker verification without altering the call flow. For example, the identity of telephone banking customers can be verified while they speak their account number, without the need to enter a password or PIN. As a fallback, the system offers a Posi-Ident feature which fires personal questions at the caller if their identity cannot be confirmed by speaker verification alone.

Not surprisingly, the sales prospects for technology of this sort are rosy. According to US analysts TMA Associates, the total value of all speech-based telephony product sales will exceed $11.6 billion by 2001. Most of these sales will be of limited-vocabulary systems. ❏

▲ Soon, when people call their bank or airline reservations centre, it will be hard to tell if a human is on the other end of the phone line or an interactive voice-response system

AT&T's automated telephone directory service SAVES $300 MILLION A YEAR in labour costs

hands on

contents

Welcome to **Hands On**. It may look different, but this section is still the first place to turn if you want more than just news and reviews. This month, we welcome **Cliff Joseph** into the fold. With so many people owning more than one type of machine these days, he'll be taking a look at what's happening in the PC-free world and concentrating on all things Macintosh.

Roger Gann continues to get his hands dirty in the **Hardware** column, but will also be exploring the murky depths of **16-bit operating systems**. Many PCs arrive with Windows pre-installed, so it can be a shock when you find yourself presented with the dreaded C:\> prompt and no idea what to do next. Roger is here to lend a helping hand.

Hands On is not only *for* you, but also *by* you. Email your hints, tips, macros and code to the individual author of each section, or direct to me. If you are new to Hands On and you want to know the sort of thing we're after, then don't forget the two years' worth of Hands On on our back-issues CD-ROM (*see Reader Offers, p306*).

NIK RAWLINSON, *HANDS ON* EDITOR
NIK_RAWLINSON@VNU.CO.UK

PCW Hands On on CD-ROM
Now it's easy to find that *Hands On* tip, trick, advice or review again. There's a whole year's worth of columns on our monthly *PCW* CD-ROM. So if that handy hint is on the tip of your tongue, don't sit and sweat: the answer is at your fingertips with our cover CD.

Lite fantastic

Cubasis Audio Lite SE is featured on this month's cover disc. To help you get the best from this top sequencer, Steven Helstrip presides over a special workshop.

Cubasis Audio Lite SE is based on Cubase, Steinberg's premier sequencer. Over the past ten years Cubase has established itself as the industry-leading package. What started life as a modest MIDI sequencer for the Atari ST has developed into a professional, all-in-one studio solution, providing up to 32 tracks for audio playback with real-time digital effects. If you're new to sequencing or thinking of arranging your own compositions, Cubasis has a wide range of features to get you started.

▲ PLACING EACH INSTRUMENT ON ITS OWN TRACK GIVES YOU THE FREEDOM TO CHOP AND CHANGE THE ARRANGEMENT AS THE SONG DEVELOPS
◄ THE INSTRUMENT EDITOR (CTRL-Y) IS COMPATIBLE WITH GENERAL MIDI, GS AND XG SYNTHS. YOU CAN SELECT INSTRUMENTS FOR EACH CHANNEL, APPLY EFFECTS AND BALANCE THEIR LEVELS

What you get

● **The main arrange window** looks and feels similar to Cubase and provides two channels for audio and up to 32 tracks for MIDI. One of the attractions of the Cubase range is its ease of use, partly due to its intuitive arranging tools and seamless integration of audio and MIDI.
● **Recorded parts, or clips**, can be treated equally in the arrange window, from copying and moving parts around, to splicing and joining parts together.
● **One of the limitations of Cubasis** is that there is no Piano Roll editor, which leaves just two editors at your disposal: Score and List. If you're used to working with traditional notation, Score edit will probably be the better choice for you.

● **Notes can be inserted on a stave** with the click of a mouse and are just as easily removed or altered. You might decide, say, to change a note's pitch, length, or the velocity at which it is played.
● **List edit is less graphical** and slightly trickier to use, although with a bit of practice you can still get most jobs done, from inserting MIDI events to fine-tuning your performances.
● **MIDI data is presented sequentially** in a list format. Perhaps the greatest advantage of this style of editor is that all types of MIDI data can be displayed and edited, from basic note-on and sustain pedal information, through to more complex controller and system-exclusive events.
● **Once you have recorded** a performance, basic quantising is available, from the Functions menu,

to let you fix any timing errors. It works by shifting notes to the nearest subdivision in a musical bar. The number of divisions is determined by the quantise resolution, which is set with a pop-up menu common to all windows. The resolution is selectable between a whole bar, right down to a 64th note. Triplet and dotted values are available, too.

What you need

Cubasis works with any 16-bit Windows-compatible sound card, enabling audio playback through the wave device and MIDI tracks via the internal synthesiser. To record MIDI into Cubase you need a MIDI controller such as a keyboard [Fig 1]. This can be hooked up to your sound card's joystick/MIDI connector, or via a dedicated MIDI interface.

▲Fig 1 If you need a **MIDI** controller keyboard, Evolution has five products in its range starting from **£35** (ex VAT). The **MK-149**, shown here, is a full-size four-octave keyboard with assignable modulation and pitch-bend wheels

You don't need a whizzy PC to get started. The minimum suggested specification is a 486DX/66 with 16Mb RAM, although you'll need a large hard disk to store audio files. (See "More about audio", page 244.)

Setting up

After installation, one of the first things to do is to optimise the audio settings for your sound card, to ensure that audio and MIDI tracks are tightly synchronised.

1 LOCATE THE CUBASIS FOLDER in the Start menu and run the Sync Test utility. When you hit the Start button, the program automatically detects the DMA block size for your sound card's record and playback wave devices. Unless you install a new sound card, you need only do this once.

2 TO ALLOW AUDIO AND MIDI tracks to be heard simultaneously, ensure their levels are set to maximum in your sound card's mixer applet. If you do not plan to record audio from an external source, such as a CD player or microphone, mute the mic and line inputs to keep noise levels to a minimum. If you have an AWE-64 sound card there's further tweaking to be done. The AWE-64 features a software-based synthesiser that uses the card's audio channel to play back its instruments. When this channel is in use, Cubasis will not be able to access your sound card properly and will report an error on loading.

3 USING THE SETUP MME program, which can also be found in the Cubasis folder, the softsynth can be disabled: in the MIDI output section, select the WaveSynth and AWE MIDI Mapper drivers in turn and hit the Inactive button. You will need to restart your PC for the effects to take place.

4 THE SETUP MME PROGRAM enables you to rename and set the order in which MIDI devices appear in Cubasis. The rename facility is particularly useful because, rather than selecting, say, SB16 MIDI Out (330) to play the instruments on a WaveTable daughterboard, the device can be given a "real" name, like DB50XG. If the same MIDI port is the one you're likely to use most frequently, set this as your primary device using the move up and move down buttons.

Keyboard shortcuts

Keyboard shortcuts are invaluable in Cubasis. Perhaps the most important and most frequently used are those to operate the transport controls. Using the numeric keypad, these are:

Play	Enter
Stop	**0**
Rewind	**Page down**
(shift)	
Fast forward	**Page up (shift)**
Record	*****
Go to left locator	**1**
Go to right locator	**2**
Cycle on/off	**/**

More useful shortcuts available in all windows:

Quantise	Q
Quantise and	
snap resolution	**1 to 6**
Solo	**S**
Metronome	**C**
Horizontal zoom	**G/H**
Vertical zoom	**G/H (shift)**

Cu-basics

When Cubasis loads, you're presented with the Arrange window [Fig 2, page 244]. This is where most recording and arranging takes place.

● **The screen is divided** into two sections: on the left is the track list and track info column, and to the right is the part display. The default arrangement contains 18 empty tracks: two for audio, and 16 for MIDI.

● **The MIDI channel for any track** can be changed at any time by clicking in the Chn column. It's worth noting at this point that all values in Cubasis are decreased with the left button and increased with the right. This goes against standard Windows conventions, but makes logical sense.

● **To the right of the channel column** is the MIDI output, or port, assignment. Most sound cards have three ports to select either the main WaveTable synth, the FM synth or an external MIDI device. Unless you have an external tone module, select the WaveTable output for the highest-quality playback.

● **The track info column** on the far-left of the screen enables you to select an instrument for each track using bank and program change parameters.

● **There are three more parameters**: Volume, Transpose and Velocity. Volume doesn't need much explaining, apart from the fact that values can be set for the whole track or individual parts. If no parts are selected (i.e. highlighted), values are applied to the whole track. Transpose enables you to shift the pitch of instruments up or down in semi-tone steps. If your keyboard has only two or three octaves, Transpose can be used to reach notes beyond its range. This is particularly useful when working with percussion and drum kits on MIDI channel 10, since each key has a different instrument assigned to it. ➡
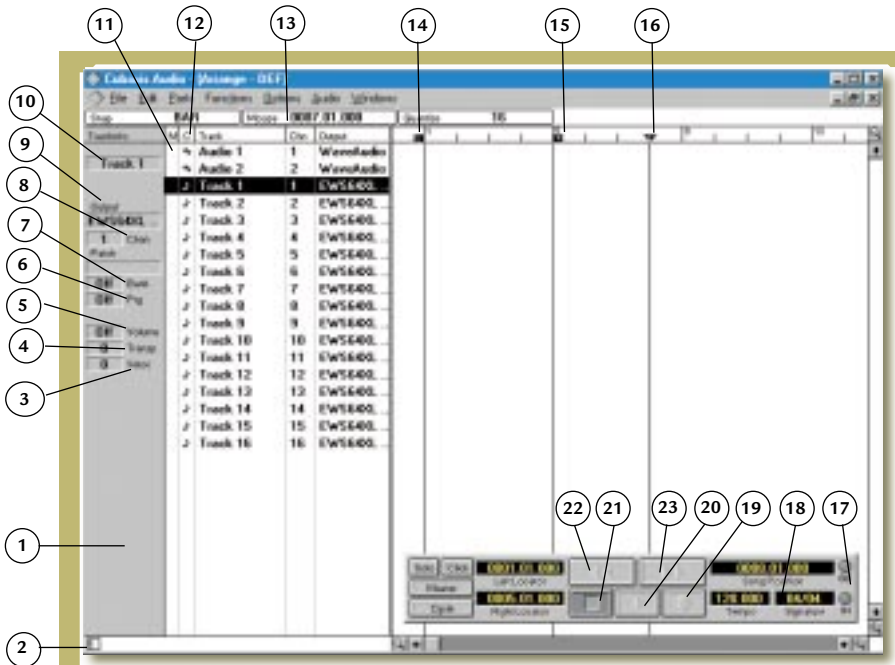
FIG 2

1 TRACK INFO COLUMN	**12 TRACK CLASS: MIDI OR AUDIO**
2 TRACK INFO COLUMN HIDE/DISPLAY	**13 CURRENT MOUSE POSITION**
3 VELOCITY OFFSET	**14 LEFT LOCATOR**
4 TRANSPOSE OFFSET	**15 RIGHT LOCATOR**
5 TRACK/PART VOLUME	**16 SONG POSITION POINTER**
6 PROGRAM SELECT	**17 MIDI ACTIVITY DISPLAY**
7 BANK SELECT	**18 TIME SIGNATURE**
8 MIDI CHANNEL	**19 RECORD**
9 MIDI OUTPUT	**20 PLAY**
10 TRACK NAME	**21 STOP**
11 CLICK IN THIS COLUMN TO MUTE A TRACK	**22 REWIND**
	23 FAST FORWARD

The key to efficient programming is in mastering the tools that are available in the arrange and edit pages. To bring up the toolbox at any time, click and hold your right mouse button while using the cursor to select one of the available tools. In the Arrange window, these include an Eraser to delete parts, Scissors to cut or splice parts, a Magnifying Glass to audition parts, a Pencil to lengthen or shorten phrases, and the Glue tool for joining parts together.

Pencil and glue

Many of the tools carry out different tasks when used with the Alt key. For example, extending a part with the Pencil creates copies, and the Glue will join up every part on the track. Try them all — they offer some valuable shortcuts. Different tools are available in the edit pages. Score provides three icons to insert notes, rests and text objects. List has a paintbrush for inserting a series of events.

More about audio

It is possible to record and playback audio on more than two tracks in the arrange window. But because the system is limited to two channels, only two tracks can be heard simultaneously. If two audio parts assigned to the same channel overlap, the part that starts furthest to the right of the screen will always take priority. The quality of audio recordings depends largely on the quality of your sound card, not the software. However, recording at the highest sampling rate (44.1kHz) will produce the best results. This is selected from the Audio menu. Note that one minute of stereo audio recorded at 44.1kHz stereo will eat into 10Mb of hard-disk space. Recording in mono, or lowering the sampling rate to 22kHz, will reduce this by half.

Velocity describes how hard a key was struck. In most cases, this can be used to increase or lower the volume of a part, or track.

● **Before you can record** into Cubasis you first have to set the bars, or measures, where you want to record to. Click on the bar ruler with your left and right mouse buttons. Alternatively, pressing L and R opens the locator boxes shown on the transport bar.

● **Each part is given the same name** as the track on which it is recorded, so it pays to label your tracks before you reach for the red button. It is not uncommon to use 20 or more tracks in a song, and when nothing's labelled properly the parts in the arrange window become tricky to work with. When cycle mode is activated on the transport bar, Cubasis will loop between the left and right locators, which is useful for building-up complex drum patterns or for "jamming" over the chorus

section until you're ready to record. The internal metronome is referred to as the "click track" in Cubasis. To toggle between on and off, press C.

Try all the tools available— they offer some valuable shortcuts

● **Audio is recorded** in much the same way as MIDI parts. However, you may want to import a sample that's already stored on your hard disk. To do this, create an empty part on an audio track (Ctrl-P) and double-click on the part. This opens the import sample dialog. Any audio files that are used in an arrangement are stored in the audio pool, which can be found in the Audio menu. Files can be dragged straight into the Arrange window from here, or removed from the song altogether.

PCW CONTACTS

Steven Helstrip *can be contacted via the PCW editorial office (address, p10) or email* sound@pcw.co.uk

Evolution *01525 372621*

Balancing act

MYOB is free on our cover disc this month. It's a friendly financial package that takes the drudgery out of business accounting. John Rennie takes you through the on-screen tutorial.

MYOB (Mind Your Own Business) takes you one step beyond personal accounts packages, to provide a complete accounting system for your business. It can produce records and documentation that will keep both your accountant and the Inland Revenue happy. But you need to familiarise yourself with a few basic terms before you get started. Once you've done so, running through the dummy book-keeping procedures of Widget Ltd, which serve as the MYOB on-screen tutorial, will equip you with all you need to set up MYOB to handle your own company's accounts. And, if you're blinded by figures, don't worry. Beneath all the accounts and bookkeeping jargon is merely the use of addition, subtraction and multiplication.

Firstly, you need to know the structure of your company's financial year. In which month does it begin and end? It won't necessarily begin on 1st April along with the Inland Revenue's. Establish whether you need an extra accounting period built-in to cope with transactions at your year-end. You may want to set expenses occurring after your year-end against your income in the year that's just finished, for example. Which month will you start using MYOB to record your accounts? This will be known as your conversion month. What are the balances of your accounts at the start of this conversion month? This can be tricky to establish because unfortunately, customers don't all conveniently pay by the first of every month. But don't worry, your accountant will know the answers to all these questions.

Okay, those are the basics as they apply to your business. You also need to understand the fundamental accounting terms. First, let's grasp the six basic types of account: assets, liabilities, capital, income, cost of sales and expenses.

Assets are all the things your business owns: the cash you hold in your accounts, your stock, furniture and fittings. If Smith Ltd owes you £100 for work or goods you've supplied, that is an asset, too. On the other side of the sheet are **liabilities**: all the money you owe, whether in loans, on credit cards, unsettled bills and so on. Subtract your liabilities from your assets and what you have left is your **capital**. **Income** is any money you receive for products

Hard information that will satisfy your accountant and the tax man

and services you sell. **Cost of sales** covers the price of your raw materials and wages — all your major variable business costs. And the rest of your costs are the **expenses** — your postage, rent, rates and the rest.

These figures are combined to paint a picture of your firm's financial state. Assets, liabilities and capital come together to form the **balance sheet**, a snapshot of your financial position at a certain date. The bigger picture, the **profit and loss account**, is constructed from the income, cost of sales and expenses over a fixed period (a month, a quarter or a year). This is the infamous **bottom line**, and tells you whether your business is in profit or not.

Getting going

Let's run through the Widgets Ltd tutorial, which will cover all the accounting procedures you'll need. Then you can apply the lessons to your own business. Once you've installed MYOB, launch the program and the Welcome to MYOB window appears. Click on Opening an Existing MYOB Data File. Select TUTORIAL.DAT and the Command Centre Window [Fig 1] will be displayed. To get Widgets Ltd in business, we need to rustle up some capital. Your friendly bank manager has stumped up £30,000, enough to rent premises, buy materials and take on staff. Let's put this working capital on deposit.

1 CLICK THE CHEQUEBOOK button in the Command Centre. (*Notice the flowchart which appears. This convention runs throughout MYOB and not only makes the package easy to use, but simply and graphically teaches you how companies work.*)

2 HIT THE Make a Deposit button and you will be taken into General Bank Account. Your cursor is in the Date field. Type in "1/1/97", tab down to Amount and enter "£30000".

3 TAB TO MEMO and enter "initial funding of company". Tab to Allocation Account [Fig 2], hit tab again and you'll be given a choice of accounts.

◄**FIG 1** EVERY FUNCTION IN **MYOB** BEGINS AT THE **COMMAND CENTRE**

VAT. Click Record and your rent transaction is logged as part of your profit and loss account. You can follow the same procedure for buying office furniture and for other expenses. Always select "Supplier" as your card type and establish whether the goods or services you are buying are VAT payable or not.

Stock

The business of Widgets Ltd is buying widgets and selling them at a profit, so we need to buy a stock of widgets.

1 **BACK AT THE CONTROL CENTRE** window, hit Stock Control [Fig 3] then Items List. Click New: the window that pops up is your method of booking-in items of stock.

4 **CLICK OK** to get back to the Write Cheques window. The name of the landlord will be highlighted: hit tab and his details will be filled in automatically.

4 **DOUBLE-CLICK** on Paid in Capital. You'll be returned to the Make a Deposit window, where all your start-up details are now entered.

5 **YOUR OPENING BALANCE** is highlighted so type in "£30000" once more and hit tab. Blank out the figure in the VAT field, then click Record and Cancel. You're now back in the Control Centre and ready to start things rolling. If you were to view your balance sheet at this point it would show that you have capital of £30,000 (as yet, of course, you have no profit and loss account).

Office rent

Right, now we've got the capital, we need to rent some office space.

1 **BACK IN THE CHEQUEBOOK** section of the Command Centre, hit the Write Cheques button [Fig 4].

2 **GO TO THE AMOUNT FIELD** and type in "£1000". Enter the name of your landlord in the Card field.

3 **TABBING FROM HERE** will take you to a blank form where you can permanently enter your landlord's contact details. Click New and the card index will pop up. Tab from field to field, entering phone number, fax, address and so on. Be sure to select Supplier as the Card Type in the pop-up window at the top of the card.

5 **TAB TO MEMO** and key in a description of the transaction: for example, "first month's rent".

6 **TAB TO ALLOCATION** Account, then tab again. Double-click on Rent and again you return to the Write Cheques window.

7 **KEY IN "E"** in the VAT column to indicate that your rent is exempt from

2 **CLICK IN YOUR ITEM NUMBER** (we'll use 100-101A5 for this particular stock item) and tab to Name ("widgets" in this case).

3 **THE ITEM INFORMATION** window you're working in is used to track all your stock movements, so it includes all the information about buying, selling and stocking widgets. To activate these three elements of your stock control, click the three check boxes at top right: "I Buy...", "I Sell...", "I Stock...". MYOB will automatically link these accounts, so whenever you buy or sell widgets, your overall stock level will be adjusted.

The profit motive

Balance sheets aren't called balance sheets for nothing, so when you spend £500 on a new stock of widgets the total

in your assets column won't change: the £500 will simply shift from your bank account to your stock total. And neither do profits come out of thin air, so for every sale you make there will be a corresponding debit in your stockholding which will be added to your "cost of sales" total. Hopefully, the revenue you take in from sales is greater than the cost, and that's called profit. This simple but fiddly balancing business is what MYOB does for you automatically, transferring values between the various accounts.

Let's say you want to buy 100 widgets from World of Widgets. Go back to the increasingly familiar Command Centre window and hit Purchases.

1 **CLICK THE PURCHASES** button. When the Purchases window pops up, hit Type then select Item. Click OK.

2 **YOU NOW TYPE** "World of Widgets" into the Supplier field and tab out. MYOB won't recognise the company as it's a new supplier, so just click New and we return to the card file entry last seen when we were renting our office space. Just follow the same procedure and hit OK. This takes us back to the purchase order window, with World of Widgets highlighted as the supplier.

3 **TAB TO THE RECEIVED FIELD**, type "100" and tab on.

4 **PRESS TAB TWICE:** the selection window is displayed with the first item highlighted. Double-click on "widgets" and you're taken back to the purchases window with the item number "100-101A5", you'll recall, filled in.

5 **TAB TO PRICE,** type in "£9.50" (the unit price of a widget) and MYOB will work out the total cost, the VAT and the balance due. You can also tab down to Comment and enter any special instructions to your supplier, such as "Don't deliver Mondays", "Phone before delivering" and so on.

6 **HIT PENDING,** then Cancel to close the window. No money has changed hands, but the purchase order is in a pending file waiting for the delivery of your goods. When they arrive, you will Record the order and it will become an accounting event.

Paying for the goods

Now your widgets have arrived, it's time to pay up. Go to Command Centre.

▶ **FIG 5** BALANCE SHEET SHOWS AT A GLANCE HOW YOUR BUSINESS IS DOING

1 **HIT PURCHASES,** then the Purchases button. Hit tab, and a list of suppliers will be displayed.

2 **DOUBLE-CLICK** on "World of Widgets" and a list of your logged purchase orders will pop up. Double-click on your pending widget order and the Purchases window will pop up again.

3 **HIT RECORD** and your first order is logged. Everything comes back to the Command Centre, including sales.

Handling customers

You've got the stock, so let's get some revenue into the company. Widget Eaters has offered to buy widgets at £25 apiece (a gross margin we're unlikely to attain in the real world, but widgets are scarce).

Hit Sales and then the Sales button on the flowchart. Type your customer name into the Customer field, which will be highlighted as you enter the window.

The rest is straightforward: you click the New button and it's back to the Card File Entry system we've used to log our suppliers. Once that's filled out, OK will bring you back to the invoice window.

One note of caution: make sure you have Item Invoice selected. You can fill in the rest of the details as shown and hit Record to submit your invoice.

The bottom line

From here on, matters are much easier. As you buy more stock and fill more orders you will encounter pre-filled fields, so there is no need to re-enter the information for Widget Eaters, your landlord and your suppliers.

As you sell widgets to different customers at varying discounts and buy stock at various prices, MYOB will calculate the overall costs and revenues and calculate your balance sheets and profit and loss account accordingly.

Where MYOB will help you is in the numerous reports it provides about your business. The two we're interested in are the balance sheet (the snapshot of your firm's standing on a certain day) and the profit and loss account (the bottom line at the end of the accounting period).

1 **CLICK INTO** the Command Centre window, highlight Nominal Ledger and go to Index to Reports under the Reports menu. You'll be given an exhaustive list of report options on your business (we've taken the example of the balance sheet to show you how the ins and outs of the firm have been accounted for so far [Fig 5]). These can be printed out for an instant rundown of your company's state of health.

Money management

In our examples we've brought in a lot of information and detail which you may not be interested in mastering. But that's okay; as long as you've been fastidious about entering every expense and every item of income (a discipline you should be maintaining anyway) MYOB will collate the data for you. And it's hard information that will satisfy your accountant and the taxman.

Speed ills

56K modems? Pah! They don't work at that speed. In the US, dual V.90 modems will boost your connection speed to 112Kbps. Nigel Whitfield reviews the need for speed on the net.
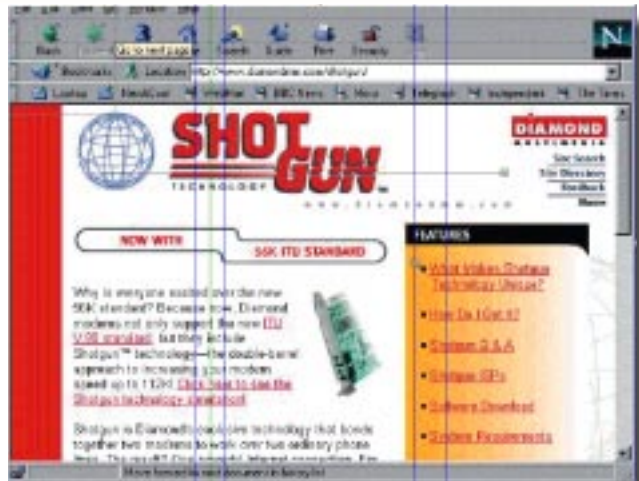
Y ou may have thought a 56K modem was more than fast enough, but there are already plenty of people who are trying to push modems ever faster. If you have an ISDN line, you may be used to the concept of channel bonding, where instead of using one 64K link, you can use two and get double the speed (for the cost of two phone calls). In fact, the same trick is performed with my own internet connection. Most of the time it relies on the permanent line to my office, but when that exceeds 95 percent capacity, the ISDN comes on stream to double the link. The latest modems in the US, from the likes of Diamond, are not just V.90. They're dual V.90 with two phone leads, and use two lines to bump up the connection speed to 112Kbps. If you have a call waiting on one line, it will even dynamically disconnect one of the lines to your ISP when someone's phoning you, and reconnect afterwards. Ship a few of these to the UK, swap to a cable operator that charges you the same for two lines as BT does for one, and who needs ISDN?

GET YOUR MODEMS ON THE WEB: FROM COMPANIES LIKE SHOTGUN TECHNOLOGY ▶ OR ALTERNATIVELY HOOK UP WITH ISDN ▼

Flat on its face

For the most part, many people will find that the biggest difference they see is not in download times but in the number of trees used to print their phone bills, now with double the call costs. Okay, so you might have a 56K modem now; but how often do you see flat-out download speeds? And how often do you sit there thinking "2.8K per second isn't great, is it?" I'll bet the latter is rather more likely.

Of course, you're welcome to spend the money if you like, but think how much of what you download really is needed and how much is bloat. What about those massive graphics on web pages where a font change and plain text would do? Or huge updates to further bloat the size of your web browser? Sure, you need some of it;

but what you probably need just as much is fast access to the information that's really important, whether it be games, research, or anything else. And using two phone lines, or dual-channel ISDN, isn't going to make that arrive much faster until something else happens.

It's time for internet providers (few of which make much profit out of domestic customers) to look at providing more value to their business users. Rather than tossing 5Mb more web space at people who pay a tenner a month, the needs of many might be better served if the charges levied for fixed connections were lower. A fast connection at home

ISPs should provide more value to their business customers

may be fine, but if the companies and organisations running the web servers you want to access have to pay around £500 every month for a permanent net link that only runs at 64Kbps, you will never download files quickly from them, will you? Speed does matter on the internet, but not just when you're the wrong side of a modem. If surfers have to stay online longer to see the information they want, while information providers are paying a fortune for links barely faster than a single modem, is that really sound economics for anyone concerned, including the providers? ➡

Questions & *answers*

Q Can I connect to the internet without getting an ISP? As a student, I find that the phone line costs enough without the monthly charge from an ISP.

a *For most people the answer is a straightforward "no". The internet is a collection of networks, which pass information between them. An ISP operates one of those networks and, for a fee, provides access to it. But there are two avenues worth investigation. The first is a service that BT plans to launch later this year. You'll pay by the minute (no subscription) but that may prove expensive for heavy use. The second option is to find out what facilities are available where you're studying. Many universities have some form of dial-up access which can be used to connect to the net, but you'll have to contact the appropriate people and ask them if there is a service you can use.*

Q I've discovered a good (freeware) program called Catch-up. It tells you if there are any updates available for the programs you are using. It informed me that Rvplayer and Raplayer files could be updated to version 5 (I don't know where these files came from: part of Internet Explorer, I think). Anyway, I downloaded the update and ran it. It would appear to have removed Rvplayer and replaced it with realplay.exe. But the Raplayer file still exists as version 2.1. Is this program required, or, in the update from 2 to 5, has Realmedia changed both the default location and filename, thus leaving redundant files around?
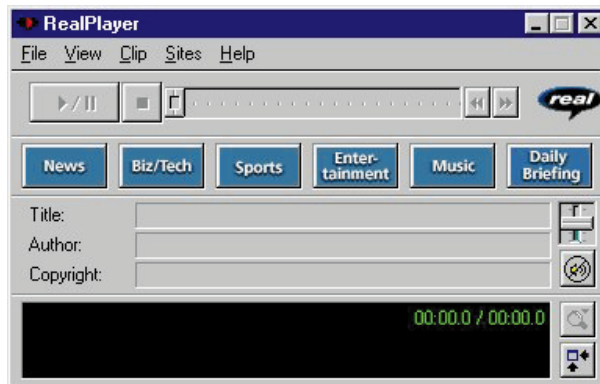
a *These files are part of the Real Audio and Real Video systems which are used to enable you to hear sounds or watch videos over the net without having to first download the whole file. It uses a technique called streaming. There used to be two separate programs, one for video and another for audio, but with the latest version they've been combined into one RealPlayer, the file realplay.exe. You can safely remove Raplayer from your system.*

Q I need to identify the email address of callers to my web site, so I tried using the Server Side Include technique you talked about in your January column, but with no luck. AOL said this was a "coding" issue and outside the rules of its support line. Do I have to get my provider to switch on these SSI goodies? How do I get these environment references to show within my HTML?

a *Yes, Server Side Includes do need to be enabled on the server to achieve the effect I wrote about. However, there are some alternative solutions which can be used with browsers that support scripting and have it turned on. There are a number of variables that are set automatically in JavaScript, so if you want to find out where someone was before they came to your page, you need to look at the "document.referrer" variable. How you use this depends on whether you want to display to the user where they came from, or save the information for your own purposes (likely to be more difficult). You can find plenty of examples at www.javagoodies.com, with a script to show the last site visited at www.javagoodies.com/comingfrom.html. To save the information you may need to use JavaScript to load the "document.referrer" into a hidden field on a web form, which can be posted when the user clicks on another link. But unlike using SSIs, there's no foolproof way to ensure you receive this information whenever someone looks at your page, as many people may have turned scripts off for security or speed.*

◄ **REAL-TIME VIDEO AND AUDIO STREAMING**

● **Eudora update** In the August column I mentioned using Eudora Pro for access to multiple email accounts. Thank you, Susan Lear and Tony Yates, for pointing out that you can do this with the Lite version by creating a separate directory for each user. Making a Windows shortcut gives the path to the directory as part of the command line. You could specify the name of the INI file if you want to share folders but have different email addresses. Mac users can create copies of the Eudora Folder (System Folder) for each user, with a unique name, and start Eudora by clicking on the Settings file in the appropriate folder.

▲ **DO SOME DETECTIVE WORK USING JAVA GOODIES**

PCW CONTACTS

Nigel Whitfield *by post via PCW (address, p10) or email* **internet@pcw.co.uk**

Defrag's a drag...

...but it has to be done. Tim Nott relates the triumphs and the tears. And what about the final cut of Windows 98? The System Information tool is just one of the features that will cheer you up.
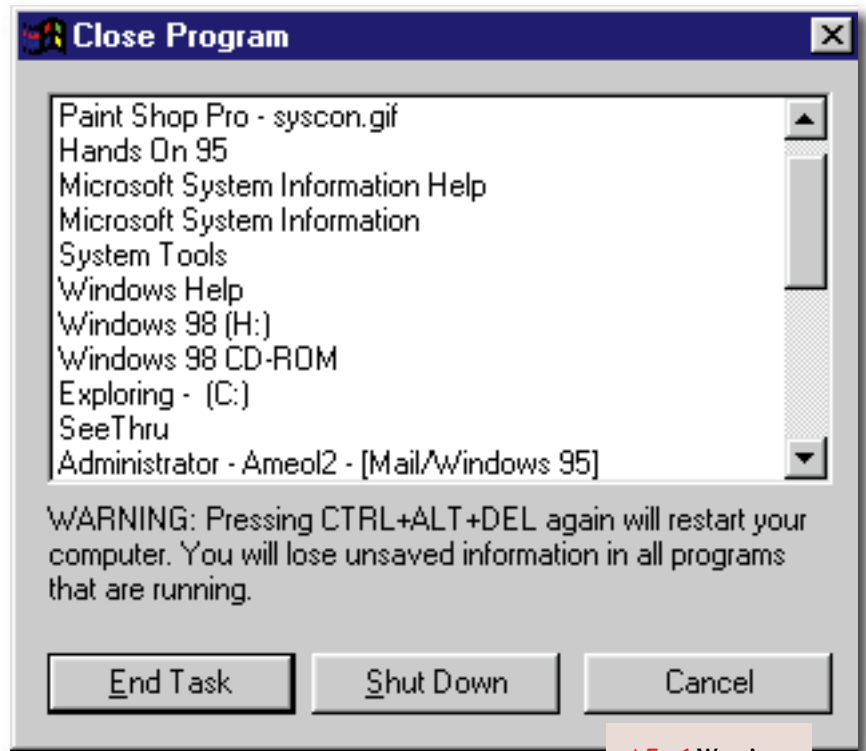
These Hands On columns are filed early in the *PCW* production cycle and at the time of writing I'd only been using the final cut of Windows 98 for a few weeks, although I've been running the beta for several months. One rather good feature is the System Tune-up Wizard. It provides one-stop shopping and scheduling for disk utilities such as Scandisk and Defrag.

I had a joyous email from regular Hands On correspondent Peter McGarvey who stated that following a defrag, the time to load Word 97 had dropped from nine seconds to two. And this on a modest P133 with 32Mb of RAM. You're kidding, I quipped merrily. I bet you're timing from a session where Word has recently been loaded and much of it is still cached in memory. And lo, McGarvey restarted his machine from scratch, clicked on the Word icon and two seconds later had it up and running.

Unlucky for some

On this machine I have an even more modest P100 but with 64Mb of RAM, so my 13 seconds seemed comparable with Peter's original nine. So, other things being equal, I should see the load time decrease to three or four seconds after a good defragging. Given the marvellous dual opportunity to speed up my system and go out for lunch at the same time, I set it optimising away. An hour later we had both finished. I clicked on the Word icon. But other things were evidently not equal, as it still takes 13 seconds.

While we're on the fragging subject, David O'Callaghan has requested that I "stop betting food items to people that Microsoft FindFast is the cause of all their hard-disk-gnashing" (*Q&A, June*). He cites screensavers, monitor power-downs, background printing and

Close Program

Paint Shop Pro - syscon.gif
Hands On 95
Microsoft System Information Help
Microsoft System Information
System Tools
Windows Help
Windows 98 (H:)
Windows 98 CD-ROM
Exploring - (C:)
SeeThru
Administrator - Ameol2 - [Mail/Windows 95]

WARNING: Pressing CTRL+ALT+DEL again will restart your computer. You will lose unsaved information in all programs that are running.

[End Task] [Shut Down] [Cancel]

▲ **Fig 1** What's going on? Ctrl + Alt + Del reveals all

Windows re-adjusting the swap file as other possible defrag or scandisk stoppers. Well, I wouldn't have thought a screensaver would have caused problems, but Roger Metcalf wrote from Arlington, Texas, saying that he too had experienced problems with night-scheduled defrags. He wrote: "I was finally able to trace the culprit back to a screensaver program that occasionally writes to the hard drive. Since I switched back to a Microsoft screensaver I have not experienced the problem."

Snooping around

Tony Bolton still had the problem after disabling FindFast. Doing a Ctrl+Alt+Del (always a good idea to be able to know what's really running, see Fig 1) revealed several possible culprits, including: "Tk_schen, a virus-check scheduler; Loadwc, a web checker but I don't know what it does; Iowatch, something to do with my Zip drive; and Ptsnoop (I have no idea what this does). As far as I know, the only other thing running is Dr. Solomon's WinGuard."

The short answer to all this is that anything which writes to the disk being scanned or defragged will cause the process to restart. And I'm rather surprised at the lack of warnings telling you this when you start. It's best not to have anything else running. Applications which Autosave are another possible culprit, as is anything that logs data to a file.

Tooled up

One thing I don't like about Windows 98 is the hideously slow Welcome to Windows tour, which is a triumph of design over content. But it did lead me to (eventually) discover something I *do* like: the System Information tool. This is squirreled away in Start menu, Programs, Accessories, System Tools, which is why it took a little time to find it. And it's not a brand-new invention, as Office users have had a similar feature available from the Help, About box.

There's loads of wonderfully techie information here about IRQs and DMAs. This alone is enough to keep a seasoned anorak happy for hours but the really joyful, and mostly new, stuff is all in the Tools menu.

Questions & answers

Q Is there a way of creating a shortcut to change the resolution and colour depth? I have several games that will not run in my normal 1024 x 768 x 16.7 million colour mode, and it's a pain to have to change back and forth to play them.

MICHAEL ESKIN

a Not that I know of. Some games are better-behaved in that they do this for you automatically (or sometimes after asking). The nearest thing I can recommend is QuickRes. This is part of the free MS Powertoys and gives quick access to all the resolution/depth combinations your display adapter can support from an icon in the System Tray.

Q I'm network manager at our school and have over 100 PCs. I currently use POLEDIT to restrict access to the Start button functions like Control Panel and Printers. What I'd really like to do is restrict access to drive C: for everyone but particular users.

NICK FURNELL

a Although there are more secure third-party solutions, you can hide drives in Explorer with the later versions of TweakUI (see screenshot, above). You should (at least according to the Windows Resource Kit) be able to do this with POLEDIT, too. But for a straight Registry hack try the following, having taken the usual precautions:
HKEY_CURRENT_USER\
Software\Microsoft\Windows\
CurrentVersion\Policies\
ExplorerNoDrives=
hex:04 00 00 00.

You may have to create the NoDrives entry as a Binary Value. The "04" will hide C: and all zeroes shows everything. And no doubt some bright spark will tell us how the other drives are calculated.

Q I have a large file called SYSTEM.1ST in my C:\ folder. What is it, and can I get rid of it?

BARNEY RISSINGTON

a This is a copy of the original Registry created when Windows was installed. It isn't essential to the working of Windows but provides a last-line backup should the Registry become corrupt. If you're desperate for disk space you could zip it up (unset the hidden and read-only attributes first) and stick it on a floppy.

Q I am about to purchase a new PC with a 6Gb disk. Although I am sure you covered the subject some years ago, I am unable to find the particular issue of *PCW* that dealt with using Windows 95 and Windows 3.11/DOS as alternatives. Can this still be done? And if so, how?

HAROLD ALEXANDER

a Yes. First you will have to FDISK the hard disk into smaller partitions, less than 2Gb each. Next, install Windows 3.11. Then install Windows 95 or 98. Ignore all the blandishments to replace your existing operating system and insist it installs the new version to a different directory. You'll then be able to dual-boot by pressing F4 or F8 at boot-up.

Q I have just bought a PC to help my wife who has started using them at work. The system at her

▲ TWEAK HERE TO HIDE DRIVES. IT WORKS IN EXPLORER, TOO
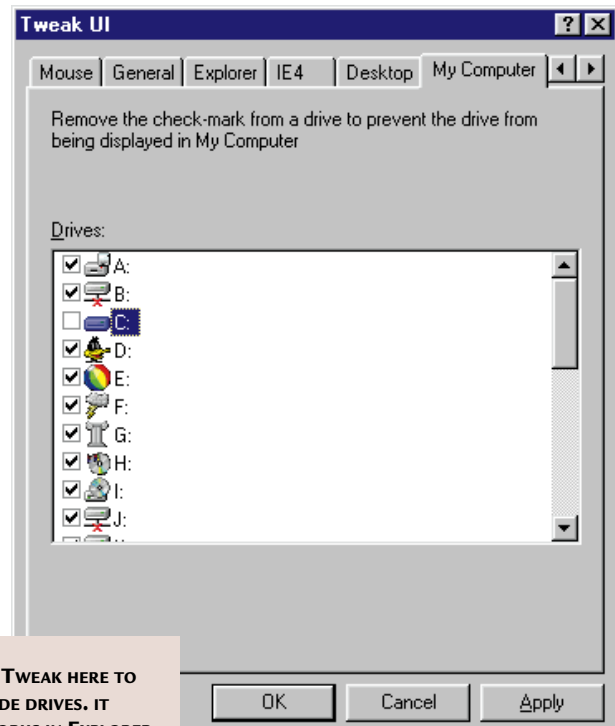
office uses Windows 3.1. Is there any risk in installing 3.1 on the same machine as Windows 95, as long as the installation directory is called something other than WIN or WINDOWS? The idea is that I would close down 95 and go into DOS from where I would start 3.1 from the other directory.

EDDIE MCCABE

a You cannot run Windows 3.1 that way but see the answer to Harold Alexander's query (previous column). But, as Mr Blair would say, there is a Third Way. Practically all Windows 3.1 programs will work fine in 95 (or 98) and you can still use the Program and File Managers that Windows 3.1 users have come to know and, possibly, love.

Q Following a spate of crashes and Safe Mode starts, I now get the

StartUp option screen every time I switch on the PC. Eventually, if I don't press anything, it counts down and launches into Windows, but it's rather a nuisance. How can I stop this?

NIGEL COMLEY

a Open Explorer and make sure that "View all files" is selected in "View, (Folder) Options, View". Then in the root of C:\ you will find a file called MSDOS.SYS. Make a backup, then right-click, Properties, and turn off the Read-only and Hidden attributes. Open the file in Notepad — despite the name it's a simple text file, but if you use the "Open with" command make sure the "Always use..." option is not ticked. You'll see a section headed [Options] and in here will be an entry named BootMenu=. If this is set to 1, then you will always get the Start Up menu. If it is set to 0, you only get it when you press F8.

● There's a System Configuration utility [Fig 2] that lets you disable entries in Autoexec.bat, Config.sys, Win.ini and System.ini. More importantly, it lets you disable all those things that start up automatically when you load Windows, but are triggered from deep in the bowels of the registry rather than the StartUp menu.

Star turns

Then there's a System Report tool, to let you inform Microsoft in the unlikely event of your having any problems, and various other bits and pieces. The stars of the show, for those of a diagnostic bent, are the Version Conflict Manager and the System File Checker.

The first of these shows a list of all files that have been replaced with newer versions by software installation (including the Windows 98 upgrade). If you get problems with a particular application you can try restoring the original file.

The second, as its name suggests, checks all your system files (with lots of options) and should it find any corrupted, will winkle out a fresh replacement from the CD-ROM without the user having to trawl about in the CAB files.

Font list tips ride again

● **More tips on the font list front**. You may remember the problem of getting a printable or saveable list of font names, together with their file names (*July issue column*)? Brian Handscombe has written a purpose-built DOS program that does just this. You can get it free from www.users.globalnet.co.uk/~cdman/.
● **One thing I'd add to the Readme file** is that to save the list, use the redirection symbol (for example, TTFNAMES C:\windows\fonts > fontlist.txt).
● **And here is a beautiful** piece of lateral thinking from David Mooney. Run Regedit. Go to MyComputer\HKEY_LOCAL_MACHINE\SOFTWARE|
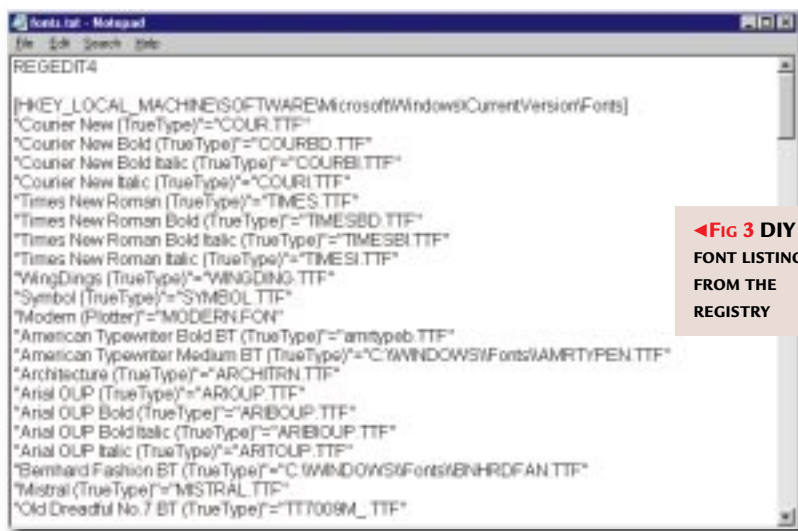
◄Fig 3 DIY font listing from the registry
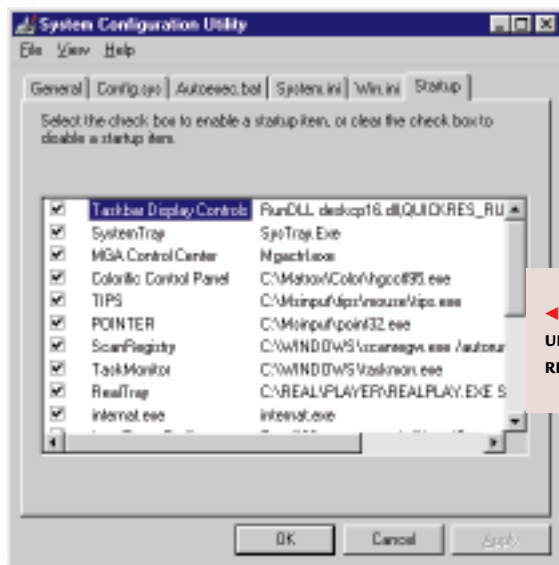
◄Fig 2 Start-up mysteries revealed

Microsoft\Windows\CurrentVersion\Fonts. You will see a list of names and files in the right hand pane. Export the branch as, say, FONTS.TXT and then load it into Notepad [Fig 3].

If all else fails...

Here is a little lesson for us all. Following an enquiry from Duncan Stewart on why his CD Autorun didn't, I rounded up the usual suspects — Auto Insert Notification in Device Manager, AutoPlay as default action, and so on.

It still would not work, so Duncan took the eminently sensible step of contacting the supplier, because the machine was still under warranty. And they advised him to pop down to

Woolworth's and spend £9.95 on a CD-ROM cleaner disc. So he did. And now it all works perfectly.

Crazy as a fox

Regular readers may remember that this all started with the obscure tip of changing the "Quick brown fox..." text in Windows font viewer (*PCW*, March). There is nothing like a bit of trivia to get the correspondence flying, and the response has been so great that I don't have room to name names. The search for the perfect 26-letter pangram produced, among others:
● **Veldt jynx grimps Waqf zho buck**. Yes, all in the dictionary. But I can't really make any sense out of it.
● **Cwm fjord-bank glyphs vext quiz**. Very popular, but I'm a bit uneasy about this Nordic sea inlet in a Welsh valley.
● **XV quick nymphs beg fjord waltz**. I'll let the XV stand, but surely not a good place to dance?

None of the French ones I received consisted of just 26 letters but they comfortably beat the 73-letter default screed: *Servez a ce monsieur le petit juge blond assis au fond, une biere hollandaise et des kiwis*.

No more! You'll get me into trouble.

PCW CONTACTS

WELCOME TO 16-BIT — DOS AND WINDOWS

Welcome to the first column of a new addition to the Hands On section. 16-bit replaces the old Windows 3.1 column. Its brief has been extended to embrace that other 16-bit PC operating system, DOS. We've made this change of emphasis because, for the past few years, DOS has been woefully ignored as everyone points and clicks and drags and drops with their new, super-duper, 32-bit GUI. And yet DOS hasn't gone away: scrape a little off the Windows 98 desktop and underneath you'll find that familiar, stark C:\> prompt. Yes, there are still some computer activities that cannot be performed without resorting to "the dark half", as I'm wont to refer to DOS. If you try installing a new hard disk, I'm very sorry, but you'll have to get your hands dirty and use the DOS utility from hell — FDISK. There must be a legion of Windows 98 users who shy away from the MS-DOS prompt, simply because it is too intimidating. You'll have to take my word for it, but really, it isn't. It will be the aim of this column to shed light on the dark half and to show you ways of configuring it and making better use of it. And a word of reassurance for all our steadfast Windows 3.1x users — don't worry, it's not going away. I'll still be devoting column inches to the doyen of PC GUIs. But for a short while I'll be rectifying the shortfall in DOS coverage by spending more time on DOS and less on Windows 3.1x. One thing won't be changing, however, and that is the column's usual dependence on its readers to provide feedback and problems to solve.

Roger Gann

Prompt response

Don't be scared of DOS, urges Roger Gann — it's not as intimidating as you might think. You _can_ make better use of it.

There is still some debate over whether Windows 9x is a true operating system or whether it's just Windows 4 riding atop DOS 7, just as Windows 3.1x sat on top of MS-DOS 6.2 [Fig 1]. Windows NT 4.0 has the familiar DOS command-prompt capability, but it's virtually impossible to extract this functionality and serve it up as a stripped-down command-line-only version. You can perform this stunt with Windows 9x, however. I guess it depends on what you mean by "operating system".

Up and running

There's no question that the Windows GUI functions on top of a lower-level operating system that looks and behaves pretty much like DOS. However, even though this subordinate part of the OS looks like DOS, its system files are very different from those in all previous DOS releases. Also, while Windows 9x is dependent on DOS (which, let us not forget, stands for Disk Operating System) to load its key files, once they are loaded most of the original DOS code, particularly the disk device drivers and memory management stuff, is discarded in favour of 32-bit protected mode versions. So, while Windows 9x is dependent on DOS to get it up and running, once it is up, it largely ignores it.

Until the final release of MS-DOS (v6.22) DOS loaded the IO.SYS and MSDOS.SYS files at boot time (and the DriveSpace driver, if you were using disk compression). These files were hidden system files and consisted of executable code. Now, in Windows 9x, IO.SYS and MSDOS.SYS still exist but the latter is a text-based configuration file.

Under Windows 95, the IO.SYS file is a monolithic replacement for four DOS files: IO.SYS, MSDOS.SYS, CONFIG.SYS, and AUTOEXEC.BAT. The new IO.SYS has all the instructions the operating system needs to initially interact with your hardware. It also loads some default CONFIG.SYS and AUTOEXEC.BAT commands and it controls much of the remaining boot sequence.

IO.SYS loads first, followed by MSDOS.SYS. This text file contains settings for several boot options, including the GUI status, network support and the boot menu — the one that pops up when you hit F8.

Incidentally, I notice that under Windows 98 you don't get much of a prompt to hit the F8 key, as the usual clue — the "Starting Windows 95" notice — just isn't displayed under Windows 98. After loading MSDOS.SYS, IO.SYS then loads the system's Registry files, USER.DAT and SYSTEM.DAT from the \WINDOWS directory.

Legacy option

The next step in Windows 95's boot sequence is to load COMMAND.COM, CONFIG.SYS, and AUTOEXEC.BAT. Note that booting Windows 95 without loading CONFIG.SYS and AUTOEXEC.BAT is preferable because the default 32-bit drivers will be faster and consume no conventional memory.

So why include this legacy option?

▲**Fig 1** The Windows GUI relies on a DOS base

Purely to ensure backwards compatibility
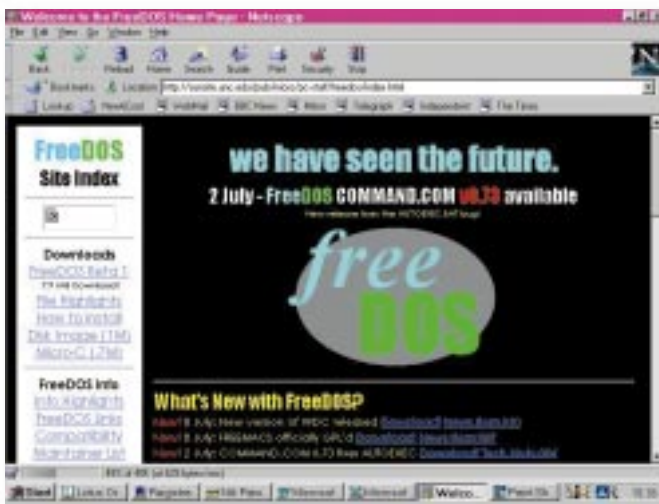
Microsoft as the OS of choice for the IBM PC, CP/M 86 later resurfaced on the original Amstrad PC1512 front-ended by GEM (an early GUI). Encouraged by success and the poor reception that MS-DOS 4.0 received (Microsoft made the mistake of letting IBM have a say in developing it), Digital Research released DR-DOS 5.0 which offered many advantages over the weak alternative from Microsoft. Its success spurred Microsoft on. Being keen not to repeat the mistake, it launched MS-DOS 5, a much better OS.

But DOS was becoming less important as Windows became the dominant operating environment, and despite offering stiff competition to MS-DOS, DR-DOS slowly faded away. Digital Research was bought by Novell, which released Novell DOS 7, but that didn't halt its decline. Eventually it was sold to Caldera, a Novell off-shoot, and was renamed OpenDOS, although just recently it assumed its original moniker.

Caldera has further refined the OS. It is Year 2000 compliant and the kernel will correct the system date even if your BIOS doesn't support the Year 2000. It also features a genuine multitasking kernel. As before, the OS is ROM-able and is suitable for embedded devices such as PDAs and set-top boxes. A DOS-based internet browser, Caldera DR-WebSpyder, was recently released. So things *are* happening with DR-DOS.

You can download a copy of DR-DOS and DR-WebSpyder from Caldera's ftp site at <ftp.caldera.com>. Follow the links on the ftp site to /pub/drdos. The full set is a 6Mb download. Caldera's web site can be found at <www.caldera.com/dos/index.html> [Fig 2].

FreeDOS is a very different kettle of fish. This is a straight clone of MS-DOS 3.3 written by volunteers and academics (a bit like Linux). Why MS-DOS 3.3? Simply because DOS remained fundamentally unchanged from that version forward. It's a 16-bit single-tasking OS based around the DOS-C kernel written by Pat Villani and includes the usual utilities and command.com shell.

Another interesting thing about the FreeDOS project is that it is largely written in MICRO-C, a freeware C compiler, which encourages developers from all over the world to chip in with suggestions and code samples, *à la* Linux.

The project is still at the late beta stage so doesn't guarantee 100 percent DOS compatibility at present, but it can run WordPerfect 5.1 and Doom. It cannot, however, run Windows. Its *raison d'être* is that there are users out there who

with older hardware and software. For example, to install Windows 98 on a virgin hard disk you'd need to boot with a DOS disk that had the necessary device drivers to make the CD drive accessible. Some older programs look for these start-up files to make sure they have the right settings, and when they can't find them, they complain.

For example, some legacy software requires 20 "file handles"; the default FILES setting in Windows 95 is 60. Such programs might parse the CONFIG.SYS file for the existence of a FILES command. To keep a program like this happy, add this line to your CONFIG.SYS file:

```
FILES=60
```

It won't actually change anything, but it will keep one program happy!

Another reason for having these start-up files is that if you frequently restart in MS-DOS mode none of the internal, protected mode drivers will be available to you unless you've loaded them in CONFIG.SYS or AUTOEXEC.BAT. You can also use the DOSSTART.BAT batch file here and this is something I'll be looking at in subsequent columns.

DOS into Linux does go

Chris Bidmead [Hands On Unix] can't have it all his own way with Linux. Believe it or not, there are DOS equivalents of Linux out there. FreeDOS and DR-DOS may not be the equivalent in terms of power or functionality but are nevertheless free. Both are (or will be) close clones of MS-DOS. The former is totally free and the latter is free for evaluation purposes.

DR-DOS will be familiar to many *PCW* readers of old. Its roots hark back to good old CP/M 86. Having lost out to

either don't need the power of a modern 32-bit operating system, or lack the necessary computer hardware to run them on. And it is free, under the terms of the GNU General Public Licence.

You can download it from the SunSite ftp site at <ftp://sunsite.unc.edu/pub/micro/PC-stuff/freedos>. The complete suite is an 8Mb download. The web site is at <http://sunsite.unc.edu/pub/micro/pc-stuff/freedos/index.html> [Fig 3].

PCW CONTACTS

Bin there, done that

The Recycle Bin can't always regurgitate inadvertently trashed files, so Network Undelete is a godsend for harassed administrators. Andrew Ward explains why. And, share and share alike, provided you have permission.

I don't tend to delete files I want to keep. Indeed, with hard-drive capacity as big as it is today I don't tend to delete files at all. But it seems that other users do. If you're the administrator for a Windows NT network, you're likely to be plagued with demands by users to restore inadvertently trashed files.

The Recycle Bin goes some way towards resolving the issue, but if the purpose of deleting files is to free-up hard drive space, then users will either use Shift-Delete (to carry out a permanent deletion) or go and empty the Recycle Bin anyway. And in any case, the Recycle Bin doesn't catch files deleted in a variety of ways (from the command prompt, for instance).

A product designed to address this issue is Executive Software's Network Undelete and, as the name suggests, not only does it work on an individual client or server system, but even across the network. It's ideal for harassed administrators.

Road to recovery

Following installation of Network Undelete, your Recycle Bin disappears altogether, to be replaced by a Recovery Bin. This seems to catch files no matter how they are deleted — even those removed by software de-installation programs. In fact, there's a danger that Undelete will go too far and catch all sorts of rubbish that you couldn't possibly want again.

Recognising this, Network Undelete supports an exclusion feature [Fig 1] which allows you to specify certain file types, file names or even folders that you *don't* want to be able to recover. As
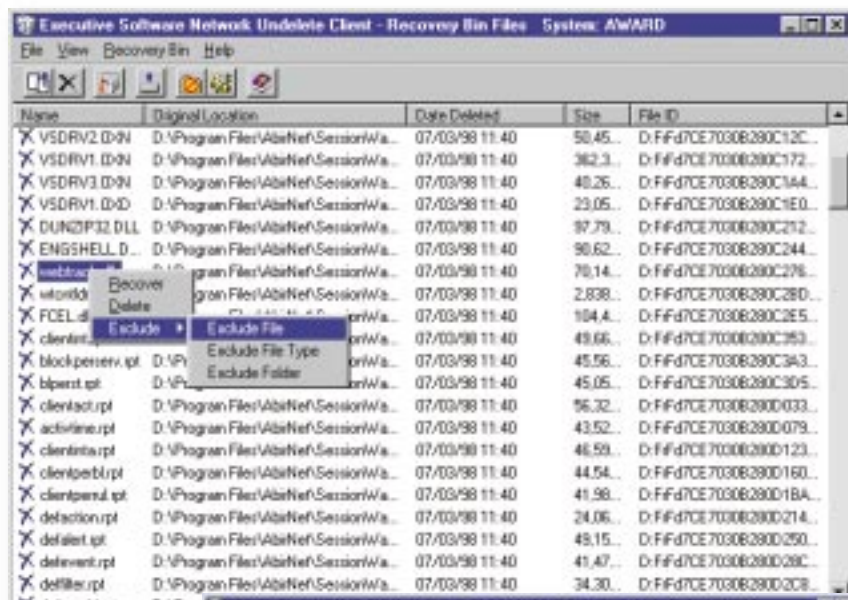
▲ **FIG 1** IF **NETWORK UNDELETE** BECOMES TIRESOME, YOU CAN EXCLUDE FILES FROM BEING RECOVERABLE

▶ **FIG 2** **NETWORK UNDELETE** WILL EVEN FIND FILES YOU THOUGHT HAD DISAPPEARED YEARS AGO
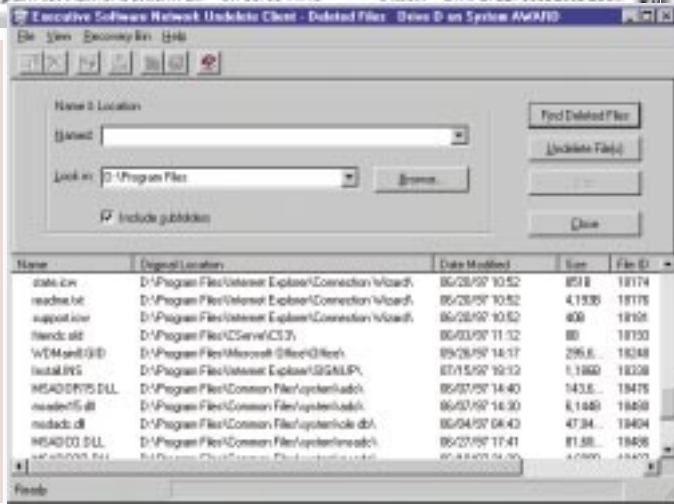
standard, the exclusion list contains such things as the file extensions typically associated with temporary files.

By default, the recovery bin size is set to 20 percent of your drive but you can easily change that. You can also opt to have a single recovery bin for all drives, rather than one per drive, and turn off the feature on a per-drive basis which is useful if you've adopted the advice of this column and set up an entire drive for handling temporary files.

The right stuff

Installation of the product is straightforward (although it does require

a reboot) and recovery itself couldn't really be easier: just right-click the name of a file in the recovery bin and select Recover from the drop-down menu.

Network Undelete will even restore files that have really been deleted: for example, if you clear the recovery bin of files that have been excluded from recovery bin processing. It will even find files that were deleted before Network Undelete was installed [Fig 2]. However, on NTFS partitions, you cannot restore completely deleted files that are large or really huge (files that have more than one record in the MFT).

I'm sure that none of you would ever keep questionable content on your ➡

hard drive so you wouldn't be worried about the implications of this product. Nevertheless, from a security point of view only someone with administrator rights, or the original owner of a file, can recover it. A single end-user client copy of Network Undelete is £35 (ex VAT) and the administrator version is £140 (ex VAT). There's a starter pack of one administrator plus five client copies for £235 (ex VAT) and Network Undelete should be available from software resellers.

Good question

Reader Gordon Bamber has raised a very good question: what exactly are the differences between share-level permissions and directory-level file permissions, and when should you use one or the other? First, a bit of history. Share-level permissions are a feature of Microsoft networking and have been around for longer than Windows NT. But with the advent of NTFS, the ability to set file- and directory-level permissions has also become possible (to add security, say, in the case where a single desktop

▶**FIG 3** SHARE-LEVEL PERMISSIONS ARE SET VIA THE SHARING TAB, AND DIRECTORY AND FILE PERMISSIONS VIA THE SECURITY TAB

computer is used by two or more people). File and directory permissions are intrinsic to the machine itself and thus add a new layer of security beneath the share permissions. As you might expect, both layers of security work (one is not negated by the other) so it's easy enough to fathom out what would happen in any particular set of circumstances. For instance, there's a user directory on my
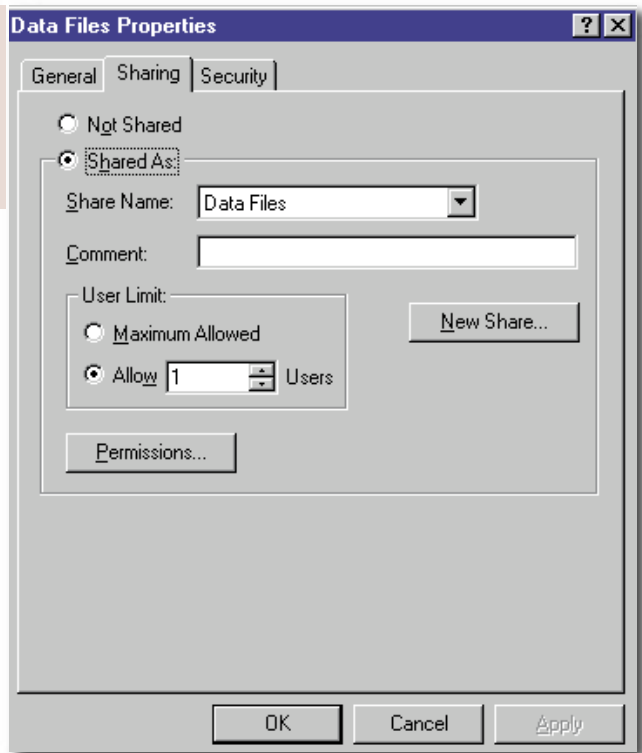
system called "Andrew", which is not currently shared. I'm the only user who can access the directory. If I then decide to share that directory, regardless of what share permissions I do or do not specify, I'm still the only user who can access that directory. If I set up a share that only a user called "Linda" can access, then even though she can get to the share, she can't get to the directory. And across the network I can't get to the share at all, because only Linda is allowed access to it. Thus, in a normal networked environment it seems to make sense to use only the share-level permissions, and for most applications just ignore the fact that NTFS also supports file and directory permissions.

No place like home

There's one important exception and that is networked home directories. If you had many hundreds of users and shared all their home directories, you'd create an absurdly large browse list. But by creating one directory called "Users" and sharing it, you can create sub-directories for every user and set directory-level permissions [Fig 3] on those so that only a user can access their own home directory. ➡

UNWANTED SHARES

A final word on the subject of getting rid of unwanted shares. When, in the June issue column, I first suggested that one way of deleting them was to use the registry error, there was actually an error in the registry path I showed, which was spotted by Julius Clayton. Instead of:
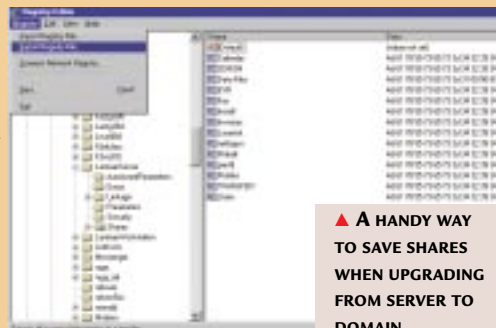
▲ A HANDY WAY TO SAVE SHARES WHEN UPGRADING FROM SERVER TO DOMAIN CONTROLLER

```
HKEY_LOCAL_MACHINE\SYSTEM\ControlSet001\Services\➡
LanmanServer\Shares
```
I should of course have specified;
```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\➡
LanmanServer\Shares
```
because ControlSet001 may not be the one currently in use.
(Key : ➡   Code continued on next line)

Julius also points out a valuable use of this key. Changing an NT system from a domain controller to a server, or vice-versa, requires a fresh install of NT. And what happens when you reinstall NT? Well, you lose all your shares, which, as Julius says, can be rather annoying if you have hundreds of them. But by saving the key before you carry out the installation you can later import it again, which will recreate the shares and share permissions for you (following a reboot).
● To save the key, run REGEDIT, navigate to the appropriate key, then select Registry / Export Registry File... from the menu (and Import Registry File subsequently, to re-import it).

HERE'S AN APOLOGY. A while ago I wrote about Service Pack 4 (SP4) thinking that by the time my article appeared (*PCW*, August) SP4 would have hit the streets. After all this time, you would have thought that I would realise Microsoft never moves quite as fast as we'd like. In fact, it may be that SP4 is not even out by the time you read *this*, although I do have Frank Utermoehlen, Microsoft's OEM marketing manager (Europe), on record as having said that SP4 would be released "this summer". (He also said that NT 5.0 would be out around April next year, but I'm not sure I believe that, either.) If I do wait for the service pack to come out before telling you about it, there's a delay of two or three months. What you can be certain of is that as soon as SP4 is available it will appear on our *PCW* cover disc (provided there is room for it and that Microsoft is forthcoming with permission).

Simon Corner raises the question of whether they should be installed at all? With Windows NT, the answer is usually yes — Microsoft generally manages to fix far more problems than it introduces. Most significantly, security holes are frequently being found in Windows NT, and each new service pack fixes all those

PROCESSOR STEPPING

Elliot Moore runs Windows NT 4.0 Server on a dual Pentium 133 SMP system with two different processor steppings but has no problems at all. According to WinMSD, one of the processors is Family 5 Model 2 Stepping 12 and the other is Family 5 Model 2 Stepping 11. Intel provides some information on mixing steppings at http://support.intel.com/support/ processors/pentium/KBDL567U .htm. There's a compatibility chart which highlights any problems or workarounds that might be necessary (for almost any combination, pipelining must be turned off). And fairly obviously, both processors must be running at the same frequencies and at the same bus/core fractions.

THE YEAR 2000 AND WINDOWS NT

Readers have asked for more information on Windows NT 4.0's non-compliance as regards the year 2000. The place to look is www.microsoft.com/ ithome/topics/year2k/ product/WinNt40wks. htm, but these are the four areas of non-compliance that Microsoft has found so far:

1. THE USER MANAGER does not recognise the year 2000 as a leap year and will not accept 29 February 2000 as a valid date to expire an account.

2. THE CONTROL PANEL Date/Time applet's date displayed may jump ahead one more day than expected (although the system date is still correct).

3. WHEN THE PROPERTIES of Office files are modified from the shell, only 2-digit years are allowed, and they are assumed to be in the 1900 century.

4. THERE ARE DATE ENTRY fields in the Start Menu / Find / Files or Folders / Date Modified tab that will show non-numeric data if the year is greater than 1999.

To fix these problems, download the patches from http://backoffice. microsoft.com/ downtrial/moreinfo/ y2kfixes.asp or wait for Service Pack 4.

I won't embarrass those who have written in suggesting that the year 2000 is not a leap year after all, by mentioning their names. But for their benefit, here is Section II of the 1751 "Act substituting the Gregorian for the Julian Calendar" [24 Geo. II cap. 23]:

"That the several years of our Lord 1800, 1900, 2100, 2200, 2300, or any other hundredth year of our Lord, which shall happen in time to come, except only every four hundredth year of our Lord, whereof the year of our Lord 2000 shall be the first, shall not be esteemed or taken to be bissextile or leap years, but shall be taken to be common years, consisting of 365 days, and no more; and the years of our Lord 2000, 2400, 2800, and every four hundred year of our Lord, from the year of our Lord 2000 inclusive, and also all other years of our Lord, which by the present supputation are esteemed to be bissextile or leap years, shall for the future, and in all times to come, be esteemed and taken to be bissextile or leap years, consisting of 366 days, in the same sort or manner as is now used with respect to every fourth year of our Lord."

For those whose linguistic skills and/or attention span are challenged by long sentences, what it says is that every hundredth year is not a leap year, except for every four hundredth year, which is, starting with the year 2000.

What the Act failed to take into account, of course, is the fact that the year 4000 should not be a leap year — so anyone currently writing software has to work on the principle that it is, knowing that a new Act will be passed at some point and that it will all change again. By which time there will be hundreds of computers per inhabitant of the world, and trillions of different pieces of code, all busy miscalculating leap years.

that are known at the time. And yes, new software does expect the latest service pack. Plenty of application software for Windows NT 4 specifies Service Pack 3 as a prerequisite. Oh, and you also only ever need to install the latest version because it includes previous fixes.
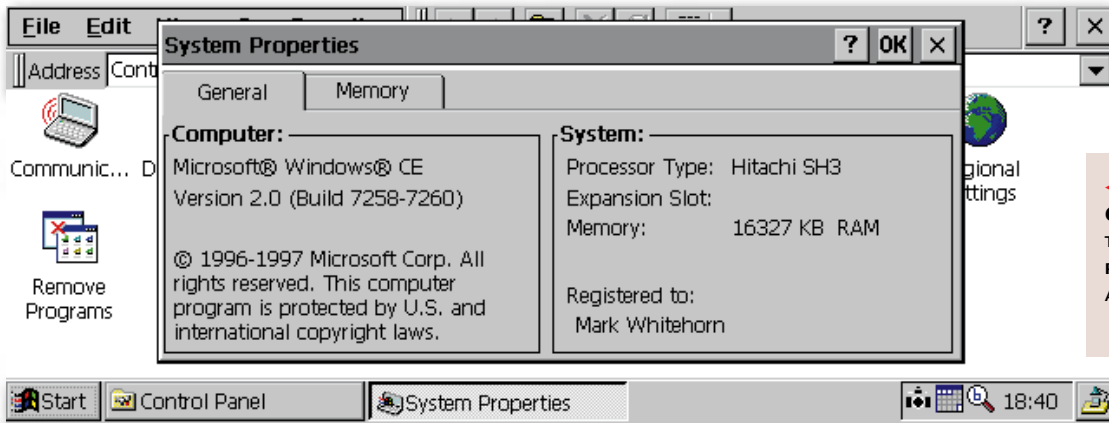
PCW CONTACTS

Andrew Ward *can be contacted via the PCW editorial office (address, p10) or email* **NT@pcw.co.uk**

See hear — it's CE

The world according to Windows CE, as Mark Whitehorn presents some handy help and hints.

◄**FIG 1** THE GENERAL TAB OF THE SYSTEM PROPERTIES REVEALS ALL...

The web is full of shareware and freeware. Not unreasonably, you may be tempted to download some and run it. If so, you should find out what processor is fitted to your machine (e.g. MIPS, SH3) because you may be confronted with different downloads compiled for different processor types.

Most commercial software automatically detects your processor type and installs the version you need, but this isn't always the case for shareware. If you need the information, have a look in Control Panel, System and select the General tab. My HP 620LX is running on a Hitachi SH3 [Fig 1].

RAM under control

Windows CE machines have no hard disk so they store information in ROM and RAM. Thus RAM in a CE machine can be made to function like a hard disk and used for storing applications and data. It can also function like conventional RAM in a PC (used for running applications). Have a look in the same System area (*see above*) but select the Memory tab [Fig 2]. This is where you can control the way in which RAM is allocated between these two functions.

It is up to you to decide what the optimum setting
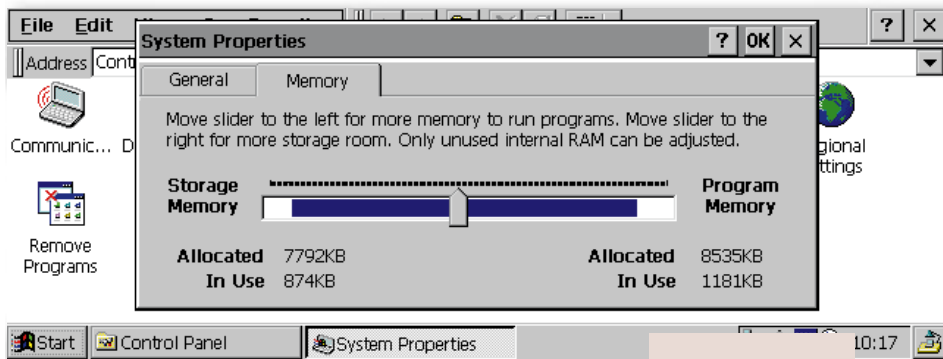
▲**FIG 2** ...BUT THE MEMORY TAB OF THE SYSTEM PROPERTIES REVEALS MORE

for your usage happens to be, and probably, when you get the machine, you won't have a clue. Fine. Leave the setting where it is, but remember that this is where the information is stored. As soon as you seem to be running out of space for either function, pop back here and take appropriate action.

Bin and gone

The Recycle Bin is mega-useful on a Widows CE machine, just like it is on

95/98 and NT. Not, you understand, that I have ever deleted anything by mistake, but I have a friend who once... Anyway, my advice is to leave the RB operational. However, if you find that you are becoming very short of space, you can turn it off by Alt Tapping the RB icon and un-checking "Do Not Move Files..." to free up more space [Fig 3]. You can also take the less radical step of setting the RB
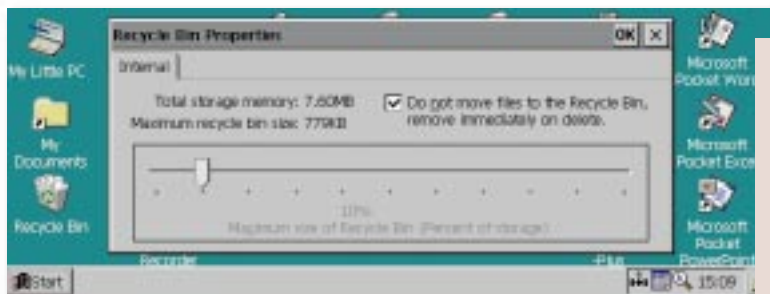
◄**FIG 3** DISABLING THE RECYCLE BIN IN WINDOWS CE. THIS IS POSSIBLE, BUT ONLY RECOMMENDED IN EXTREMIS (SEE TEXT)

Questions & *answers*

Q I'm looking for an idiot's intro to programming the Palm 3. Hope to see one soon.

MIKE RILEY
<MRILEY@MAIL.BOGO.CO.UK>

a This is one of the few emails I've had that refer to the Palm. I've no problem with doing a tutorial on programming for Palms, Psions and/or Windows CE machines. Please let me know your thoughts.

Q I would like to ask you about the possibility of using Polish fonts in PDAs. I used to have an HP OmniGo 100 and I now own a Psion 3c. The former used English fonts as well as French and German ones, but no Central European versions. I can use Polish fonts when I work with my Psion 3c, but can you tell me how it would look in the systems using Windows CE (I mean the "keyboardable" ones) and Epoc 32?

PRZEMYSLAW SPERLING
<SPERLING@AMU.EDU.PL>

a I haven't the faintest notion of how to get a Windows CE machine to run with Polish fonts. Nevertheless, I have the greatest faith in the readership of PCW. Can someone out there enlighten us?

Q Can small Windows 95 or NT-based programs be run on a Windows CE palmtop?

IAN DAVIES
<IAN.DAVIES@VIRGIN.NET>

a The simple answer to this one is "No". Despite the name, Windows CE is essentially a totally different operating system.

---

to take up less memory.

While on the subject of saving memory, another useful trick is to save your documents as *.txt rather than *.doc files because they take up less space. You can also have a hunt through the file system and delete any sample documents, *.BMP and *.WAV files that you don't actually use.

Power saving

So much for saving "disk" space. What about saving battery power?
● Use the backlight as infrequently as possible when running on batteries.
● Don't abandon your machine for days with alarms bleeping and lights flashing. It will feel that you don't love it and flatten its battery in a fit of pique.
● Sounds not only irritate everyone around you, they also drain power.
● Don't leave the machine docked while on internal power.
● One of the biggest power hogs are modem PCMCIA cards, so only use one while on mains power.
● NiMH batteries last longer than conventional Alkaline.
● Conventional batteries last longer than rechargables, but the latter are cheaper in the long run.
● Lithium rechargables are better than normal rechargables because essentially they have no "memory".

No PDA, no fun

There are some old people ("old" defined in this instance as one who was sentient

MORE TIPS AND TRICKS FOR WINDOWS CE

John Kennedy <john@sticky.net> has provided these useful tips for Windows CE machines.

● **Speed up your desktop** by keeping only the bare minimum of shortcut icons on it. Each icon redraw takes time, and if you have a lot you can spend five seconds watching your desktop appear. Delete those you don't need.
● **If your HPC has shortcut buttons** (e.g. Philips Velo) use them instead. You can launch apps in a second or less.
● **Keep your most frequently used applications** running all the time, minimised in the Start bar. You won't even have to wait for them to load.
● **Use the Control Panel "Owner" applet** to display your name and contact when the HPC is turned on. Make sure you have a "Reward if returned to owner" message display.
● **Upgrade to Windows CE v2** because the extra features are definitely worthwhile. For example, I can keep a record of all my important and personal information such as CC numbers and ISP passwords in a Pocket Word document for easy access. And, as Windows CE v2 will encrypt files, I don't have to worry about losing it.
● **Use Power Toys**, available from the Microsoft web site. The Pocket Paint utility is reason enough to download it, but there are plenty of other goodies, too.
● **Windows CE v2 knows about** Ethernet cards and networking. You can even connect your HPC to your LAN and browse through Windows 95/NT directories if you download the Networking tool from the Microsoft web site.
● **Customise it!** Windows CE allows a backdrop image to be used. Use your favourite paint program, such as Photoshop or PaintShop Pro, to reduce the colours and add dithering. Then save as a BMP and copy it across. ALT-tap on the screen to bring up the screen properties, and select your new pattern. There are plenty of pictures on the web if you don't want to make your own.

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in the early 1980s) who argue that PCs have become more boring in modern times. As PCs have passed from "interesting toy" to "cutting edge corporate tool" they have undoubtedly become more productive. But are they

TIPS FOR PSION 5 USERS

From John Goss's monster bundle <john.goss@dial.pipex.com> here are some more tips, the first of which were published in last month's column.

● **Shift-Ctrl-C brings up a window**, letting you insert special characters.

● **Sometimes programs can waste memory** when they are closed and leave you with less space than you should have. An occasional soft reset can be a good idea, or download MMU, a program which frees up the wasted space.

● **It is possible to connect your Psion 5 to a PC via infra-red**. Most laptops and some PCs now come with infra-red ports, so it's a good idea to make use of them, and here's how :

1 Uninstall PsiWin.

2 Now you need the latest IRDA drivers from Microsoft. Get them from <www.microsoft.com/windows95/info/irda.htm>.

3 Install the driver you need and then go to your relevant infra-red Com port and set the speed to the maximum available.

4 Go to Control Panel and into the infra-red settings. Click on the options tab, make sure everything is on the right settings and enabled on the right port.

5 Install PsiWin 2.1. (Note: If you don't have PsiWin 2.1 you can get it from <www.psion.com>.)

6 Double-click on your connection monitor, go to the connections tab and tick the infra-red box. Also put the baud rate to 115200 if it's not there already.

7 Now turn on your Psion, enable the remote link on infra-red (press Ctrl-L to bring up the dialog) and point at your PC's infra-red port. Wait a few seconds and it should connect. You can also find this information on the web at <5alive.psionking.com/Archives/Reviews/IrDA.htm>.

ROM display

● This tip is courtesy of Tim Jeffries <JudgeJeffr@aol.com>.
If you want to access the Psion Series 5's ROM drive (Z:):

1 View the directory tree window, but rather than use the standard keyboard shortcuts of Tab or Ctrl+G, use the alternative of Ctrl+Tab.

2 Wait a while until all the directories on C: are displayed and then click on the box at the top left that reads "C" (without the quotes).

3 Press Tab, and then click on "Z" from the drop-down list that appears.

4 The ROM drive will be displayed. Press Enter to view it in normal mode.
If you want or need to do this often, you could press Shift+Ctrl+B to bookmark this folder. Then you can just press Ctrl+B to get back to it. Note that this will override any other bookmark settings you have made. Although you cannot change anything, because it is stored in the ROM and is therefore read-only, you can view it and it is useful to find out about the Psion's architecture.

Just browsing

Nice one, Tim! I didn't know about this one and spent a happy hour just browsing. Glad to know that you aren't the real Judge Jeffries (nor yet Judge Dred).

It worked!

▲**Fig 4 All you have to do is work out what this has to do with PDAs**

any more fun? "No" is the short answer. This is one reason that I love PDAs. They have yet to attract the interest of the suits, so they are still fun.

Take a look at Fig 4. This is an aerial shot of John Kennedy's house. He obtained it by tying a DC25 digital camera to a kite that he flew, one assumes, from his back garden.

What has this got to do with PDAs? John was experimenting with manipulating images with PDAs, sent me the image for the fun of it, and it seemed to me to sum up why I like PDAs.

On the other hand, please don't do this at home. Please don't tie your two-year-old child to a kite in an attempt to better John's artistic composition. Don't try to move images from a digital camera to your PDA. I wouldn't want you to start enjoying this stuff!

Hotel guide

"I'd like to let you know about a new Psion product our company has just released. You can find full details on our web site http://ourworld.compuserve.com/homepages/Fawnbench. It's an electronic version of the popular AA Hotel Guide book. Being in electronic form means a user can now filter, sort and locate geographically the types of hotel in which he is interested. It also links with our 'Geographical Database' application, allowing a hotel entry to be located on a map — and all from the Psion screen."

fawnbench@mailcity.com

Been there, looked at it, and it seems like fun. This brings us rather neatly to the topic of mapping with PDAs. As this seems to be a recurrent theme, we'll start looking at it next month.

PCW CONTACTS

Mark Whitehorn *welcomes readers' correspondence and ideas for the Hands On PDAs column. Contact him via the PCW editorial office (address, p10) or email* **pda@pcw.co.uk**

HERE'S A BIT OF CLASS: CARAVAGGIO'S *JUDITH BEHEADING HOLOFERNES*. THE MAIN PICTURE IS A .DJV FILE COMPRESSED TO **28K** FROM THE **110K** JPEG ORIGINAL (BACKGROUND). A STRAIGHTFORWARD CDJVU COMPRESSION PRODUCED THE **11K** DJV FILE YOU CAN SEE LISTED AT THE TOP OF THE XTERM WINDOW BUT THIS WAS RATHER TOO LOSSY, SO I DOUBLED UP THE PIXELS ON THE ORIGINAL BEFORE COMPRESSING IT (CDJVU HAS A **-UP2** SWITCH FOR THE PURPOSE) TO RETAIN MORE DETAIL [SEE MAIN TEXT, BELOW]

Picture this

DjVu is compression technology that aims to make high-res documents easily distributable over the net. Results, like the example above, can be impressive, says Chris Bidmead.

AT&T calls it the "next generation compression technology" and claims that it achieves compression ratios as high as 1000:1, which is five to ten times better than existing methods. DjVu (pronounced *déjà vu*) can squeeze a full-colour picture scanned at 300dpi down to less than 60Kb, instead of the typical uncompressed size of tens of megabytes. The idea is to make high-res colour and black-and-white documents easily distributable over the net.

You'll find a set of Linux utilities to handle DjVu at http://dejavu.research .att.com. AT&T recommends using a browser to display the compressed images, and includes a plug-in for Netscape. Alas, plug-ins are operating-system dependent and the one they supply only works with Windows. But you can display a compressed .djv image by using the ddjvu decompression utility

and piping the result into Display, the utility that comes with ImageMagick. Chances are you already have this excellent graphics suite in your Linux distribution. If not, or if you're running a different platform, visit the home page at www.wizards.dupont.com/cristy/ ImageMagick.html. You compress your original jpeg, gif or tiff (it also handles bmp, ppm and pgm) using the cdjvu utility. For example, to squeeze the Caravaggio (*above*), I used:

```
# cdjvu judith.jpg judith.djv
```

The ddjvu utility decompresses the image again, and you can feed it into Display like this:

```
# ddjvu judith.djv | display
```

I tried putting that line into Netscape as a helper app but it seems not to like the pipe. If anyone knows how to make this work, do please drop me a line and I'll pass on the information.

● **Last month I may have** made getting X to work with the Matrox Millennium II sound more complex than it is. That's because I did it the hard way. The easy way is just to get a recent Linux distribution that uses XFree86 3.3.2 or later, because this has Millennium II support built into the standard XF86_SVGA server.

If, like mine, your Linux uses an earlier version of X you don't need to download and install the whole of XFree86 3.3.2. In theory it's only the server that needs changing. I got it from Suse at www.suse. de as xmatrox.tgz. It's just over 1Mb in size, so it's a manageable download.

Untar this with **tar xvzf X332SVGA.tgz** to extract the server. Now cd to the appropriate X directory. With my Caldera OpenLinux installation it's /usr/X11R6/bin but various Linux distributions still differ on this. An easy way to find it is to use the locate command to look for **XF86_SVGA**. Now rename your old X server (if it also happens to be called XF86_SVGA) and copy the new XF86_SVGA into this directory. Conventionally the server is evoked as X, so you'll need to establish a symlink. From inside the X bin directory you can do it with:

```
ln -s XF86_SVGA X
```

You can now check that the link is there with ls -1, which should show something like

```
X -> /usr/X11R6/bin/
XF86_SVGA
```

When X loads you don't normally run it directly. The usual way is to run a script called startx, which runs a binary called xinit, which in turn evokes X. When it loads, X consults a configuration file called /**etc**/**XF86Config**. You need to be sure this is set up with the right parameters to trigger the Millennium II features in the server. Unless you're an out-and-out geek you'll probably need the XF86Setup script to do this.

Earlier versions of XF86Setup don't know how to set the appropriate Millennium switches, so be sure to
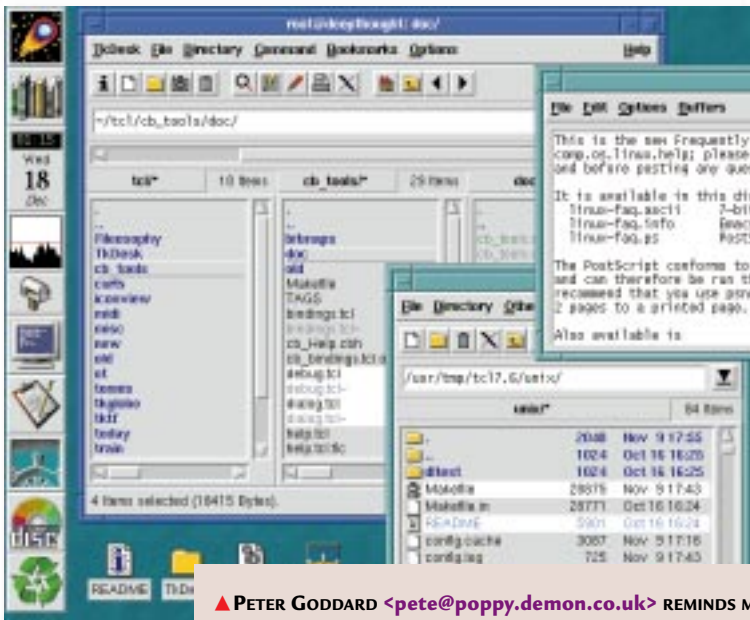
download the new version that goes with 3.3.2. The version on the Suse site is **xsuseconfig.tgz** and includes a database file called Cards. In my Caldera installation these two files go respectively into /usr/X11R6/**bin** and /usr/X11R6/**lib**/X11. You should check this first by using the locate command again to see the locations of your current versions of XF86Setup and Cards.

Now use the new **XF86Setup** to recreate /**etc**/**XF86Config** and you should be able to run startx as usual.

Ah, but there's another catch…

Nanny state

This will work fine as long as you're root, but if you're any other user you'll find X will refuse to load, with a message warning: "You should be using Xwrapper to start the server".

This is because XFree86 3.2.2 has suddenly become HAL in the film *2001* and is nannyishly warning you that you've

hit a security issue. Xwrapper is a binary that XFree86 3.3.2 inserts into the startx->xinit->X sequence to get around this security hole. Unfortunately, even when I'd tracked down XWrapper I still couldn't run X as a user. The same warning kept coming up and I noticed it carried a rider: "We strongly advise against making the server SUID root!"

Because X has to do some hairy systems things, it needs to be running with root permissions. The point of Xwrapper is to ensure that these root permissions cannot be exploited by a mischievous user. As the only person on my network I made the judgment call that getting X to work was more important than guarding against security breaches, so I gratefully picked up the clue in the rider and made X the SUID root.

Insecurity guard

Setting SUID root on an executable is a bit complicated to explain but simple in practice. If root owns an executable file but allows me to run it (which is the usual case with Unix utilities), normally that file will run with permissions appropriate to my user status (rm, for example, won't allow me to delete root-

---

[FIG 1]

Modifying permissions in X

```
# ls -l XF86_SVGA
-rwxñxñx 1 root root 3261116 Mar 7 11:46 XF86_SVGA
# chmod -v u+s XF86_SVGA
mode of XF86_SVGA changed to 4711  (rwsñxñx)
# ls -l XF86_SVGA
-rwsñxñx 1 root root 3261116 Mar 7 11:46 XF86_SVGA
```

[FIG 3] Challenge Alex! Modifying mv with a simple script

```
#! /bin/sh
# mov- A simple shell script to move files or directories, with the added
# capability to move across file systems (which mv does not do).
#
# You'll have to just ignore the error messages as piping them to /dev/null
# seems not to work. You'd also better make sure the arguments are just
# simply "mov source dest" or bad things might happen like deleting something
# you don't want to delete.
if !(mv $@)
then
        cp $&
        rm -fr $1
fi
```

owned files). Setting the file SUID gives the executable full root permissions for as long as it is running.

This was the old, insecure way of running X, and I wanted it back! You can do it easily. Become root, switch to the directory the executable is in (or give its full path name in what follows) and then use chmod to modify the permissions. I like to use ls -I before and after to see the permissions. If you want to see them as they change you can use the —verbose flag for chmod, too [Fig 1].

Eye spy

Reader Neil Homer <neil.h@dial.pipex .com> writes that this column is to blame for pushing him off the straight and narrow (his job is administering Windows NT networks) in the direction of Linux. Sorry, Neil.

He calls Linux an eye-opener: "I bought RedHat 5.0 and installed it at home, and on a PC at work — much to my employer's annoyance. I was surprised at its ability to integrate into a multitude of environments. Strangely, developers who work in the same company were also going misty-eyed when I fired up our first Linux box."

Once he'd added ApplixWare he found that "If you can do it using Windows, then you can do it using Linux. I can't believe that I can do whatever I want with Linux and ApplixWare for about £140, that would otherwise cost me three or four times as much to do with Windows 95 and Office, never mind the rest of the server products that come with Linux."

Like many of you, Neil concedes that Linux probably has a long way to go

before it's a direct challenge to Windows for the desktop. I've never seen it like this myself: if Windows does what you need, then fine; but if you want some control over your own machine, you should look elsewhere. Linux is a good place to start.

Package tour

Philip Sweeting <philip@jxs-software. demon.co.uk> writes: "Could you tell me what the extension 'rpm' signifies in Linux? How does one unpack it (I am assuming it is some sort of compressed file or something)?"

It stands for RedHat Package Manager. As the name implies, it was originally developed by RedHat (with financial support from Caldera). It's the standard package manager (method of installing and deinstalling apps, utilities and the OS basics) on these two platforms, and on others (like Suse), too. Go to www.rpm.org for more details.

Stamping ground

In the August issue I mentioned a tip from Andy Holyer <andyh@pavilion. co.uk> about using tar to move entire directories. Alex Holden <alex _ holden@ geocities.com> has emailed to point out that Andy and I have made a mistake in assuming that cp cannot be used to preserve file stamps. "The command line option you should use is -a or -archive which is analogous to -dpR. This copies a directory structure recursively and preserves as much as possible (including time stamps) in the process."

Alex is right, of course. But tar still has one advantage. Andy Holyer points out that adding the v flag to tar, as in:

```
# cd /var ; tar cf - spool |
(cd /somepartition ; tar xvf
 - )
```

prints out a log to the terminal of what's happening and, on a slow network "lets you know whether it's worth going for coffee."

Alex added a further thought which sparked a three-way discussion between us: "Mv won't move files between file systems because it doesn't actually move the files at all, but basically just modifies the directory entry.

"It sometimes annoys me when I forget that /usr/src and /home are separate partitions and I try to mv a file between them. Perhaps mv should be extended to test if the source and destination are on different file systems and, if so, perform a copy and delete action instead of a rename."

I told Alex I found the idea of modifying mv horrifying. "I hate the idea of complicating a long-standing and well understood utility," I said. "Particularly as it would be fairly simple to write a shell script that behaves as you suggest."

Andy agrees with me that the limitation of mv to a single file system can be a useful safety measure which warns that you may not be doing what you think you are doing.

Alex rose to the challenge with a simple script [Fig 3]. The brief was for a script that "behaves as you suggest", which would include error checking. Anyone care to improve on this?

PCW CONTACTS

Chris Bidmead *can be contacted via the PCW editorial office (address, p10) or email* **unix@pcw.co.uk**

Jumping into Java

Terence Green looks at Java possibilities for Warp wannabes. His handy tips along with the software given away free on our cover CD, means you can be Java'd up in no time at all.

While responding to readers' letters complaining about IBM's marketing of Warp, it occurred to me that Warp users would be a lot worse off now if IBM hadn't decided to focus on its key OS/2 customers. Had IBM continued to go against Windows on the desktop, it's quite possible that we would now have even less choice. As it stands, we're guaranteed Fix Packs and the latest Java developments as they appear. It's a testament to that continuing support that we barely managed to get Fix Pack 6 and Java 1.1.4 on the *PCW* cover disc before they were overtaken by Fix Pack 7 and Java 1.1.6 (about which more later).

A word on Warp

Mike Hitchcock is not only dismayed by IBM's rejection of the SoHo and consumer PC market, but also doubtful of the benefits for home users in the Java and network computing direction that Warp is headed. I'm convinced that home users will benefit, but it may take a while to filter through. Some of the Java developments mentioned on these pages, particularly the PalmPilot/Warp connection but also the OS/2 Java FAQ sites, begin to show how it can be used to unite today's PCs with the handheld and consumer devices of tomorrow.

Java will also help reader Darren Hufford, who dislikes having to use Windows 95 at work and then having to convert to the older Windows 3.1 programs that run on his home OS/2 system.

The same program can run on both. Admittedly there are not yet that many shrinkwrap choices, but when there are,
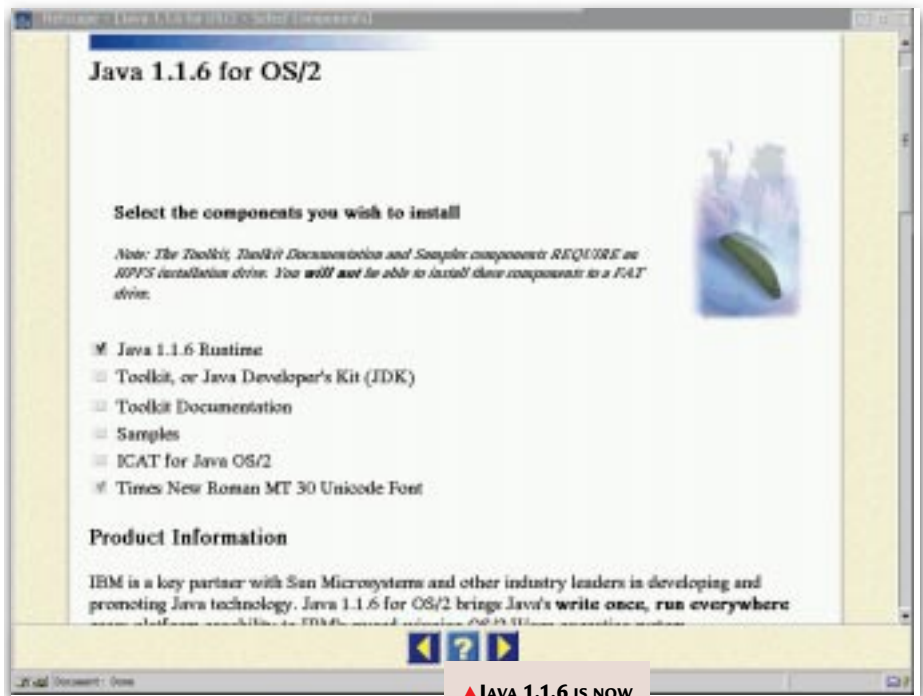
Warp will be among the first to support them. Being able to run the same application on Warp and Windows would make my life a lot easier, too.

I'm writing this column from a friend's home in Cape Town on a Windows 95 system! When I set it up a year ago I would have preferred to have set it up as an OS/2 system because my friend's main applications are word processing and email; but I set it up as a Windows system for an important reason. When things went wrong, as they did because my friend is a complete computer novice, she had access to lots of people who could offer help. Had she been an OS/2 user it would have been down to me to maintain the system from 8,000 miles away.

Now, with Java emailers becoming available (and Lotus SmartSuite for Warp to take care of the word processing) it's looking a lot more possible to set up the Cape Town PC as a rock-solid Warp box. This would be a great improvement over the Windows system which, whenever it cannot dial out, suggests reconfiguring Windows 95. These misleading messages create havoc among novice users.

While I'm pleased that IBM took the

decision to focus on key Warp accounts, because it has brought benefits for home users, there is a gaping hole in this argument which concerns individual Warp users in companies of all sizes. I receive many emails from readers who feel cut off because they have chosen to run Warp at work. They receive no support from their IT department and yet they regularly report better reliability from their computers than those of colleagues running Windows 95.

I can understand IBM taking the Warp spotlight away from consumers, but leaving all single-unit purchasers in the dark prevents individual Warp users in companies from being able to provide a practical demonstration of a solid alternative to Windows 95.

Java 1.1.6

On our *PCW* cover disc you'll find a copy of Java for OS/2 Warp. Java 1.1.6 is totally groovy. It supports Warp 3 and Warp Connect with FixPak 32 or later, Warp 4, Warp Server and Workspace On Demand, so there's a single codebase to support all versions of Warp. It works

Java 1.1.6 is now in three reduced-size packages for easier downloads

The screenshot shows:

Java 1.1.6 for OS/2

Select the components you wish to install

Note: The Toolkit, Toolkit Documentation and Samples components REQUIRE an HPFS installation drive. You will not be able to install these components to a FAT drive.

- ☑ Java 1.1.6 Runtime
- ☐ Toolkit, or Java Developer's Kit (JDK)
- ☐ Toolkit Documentation
- ☐ Samples
- ☐ ICAT for Java OS/2
- ☑ Times New Roman MT 30 Unicode Font

Product Information

IBM is a key partner with Sun Microsystems and other industry leaders in developing and promoting Java technology. Java 1.1.6 for OS/2 brings Java's **write once, run everywhere**

eadsheetsDatabases
es & DTP
Word Processing
Windows3.1
/2 Unix Networks
Visual Programmi

A FRESH SET OF YEAR 2000-READY JAVA RUNTIMES FOR THE NETSCAPE FOR OS/2 BROWSER

IBM Java for OS/2 packages. This resulted in two Java installations in separate subdirectories and potential configuration problems. The 19th June update of Netscape 2.02 for OS/2 (which should be on our cover CD) now works with Java 1.1.6 and no longer needs to include its own Java runtime.

This will be good news for reader Jean-Yves Rouffiac, who ended up with two Java installations and a pile of problems. He can now junk the previous installations using Selective Uninstall, or by deleting the subdirectories and removing all references to them from CONFIG.SYS, after which he can upgrade to Java 1.1.6.

The 1.1.6 download now comes in

three versions: runtime; runtime with Unicode font for Japanese, Korean and Chinese versions of Warp; and the 1.1.6 Development Kit which includes tools, samples and a debugger. The Runtime without Unicode, which you need for Netscape 2.02 releases dated 19th June or later and also for running Java applets and applications, is only about 8Mb. The separate Developer Kit is a 12Mb download and the Netscape 2.02 download size drops to around 5Mb.

We've previously mentioned the Year 2000 problem in respect of Fix Packs, and Java for OS/2 is only Year 2000-ready from 1.1.4 onwards, which means that previous Netscape 2.02 releases that shipped with Java 1.0.2 are not. You can bring Java and Netscape up to Year 2000 readiness by upgrading to Java 1.1.6 and the latest Netscape package.

One item you won't find on the cover disc for a while yet is VisualAge for Java 2.0. It's due for release in October, which means we can get it onto our cover disc for the January 1999 issue. I know it's a long delay, but we're assured that the 2.0 version is worth waiting for.

with the latest Netscape 2.02 for OS/2 release and IBM has split off a runtime version for those who don't want the full developers' kit. It's Year 2000-ready, too.

Earlier Netscape 2.02 updates included a Java 1.0.2 runtime which made for big downloads and created problems for Warp users who added one of the later

PCW CONTACTS

Terence Green *can be contacted by post via the PCW editorial office (address, p10) or email* **os2@pcw.co.uk**

BY THE WAY…

The following snippets were gleaned from WarpCast at www.warpcast .com/.
● If you want to know more about Java and Warp, have a look at the FAQ which Fernando Cassia has at http://fc.home. ml.org/javainst.htm and the screenshot gallery at http://fc.home.ml.org/ javinos2.htm.
● If you have a PalmPilot or IBM WorkPad you might want to try out JPD (Java-Pilot-Desktop), a Java connection for the PalmPilot written by OS/2 people at www.castrop-rauxel. netsurf.de/~arnd.grossmann/jpd/ index.html.
● There's a new IDEDASD.EXE for Warp 3 and Warp 4 which supports EIDE drives greater than 8.4Gb and fixes some problems in Fix Pak #35 and

#6. Find it at http://service. software. ibm.com/os2ddpak/ html/30ABBBF6ABD9D85 F86256598006908FA.html.
● Fortify at www.fortify.net/main. html has released a new free patch for Netscape for OS/2 to enable strong (128-bit) encryption as opposed to the iffy 40-bit stuff we are stuck with outside North America. Note that it's intended for the service level 8 version of Netscape, not the one on our *PCW* cover disc. Hopefully the situation will have changed by the time this appears in print and there'll be a patch from IBM for the latest level of Netscape, but do check the service level before installing the patch. If you open the Help menu and select "About

Netscape" the service level shows up in the title bar of the browser window.

▲ **UPDATED SUPPORT FOR THOSE EVER-GROWING IDE DRIVES, AND THIS ONE INCLUDES DOCS FOR REMOVABLE DRIVES**

Style counsel

Tim Nott likes our style —
the style of our Questions &
Answers section, that is. So
much so, that he thoroughly
recommends it and shows you
here how it's done.

I'm not responsible for the layout
of this column — that's the job of
the production staff — but I do
find it helpful to use a similar
formatting style for the Q&A
section, with the question in bold type,
followed by the questioner's name, also
in bold, followed by the answer in normal
type. Furthermore, I like to have no line
spaces within each query but a blank line
between each complete Q&A, which all
makes for a more logical and legible life.

It wasn't until several months after
the Q&A sections started that I bothered
to spare the few minutes that have since
saved me hours fiddling with formatting.
For all you agony-column writers out
there, here's how to automate it in Word.

Create a new style, based on Normal.
In my case Normal is 12-point Times New
Roman regular with 12-point spacing
after each paragraph and none before.
Call it, say, "Querysig". Make it bold (and
whatever else you want) and set the
Paragraph spacing to zero before and
after. Now the clever bit. In the "Style for
following paragraph" list, select Normal.
Now create another style, called, say,
Query. Format this similarly, but set the
"Style for following paragraph" to
"Querysig". Give the "Query" style a
shortcut key: mine's Alt+Q.

And that's it. I hit Alt+Q, type in the
question, hit return, type in the
questioner's name, hit return again and
I'm back in Normal to type in the answer.
Assuming that I know what it is, that is.

Missing links

Tony Cattermole, you may remember
from July's column, had a problem with a
mysterious, but unknown, key
combination that would cause Word 7
to close without saving files. Sean Blessit
had some interesting insights to offer on
"losing" documents in general. Although
these defaults won't close Word itself,
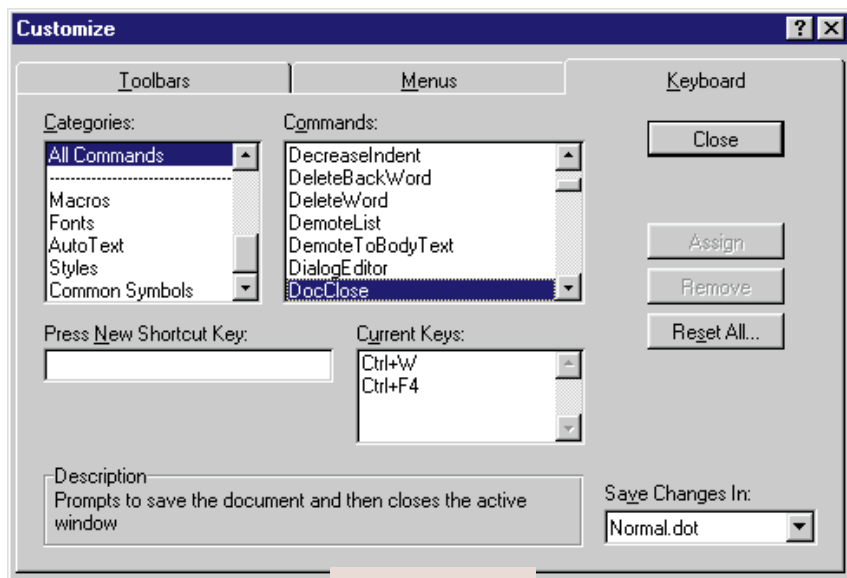
they are potential traps for the
unwary, especially those of us
who frequently have to look
down at the keyboard. Control + A
selects the entire document. The next key
typed will replace the selection, so if, for
example, you start to type "A major
problem…" and accidentally hit the
Control instead of the Shift key, the
following space will wipe out the entire
document. Undo! Undo!

Similarly, Control + N starts a new
document so when you look up you'll see
vast blankness; but the original
document will be hiding beneath it. The
most insidious, however, is Control + W,
which closes the active document.
Imagine, as Sean suggests, that you start
to type the word "Windows" but again,
hit Control instead of Shift. If you're not
looking at the screen, and don't have
sounds turned on, you may not notice
the "Save changes?" alert after Control +
W. Word will then ignore the "i", but will
respond to the "n" by closing the
unsaved file. Nasty, eh?

The solution is to go to Tools,
Customise, Keyboard, and remove the
offending shortcut keys from the
commands in the File menu. It might also
be worth checking that no other
potentially dangerous shortcut keys have
been assigned: FileExit, for example, does
shut down Word. But there's a catch
(isn't there always)? On both my Word 7
and 97 installations, the Control + W

▲ **TURN OFF THOSE DANGEROUS SHORTCUT KEYS**

shortcut doesn't appear in
the list of items under File.
You need to go to "All
commands" and look for "DocClose" in
order to nail the key combination.

WordPro tips

Further to July's plea for help in solving
the propensity of WordPro's custom
dictionary refusing to accept any
additions, I have had one reply. Thanks
to Dave Mooney for the following
selections: "With the spell bar on-screen
select Options, Edit Dictionary. Type the
new word in the Edit box, and the Add
button will un-grey. Press, and bingo, a
new entry." His second suggestion is to
open Explorer and find c:\lotus\
compnent\spell. Turn off both the Read-
only and Archive attributes. This seems
to cure the problem permanently.

Viagra falls

A little fun. Start a Word document, set
the language to US English, and type the
phrase "Unable to follow directions",
without the quotes. Highlight it, hit Shift
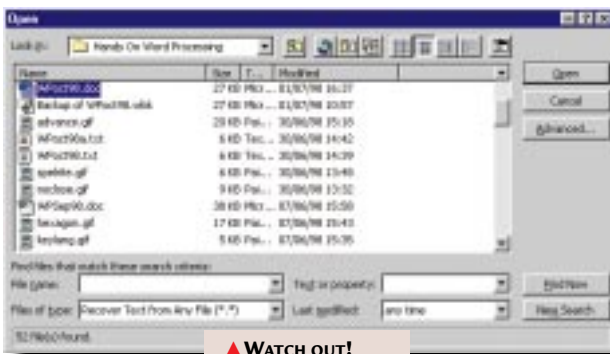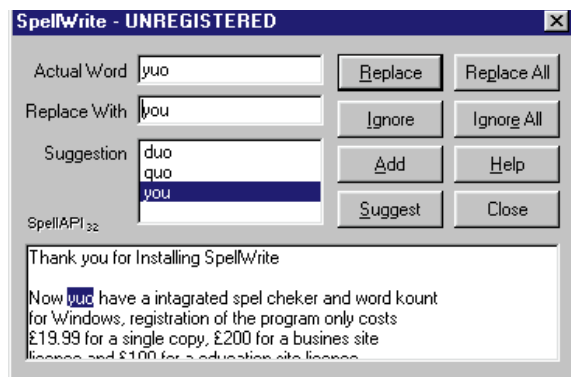+ F7, and see what the thesaurus offers.

PCW CONTACTS

Tim Nott *by post via the PCW editorial office (address, p10) or at* **wp@pcw.co.uk**

cs & DTP
Spreadsheets Databases
Word Processing
Windows3.1
Visual Programming
/2
Unix
Networks

Questions & answers

Q Whenever I open a document from within Word 97 it displays a lot of document information at the bottom of the page. This does not happen if I open the document from the Recent Documents list or Explorer. How do I stop the

▲ **WATCH OUT!** THIS WILL REMOVE FORMATTING AND ADD UNWANTED INFORMATION

superfluous information appearing?

PETER MOODY

a This sounds like you have "Extract text from any file" set as the default "Files of type" in the Word Open dialog. This will append a list of Styles and other information that is stored in the document along with the text. It will also lose the formatting. This setting is "sticky" so if you use it once, it will stay that way until you change it back to "Word Documents".

Q Can you default the Microsoft Write application which comes as part of Windows 3.x to automatically save as text and not as Write format? I don't want to use Notepad as it has a restriction as to how much text can be opened. Are there any Microsoft Write or (Notepad) spell-checking utilities which can be attached?

ANTHONY HUNTE

a No to the first question. Yes to the second. Take a look at the Software Library on July's cover CD-ROM and you will find both Windows 3.x and Windows 95 trial versions of SpellWrite, which checks spelling in any application. If you missed that issue you can get it from www.nerdsunlimited.com.

a Yes, this can be easily done. Save As... then from the "Save as type" list, choose "Text only with line breaks".

Q I would like to use Word 97 to write documents that subsequently are to be transmitted by teletypewriter. The software that does the converting does not recognise word wrapping. Is there a way to automatically add a carriage return when the cursor reaches the end of a column?

GAETANO TIMPERI

▲ **CHECK SPELLING ANYWHERE: FROM OUR JULY CD**

Q In previous versions of Word you could set a "dirty" value to control whether Word prompted the user to save the changed document. Is this possible in VBA?

PETER GUTTRIDGE

a Indeed it is — the incantation is Active Document.Saved=True. For the full dirt, look up SetDocument Dirty in the Visual Basic Equivalents for WordBasic commands section of the Word VBA help file.
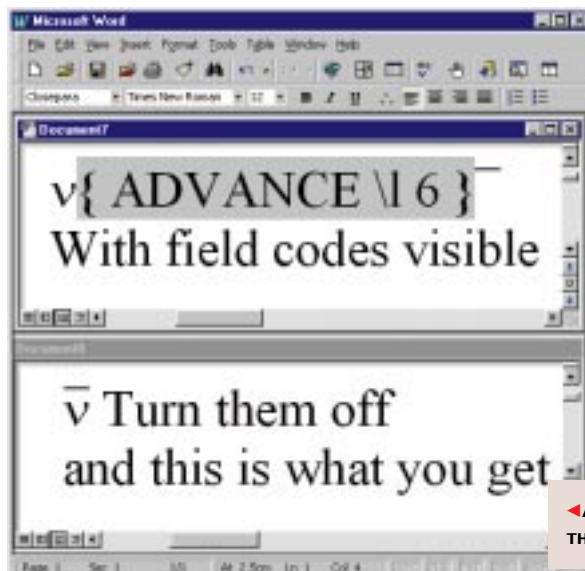

◄ **ALL THE NUS THAT'S FIT TO PRINT**

Q I've recently written a series of physics textbooks. A contributor sent me a file converted from WordPerfect. The antineutrino uses a Greek nu with a bar over it. When these were translated from WP to MS Word, the translation retained the overprinting. But I can't find any info about it in the help files, nor has anyone in one of the word processing newsgroups been able to suggest any cause. A Mars Bar for a correct answer!

MARK ELLSE

a This is Word being clever. If you turn on Field Codes you'll get a clue. The bare nu (looks like a script v) is from the Symbol font. This is followed by an ADVANCE field that repositions the text following, in this case six points to the left, followed by the overscore character (Alt + 0175) in the default font. You can achieve a similar effect by typing the nu, selecting it and adjusting the character spacing from Format/Font. One important point is that if you obtain the nu from Insert/Symbol, rather than just by changing to the Symbol font and typing "n", you'll find it stays protected if the font of the surrounding text is changed.

Add that into the equation

Stephen Wells looks at the Microsoft Equation Editor, which is accessible from Excel and lets you produce graphics for your equations.

Many of a spreadsheet's functions can be written as equations and this depiction of them is often provided in the help files. An engineer and a maths student both recently asked me how they could produce graphics for these or other equations. Office includes a program, the Microsoft Equation Editor, which does this. Access it from Excel: just choose Insert, Object, Microsoft Equation 3.0.

I like to run it independently [Fig 1]. In Explorer, click on Eqnedt32.exe in the C:\Program files\Common Files\MS Shared\Equation directory. When you've created your equation, just choose Edit, Select All, copy your handiwork to the Clipboard and then paste it into Excel or another program for printing.

The Equation Editor has a comprehensive help file but you can use it intuitively. You build equations simply by picking templates and symbols from the toolbar and typing variables and numbers in the slots provided. As you build an equation, the Equation Editor automatically adjusts font sizes, spacing and formatting in keeping with mathematical typesetting conventions. You can also adjust formatting as you work and redefine the automatic styles.

Backup and recovery

Following the recent coverage in this column about backing up and recovering spreadsheet registry and data files, George Mucho has kindly contributed the following: "The Emergency Recovery Utility located on the Windows 95 installation disk will recover registry files and more.

"All the files can be restored by booting into DOS, finding the directory where the information was saved, and typing ERD. It is not necessary to mess
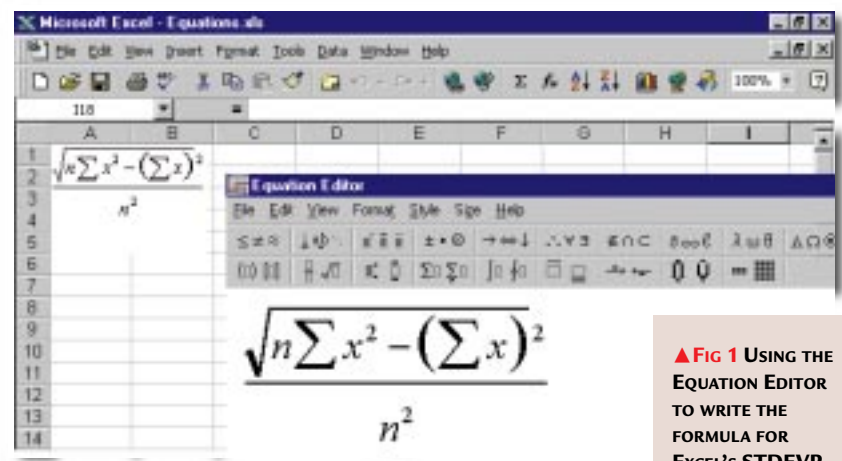
▲**Fig 1** Using the Equation Editor to write the formula for Excel's **STDEVP** function which calculates the standard deviation of a population
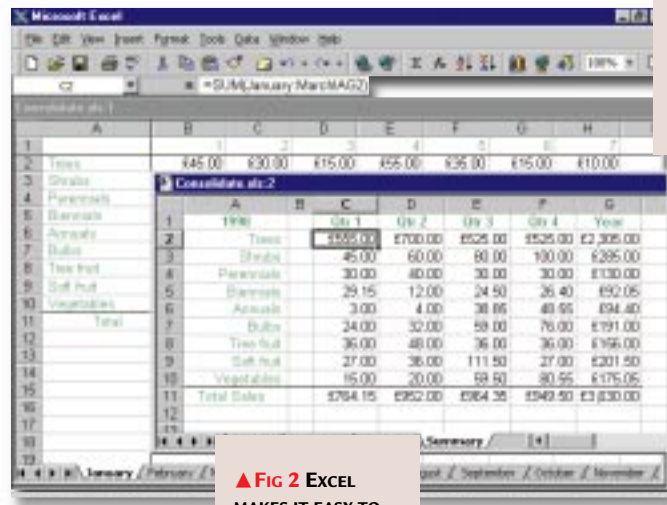
▲**Fig 2** Excel makes it easy to consolidate any group of sheets in your workbook by using **3D** references on a **Summary** sheet

around with attributes. I have been using this utility for two years now and it has never failed."

George has created an illustrated MSWord file, ERD.doc, which suggests how to use this utility and I have included it on this month's cover-mounted CD-ROM.

Consolidation

Cedric Roberts has written in several times in past years, while converting weather forecasting data from SuperCalc to Excel. He writes: "Excel is superb for my requirements and I have finished entering the data from 1956 onwards. I now want to extract information on a variety of topics: hottest day, wettest day,

number of ground frosts and latest air frost."

I would recommend Cedric become familiar with the useful information in the help files in three areas: Consolidation, Microsoft Query, and the Template Wizard with Data Tracking. Excel offers you 3D formulas just as SuperCalc did.

On a summary sheet you could find the highest rainfall for the year with

`=MAX(January:December!Rainfall)`

If you choose Data, Consolidate, Function you'll find nearly a dozen functions in the list box but there are many more you can enter yourself.

For other readers, Fig 2 shows a common use of the consolidation feature: summarising monthly financial records into quarters. Each of 12 worksheets holds monthly records. The 13th sheet summarises it in quarters using formulas like

`=SUM(January:March!AG2)`

which totals the values in cell AG2 on three separate monthly worksheets.

● **Michael Garner asks**: "I am creating a spreadsheet and have the date stored in column A. I then want the month to be stored in column B (i.e. January, February) without having to re-enter information already stored in column A. Is there any formula that I can place in column B to make this happen?"

Excel stores all elements of a date as a number. To repeat the date, enter =A1 in cell B1. If you mean you want to display the full name of the month, do it by entering =A1 and using the Custom format MMMM for B1.

To display the number representing the month (3 for March, 6 for June) use the formula =MONTH(A1) and format the cell as General.

● "**How can I count** the number of cells containing text strings?" asks Jim Smart.

One way to count the number of cells in the range B1:B8 that contain text is:

`=COUNTA(B1:B8)-COUNT(B1:B8)`

COUNTA tells you the number of cells which are not empty. COUNT tells you the number of cells holding numbers.

● **Anthony Atkinson wants to know**: "How do you insert symbols in Excel 97? There seems to be no way to do it from the Insert menu."

The Insert route is the way MS Word works. In Excel you have two choices. The easiest is to choose Start, Programs, Accessories, Character Map, Symbols and copy what you want. The other thing to do is learn the keyboard shortcuts or keep a list of the common ones. Make sure the Num Lock key is on. Then Alt+0188 is a quarter. Alt+0189 is a half. Alt+0234 is e with a grave accent. Ctrl+Alt+a (or Ctrl+Alt+e) is an a (or an e) with an acute accent.

Regarding those features in MS Word that are not available in Excel, Philippa Sutton makes the useful suggestion: "Regarding small caps in Excel 95, I just format the cell and then choose a Small Caps font like Copperplate gothic." Depending on the overall typographic design, that could be just the ticket.

● **Chris Eaton asks**: "How can I put the file path into an Excel header or footer?"

Choose File, Properties, Summary

SORTING COLUMNS

R equests for showing how Excel can sort columns are piling up, so here's an easy method. Say your list has seven columns and (for now) 14 rows, including the headings. Keep a safety copy of it because, during sorting, Excel won't change the addresses to which any formulas refer. Nor will it re-adjust the column widths.

1. Insert a new row at the top of your list and in it enter the order you want. In the example shown here you can see we want column G to become A, F to become B, and so on. Column B will become G.
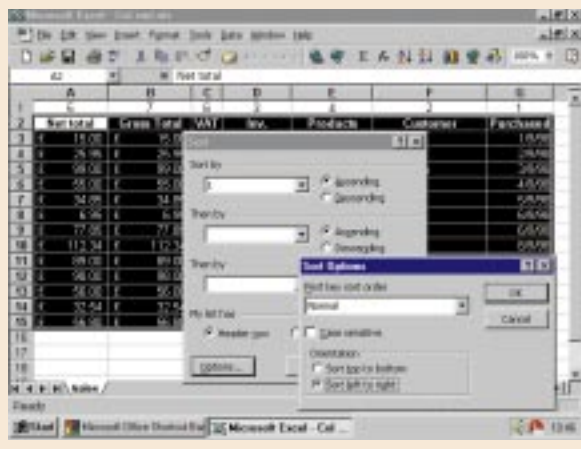
2. Select the range A1 to G15. (In a row sort you just select one cell in the list, but this is different.) Fig 4 (below) shows A2 to G15 highlighted but Excel displays that.

3. Now choose Data, Sort, Options and select the "Sort left to right" button and OK.

4. The Sort dialog box should show Sort by 1. Click OK.
That's it. Sorted.

◄ **FIG 4 YOU CAN SORT COLUMNS IN EXCEL BY INSERTING A TEMPORARY ROW AT THE TOP OF YOUR LIST AND CHOOSING 'SORT LEFT TO RIGHT'**

and enter the path under Title. Then choose View, Header and Footer, drop down the Header list and select the path.

You could alternatively enter the function, =INFO("directory") in the top row of a sheet, choose File, Page Setup, Sheet and select the Row and Headings check box. The directories of the path will be shown.

To include workbook and sheet names as well, save the file once, then use =CELL("filename").

● **Byron Simmonds wants to know**: "How can I adjust the horizontal placing of an Excel header or footer so that it lines up with an adjusted margin?"

Excel headers and footers always use

a 0.75in side margin and you have to go along with it. But you can easily adjust the margin of the print area of your worksheet if you want them to line up.

● **Martin Hayes enquires**: "What's the formula for getting the 'tab' sheet name to appear in a cell on the same sheet?"

The formula in Fig 3 displays both the workbook and sheet name. Excel puts in the curly brackets when you enter this as an array with Ctrl+Shift+Enter. But as you just want the worksheet name (which appears on the tab) you might prefer the semi-automatic but simpler formula =RIGHT(CELL("Filename"),7) assuming that the name on the tab is seven characters. Change that number to suit.

[FIG 3] 'Tab' sheet name formula

```
{=RIGHT(CELL("Filename"),LEN(CELL("Filename"))-
MAX(IF(NOT(ISERR(SEARCH("\",CELL("Filename"),
ROW(1:255)))),SEARCH("\",CELL("Filename"),ROW(1:255))))))}
```

PCW CONTACTS

Stephen Wells *welcomes readers' problems or solutions relating to spreadsheets. Write to him via the PCW editorial office (address, p10) or email* spreadsheets@pcw.co.uk

Patents impending

Two IBM patents, for data storage and classification, highlight the company's commitment to research. When the theory needs to become practice, IBM will be there, says Mark Whitehorn.

I was fortunate enough to spend some time at the IBM research lab in Santa Teresa recently. In an oblique way, the visit brought home to me how much Big Blue is prepared to invest in pure research.

I was in Ron Bingham's office talking about IBM's business intelligence tools when I noticed two patents hanging on his wall and idly enquired as to what they covered. The first turned out to be for a theoretical system that enables any and all data to be classified and stored.

"Surely you can't mean *all* data," I said. "How many objects can it classify?"

"Well," replied Ron (an IBM researcher), "more than there are fundamental particles in the observable universe."

The second patent described something which would allow such a storage/classification system to be implemented. It involved a hierarchy of servers that communicate and issue classifications. It also seems to allow for compression so that objects can be stored more efficiently. I say "seems to", because the patents were fairly mathematical and my brain couldn't cope with the details. In fact, I apologise to Ron if I have misrepresented them. The point is that IBM gave him time to work on a topic that is currently totally theoretical. One day, someone will need this kind of ability in their database and IBM will be there, patent at the ready.

▲ FIG 1 ACCESS OFFERS A LIMITED FORM OF TRANSACTION CONTROL. I KNOW OF A SYSTEM WHERE TRANSACTION LOGGING HAS BEEN IMPLEMENTED, BUT IT'S NOT A STANDARD FEATURE OF THE JET ENGINE

On the trail of transactions

And with that, we move elegantly from a highly theoretical subject with no practical application, to transactions, a theoretical subject with very immediate applications. So first, the theory, and then, why its application is so important.

Certain operations in more complex database applications are intimately tied together, at least in the logical sense. For example, Andy buys Sophie's car. The price of the car is removed from Andy's bank account. Then it is placed in Sophie's account.

If the system performing these actions should crash and only part of the process were completed, then Sophie is going to be very upset (and neither will Andy be best pleased). So, what we do is "tell" the DBMS that these two operations form an entity called a "transaction". The DBMS is told to treat this transaction as one object. Either the entire transaction must succeed, or it must all fail; there must be no half measures, even if the database crashes halfway through the operation.

Roll call

In order to provide this facility the DBMS must, before it starts to carry out the operations in the transaction, write the details of what it is about to do to a file on disk. Then, if the database crashes, when it comes back up it can look at the file and "roll back" the unfinished transactions. (The same can happen if the workstation that initiates the transaction crashes.) The ability to manage transactions in this way can be called "transaction control".

The step from here to "transaction logging" is simple. Instead of discarding the information about each transaction once it is complete, the information is retained in a log file. Indeed, every

TO BE PRECISE

I recently looked at converting characters using the built-in upper-case function. Anthony Blyth <Anthony.R.Blyth @lloyds.com> sent a function (see code.txt on our cover CD-ROM) based on the ASCII codes allocated to letters. This method requires a more intimate understanding of ASCII codes but it enables precise manipulations and conversions. It's trickier, but gives greater control.

operation carried out against the data in the database is logged in this file.

Now, imagine a system that's backed up at midnight on Sunday and that work proceeds as normal until 3.27pm on Monday when a crash'n'trash event occurs. You restore the database to the state at the last backup, and then "roll forward" through all the completed operations in the transaction log, thus bringing the database back to the state it was in just before the crash. Incomplete transactions are, of course, not rolled forward. The restoration and rolling forward can be handled automatically by most client-server DBMSs.

Transaction control and transaction logging work to ensure the integrity of your data in an uncertain world.

The moral of the story? "Take nothing for granted" — except recently, I did.

The sting

While in the US I was asked to attend a presentation, given by the vendor of a financial application, to a prospective client. The package was a client-server system with clients running Windows 95 and the back-end running on Unix.
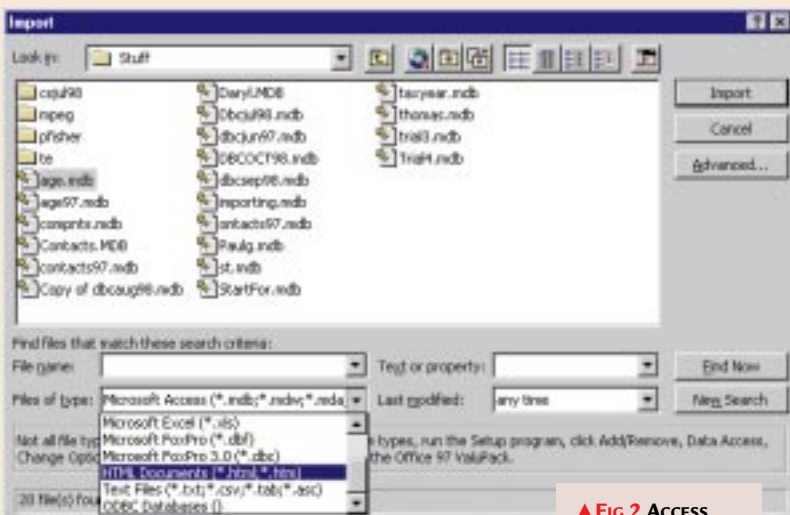
The motivation for purchasing the software came from the financial arm of the organisation, which was satisfied with the way it performed the required financial transactions. I was happy to accept their opinion, accounting procedures being outside my remit.

As for the underlying structure of the RDBMS, I initially took it as read that the proprietary software sat atop WUT (well understood technology) — something like Oracle, or DB2. It took a regrettably long time for me to twig that not only was the software proprietary, but also that the data was stored in a proprietary flat-file system and that a proprietary program was used on the Unix box to access and control that data.

Out of control

At this point, even I could no longer fail to hear the tolling of alarm bells. After all, although it's quite possible for a group of dedicated programmers working for a small company to create an entire DBMS, it is unlikely that they will do better than the entire might of Oracle, or IBM, or Microsoft. So I had to backtrack on the questions I was putting

DOS-TO-ACCESS TRANSFER

Thorkil Mailand <thorkil.mailand@ has.dk> from Denmark has asked about transferring data from an older DOS program to Access. In general, the best approach is to export the data from that package in a format which Access can import [Fig 2].

▲Fig 2 Access imports from sources including dBase, Excel, FoxPro, text (CSV and straight) and ODBC

forward and start asking about fundamentals like transaction control. The answer was simple: there was none. If a workstation hung during order processing, the entire system had to be closed and utilities run to check the integrity of the data files.

There was no transaction log, so even if the system was backed up once a night, any orders created after the backup and prior to a system crash would have to be re-entered.

From bad to worse

This is bad, and it happened to be worse in this particular case. Creating an order automatically printed a paper copy of that order, complete with an order number that was issued sequentially to each as it was created. These paper copies were ready for immediate despatch to suppliers by snail-mail.

It follows from all of this that to re-create the order information which may already have been sent to suppliers, it is necessary to re-enter the data in exactly the same order as was used prior to the crash. If not, re-generated orders won't bear the same order number as

the original. The bad news is that re-entering the data in exactly the same order is essentially impossible, given a multi-user system.

This is not a diatribe against small outfits producing proprietary software — far from it. The imagination and flair of such companies adds enormous value to the existing offerings of big corporations. Small companies can react quickly, filling niches and producing brilliant products. However, there is a strong argument for basing such products on existing DBMS technology and putting programmer effort into making it a superlatively interfaced and highly customised "accountant's friend".

Access has some degree of transaction control [Fig 1] but if you want proper transaction control as described here, you would be well advised to look to a client-server system.

PCW CONTACTS

Mark Whitehorn *welcomes readers' suggestions and feedback for the Databases column. He can be contacted via the PCW editorial office (address, p10) or email* **database@pcw.co.uk**

The SCSI bus stops here

Flag down some sound advice on the venerable Small Computer System Interface — SCSI, or *scuzzy*, as it's more popularly known. Roger Gann presents a run-through of its development.

It's been quite a while since I last broached the subject of SCSI and there have been some significant developments in that time, principally the launch of the Ultra2 standard. But first, some brief background. The Small Computer System Interface — SCSI, prounced *scuzzy* — is a general-purpose parallel bus system that originated from Al Shugart's 1979 SASI (Shugart Associates System Interface). It became an official ANSI in 1986. SCSI in all its flavours is now an acknowledged and very well standardised multi-purpose interface, supporting a wide variety of devices such as hard disks, removable disks, magneto-optical devices, tape drives, printers, WORMs, CD-ROMs, scanners, medium-changers (jukeboxes) and communication devices.

SCSI was originally an 8-bit I/O-bus that allowed connection of up to eight devices, including the host adapter card. SCSI-1, as it became informally known, was a high-speed bus system compared with the peripheral devices around at that time. SCSI-2 followed in 1994. It was not a major leap forward, but it tightened up the standard and added the ability to double and even quadruple data transfer speed on the SCSI bus.

Faster, Wider, Ultra!

The SCSI-2 specification introduced us to Fast SCSI. Or, rather, faster SCSI, because it was a rather broad term referring to devices with data transfer rates up to 10Mbps — twice that of plain vanilla SCSI. It also introduced us to Wide SCSI, which was wide in the sense that it offered a 16-bit data path compared to SCSI's normal eight-bit path and it, too, doubled the data transfer rate to 10Mbps. Add Fast to Wide and you got a data transfer rate of 20Mbps. But Wide SCSI-2 never really made it, as SCSI-2 devices would need two cables to transfer 16 signal bits.

The most recent SCSI-3 specification extends the original SCSI interface to support Ultra SCSI, which permits the

SCSI bus to operate at double the transfer rate. Some of the goals for SCSI-3 include "scatter write" and "gather read" capability, 16 devices per bus, longer cable length, auto-configuration of device addresses, operations on other physical layers such as fibre optics, and 16-bit transfer using a single cable. Just to confuse matters even more, the three SCSI standards — 1, 2 and 3 — were recently re-christened by the SCSI Trade Association. Under a new naming convention they're now referred to as SCSI-1, Fast SCSI and Ultra SCSI respectively.

ULTRA2 IS the latest SCSI technology, offering higher performance and improved flexibility in peripheral configuration. It's no longer based on the single-ended physical interface that previously limited SCSI signalling distance and hence cable length. Previously, as the data transfer rate increased, so the maximum cable length decreased. Ultra2 is also not based on the original high-voltage differential (HVD) interface. Instead, it uses a low-voltage differential (LVD) interface which offers several advantages, in particular extended cable

lengths — as long as 25m in certain cases. Under Ultra2 SCSI, transfer rates on an eight-bit bus will increase to 40Mbps. With 16-bit Wide Ultra2 SCSI devices, transfer rates soar to 80Mbps. The Ultra2 SCSI bus supports seven Ultra2 SCSI devices, while the Wide variant supports
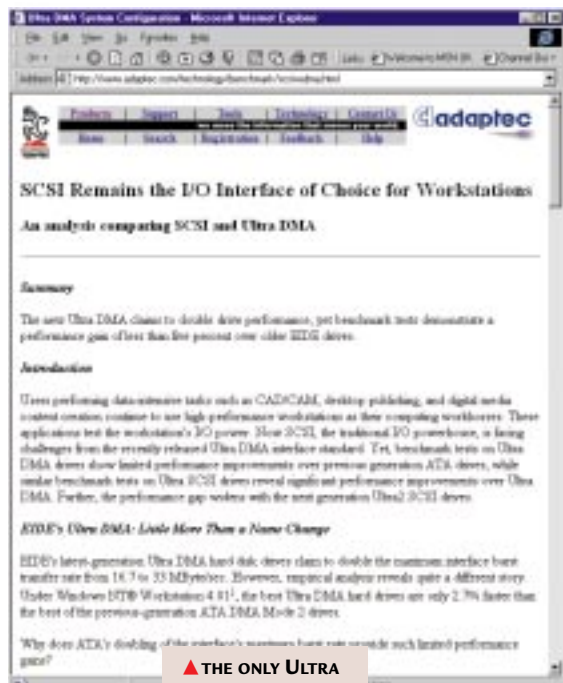
▲ THE ONLY ULTRA 2 SCSI CARD AT PRESENT IS THE WIDE ADAPTEC AHA-2940U2W. A NARROW VERSION IS IN THE PIPELINE

up to 15 devices. Both bus types support only LVD transceivers.

The first Ultra2 Wide SCSI card to hit these shores was the snappily named

SCSI types compared

Mode	Bus Width	Synchronous Speed (Mb/s)
SCSI 1	8-bit	5
Fast SCSI	8-bit	10
Fast/Wide SCSI	16-bit	20
Ultra SCSI	8-bit	20
Wide Ultra SCSI	16-bit	40
Ultra2 SCSI	8-bit	40
Wide Ultra2 SCSI	16-bit	80

Adaptec AHA-2940U2W. Despite the similar model number, this card is, in fact, completely different to its predecessor, the AHA-2940UW. The new PCI host adapter positively bristles with SCSI interfaces and has no less than three internal SCSI ports, for Ultra2 Wide (68-pin), Ultra Wide (68-pin) and "ordinary" 50-pin Ultra/Fast SCSI header. It also has an Ultra2 Wide external connector, plus a spare Ultra Wide socket on a blanking plate, so pretty much every SCSI angle is covered. It comes complete with four cables: a SCSI-2 Wide 68-pin three-connector ribbon cable, a SCSI-2 50-pin three-connector narrow cable, a five-connector

Ultra2 SCSI won't offer any perceptible performance gains over Ultra DMA

Ultra2 Wide terminated cable, and an internal-to-external 50-pin Ultra cable with two additional internal connectors.

ONE ADVANTAGE OF SCSI is that it guarantees backwards compatibility with older devices. As a result, devices equipped with any SCSI interface can be mixed and co-exist on a common SCSI bus. However, the performance of the SCSI bus is limited to the features the host adapter and the devices have in common — that is, the lowest common denominator. Which means that if a SCSI-1 device was on the bus, everything else on that bus would run at 5Mbps. Adaptec's SpeedFlex technology, employed on the AHA-2940U2W, allows you to mix Ultra and Ultra2 SCSI devices on the same SCSI bus and run each at their maximum speed, rather than defaulting to the slower rate.

The SCSI forecast

The SCSI Trade Association forecasts that a SCSI transfer rate of 640Mbps is within reach, and that a rate of 160Mbps will be available within 12 months. More than 32 SCSI devices may be present on these advanced buses. Beyond Ultra2 SCSI, the SCSI Trade Association is talking about Ultra3 and Ultra4 SCSI. Fibre Channel may be offering these kinds of throughputs now, but there's plenty of life

left in the old SCSI dog! But why go for Ultra2 SCSI anyway? Doesn't Ultra DMA deliver fast data throughputs, too? It's true that Ultra DMA and its maximum data transfer rate of 33Mbps narrows the gap between EIDE and SCSI, but raw speed is only one element in the equation. EIDE offers only limited expansion potential. Although some EIDE controllers can support more than two drives, and you can now install two EIDE controllers in a system, EIDE still isn't as flexible as SCSI, which lets you chain up to 15 devices. Another restriction is cable length: an EIDE cable can't exceed half a metre in length, regardless of how many devices you connect. This can be a royal pain with tower cases, because it's often quite a stretch from the motherboard to the drive. By contrast, SCSI cables can total three metres in length. A more serious restriction is that EIDE controllers and drives can process only one I/O command at a time, while SCSI can handle multiple requests simultaneously. This alone will keep EIDE devices out of high-end NT desktop systems. Unlike Windows 95, NT can take advantage of SCSI's ability to simultaneously process I/O commands from multiple applications and get the most out of multiple SCSI-device chains.

SO, SHOULD YOU INVEST in Ultra2 SCSI hardware? Let's look at prices: an Adaptec AHA-2940U2W host adapter will set you back around £235 (ex VAT), while an Ultra2 SCSI drive, such as the 9Gb Seagate Barracuda, will cost £525 (ex VAT). Comparable Ultra Wide SCSI solutions would cost £175 and £500, so the premium you pay for double the bandwidth is modest. However, most modern motherboards incorporate Ultra DMA so the cost of this technology is zero,

▲ **ADAPTEC'S WEB SITE DETAILS JUST HOW LITTLE ULTRA DMA DELIVERS IN REAL PERFORMANCE GAINS**

while a comparable 9Gb Seagate UDMA drive costs £200 (ex VAT). This makes the cost of upgrading to SCSI large enough to warrant economic justification.

OK, what about the performance gain: doesn't that justify forking out the extra for Ultra2 SCSI? Well, if you're running a network file server, or a graphics workstation where you routinely handle multi-megabyte image files, or you are into real-time video editing, then undoubtedly you'll appreciate the very real benefits of Ultra2 SCSI.

BUT IS ULTRA2 SCSI WORTH IT for the average Joe/Josephine? I'd have to say, probably not. While the performance is very impressive, in everyday use Ultra2 SCSI won't offer any perceptible performance gains over Ultra DMA. Don't forget that the data transfer rates quoted are the maximum or peak transfer rates, and sustained throughputs are typically half this. It is true that Ultra2 SCSI is more resilient to demanding tasks and can cope better than EIDE when stressed, but on a standalone PC it is unlikely to encounter situations that put it under much strain. You'd go down the Ultra2 SCSI route for other reasons — flexibility, and the ability to use very long connecting cables. ➡

One of the big bug-bears about installing SCSI devices is that while the host adapter may be plug-and-play, the devices that you attach to it are not self-configuring and have to be manually adjusted in order to get them to work. Two things have to be set: first of all the SCSI ID. All SCSI devices have to be assigned a unique ID number, between either zero and seven, or zero and 15. Generally speaking, the host adapter itself takes the highest ID and the other devices have the pick of the remaining numbers. If you want a bootable hard disk, you should assign SCSI ID 0 or 1 to it. And what if you want to change the SCSI IDs later on? No problem with the external devices, you just click on a button or flick some DIP switches. But internal devices? This entails the complete removal of the unit simply to gain access to a set of miniature jumpers.

Roughly coinciding with the launch of Windows 95 and the upsurge of interest in all things plug-and-play, something called SCAM surfaced. SCAM stood for SCSI Configured Auto-Magically (no, really). SCAM is a protocol for automatic SCSI ID assignment: the SCAM master (typically the host adapter) scans the bus for attached SCSI devices. For compatibility, it also needs to find and identify legacy — that is, standard — manually assigned SCSI devices. Thus the SCAM master gets a map of the attached devices and assigns a valid "soft" ID to each SCAM-compliant SCSI device. After this process, the SCAM master keeps this device table in a non-volatile memory to provide, if possible, an identical ID set up for further boot processes. So, in theory, SCAM extended some of the functionality of plug-and-play across the SCSI bus.

Well, that was the theory. It promised to make the installation of all SCSI devices a whole lot easier, the only thing left to worry about being termination. In practice, the promises made by SCAM have still to be delivered.

WHILE MOST MODERN SCSI hard disks support SCAM, the feature isn't enabled by default, so you have to explicitly enable this plug-and-play feature, which is a little odd. The same is true of SCSI host adapters: on the Adaptec AHA-2940U2W card, SCAM is an option but by default is disabled. The

original release didn't even have this feature. The story gets worse for other peripherals. Most external SCSI peripherals – scanners and re-writable drives, for example – don't feature SCAM at all. Which all seems to be a very great pity, having seen what plug-and-play has done to simplify configuration for other peripherals.

Perhaps I shouldn't be too depressed by the damp squid of SCAM; after all, it was only a partial solution and other things need to be set, too. As well as setting the SCSI ID on a device you

also have to work out whether to terminate it or not. Just as you have to terminate Thin Ethernet network cabling, so you have to terminate your SCSI chain to prevent ghost signals from bouncing back from each end.

SETTING TERMINATION is a pain because every time you add a new SCSI device to the chain, you have to double-check to make sure that only the devices at the ends of the chain are terminated. If you get it wrong, devices become invisible to the host adapter. And the way you actually turn termination off or
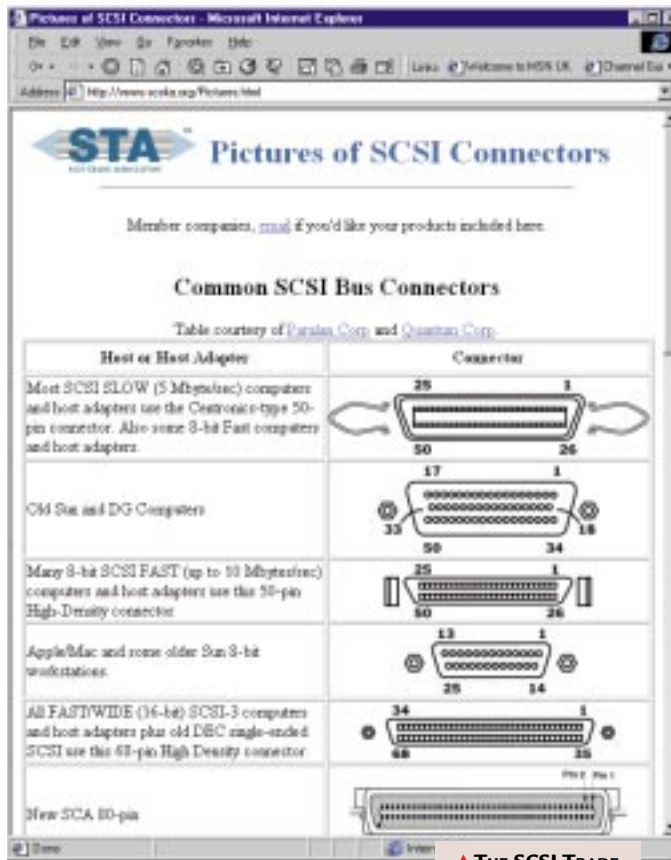
on differs from device to device. So it would be nice if SCAM could sort out termination automatically as well, but it doesn't. Actually, in a weird and rather clumsy way, termination is taken care of automatically by Ultra2 SCSI because instead of the devices themselves being terminated, it's the SCSI cable that does the business.

The rather unusual-looking "mares nest" LVD SCSI cable features a 40 x 60mm printed circuit that takes care of termination issues on the Ultra2 bus. However, the other SCSI buses on the card still need conventional termination.

More on matters SCSI in next month's column.

In theory, SCAM promised to make the installation of all SCSI devices a whole lot easier… the promises have still to be delivered

PCW CONTACTS

Roger Gann *can be contacted via the PCW editorial office (address, p10) or email* **hardware@pcw.co.uk**

Big finish

Bring your instruments to life. Having created a mixer map to control parameters, Steven Helstrip shows you how to complete the assignment of controllers to the front-end of your synth.

In last month's column we set out to create a mixer map to control the AWE synth parameters. Like any other synthesiser, whether it's an inexpensive sound card or a £2,000 workstation, the AWE preset instruments fail to do the card justice. It's only when you start to program for yourself that the instruments come to life. So let's complete the front end by assigning the remaining controllers.

So far we have created two objects: a switch to "turn on" the NRPN MSB and a fader to control frequency cut-off, (effectively a low-pass filter). With the fader set to 127, the filter is fully open and there is no change in timbre. As you lower this value, the sound becomes more muffled as the higher frequencies are filtered out. There are nine more controllers to complete the filter section, including resonance, a six-part envelope, envelope depth and LFO depth.

Resonance

Resonance is the second most important parameter in any filter section. Essentially it allows you to route the filtered signal back into the filter circuitry, which in turn creates a feedback loop. The result is greater emphasis around the frequency range of the filter cut-off.

High settings can produce squelchy 303-like blips, although some care must be taken not to overload the feedback loop at low frequencies as this can damage your speakers at high volumes.

Fade to filter

Rather than create a new object for resonance, copy the filter cut-off fader by dragging the object with the Alt key. This automatically opens the object definition dialog, letting you enter the new controller values. The input line should read B0,62,16,B0,26,XX [Fig 1]. The decimal translation is:

Hex	Meaning (Decimal)
B0	CC Status Byte
62	CC 98: NRPN LSB
16	Parameter 22: Resonance
B0	CC Status Byte
26	CC 38 Data Entry LSB
XX	Variable

The filter envelope allows you to shape the filter over time and provides delay, attack, hold, decay and sustain parameters. A master control to set the overall envelope depth is also supported, along with depth for the first LFO (low-frequency oscillator).

The AWE has two LFOs which can be set independently, with parameters for rate and delay. When applied to the filter envelope, you can create anything from subtle tremolo and Leslie effects to warped, Prodigy-like synth patches.

Fig 2 shows the remaining parameter values to complete the filter section.

As with the resonance controller, copy an existing fader to create the new objects, changing the input line and names accordingly. Note that the minimum and maximum values for envelope depth should be set to 64 and 127 respectively.

To make the panel layout more authentic, I have copied the design of the Roland JP-8000 synth and assigned dials

Fig 1 HERE'S THE OBJECT DEFINITION FOR RESONANCE

[FIG 2]

Filter envelope parameters

Parameter	Input Line
Delay	B0,62,04,B0,26,XX
Attack	B0,62,05,B0,26,XX
Hold	B0,62,06,B0,26,XX
Decay	B0,62,07,B0,26,XX
Sustain	B0,62,08,B0,26,XX
Release	B0,62,09,B0,26,XX
Env. Depth	B0,62,18,B0,26,XX
LFO1 Depth	B0,62,17,B0,26,XX
Amplitude Envelope	
Delay	B0,62,0A,B0,26,XX
Attack	B0,62,0B,B0,26,XX
Hold	B0,62,0C,B0,26,XX
Decay	B0,62,0D,B0,26,XX
Sustain	B0,62,0E,B0,26,XX
Release	B0,62,0F,B0,26,XX
LFO1 Depth	B0,62,14,B0,26,XX
Pan	B0,0A,XX
Effects	
Reverb Send	B0,62,1A,B0,26,XX
Chorus Send	B0,62,19,B0,26,XX
LFO1	
Rate	B0,62,01,B0,26,XX
Delay	B0,62,00,B0,26,XX
LFO2	
Rate	B0,62,03,B0,26,XX
Delay	B0,62,02,B0,26,XX
Pitch	
LFO1 Depth	B0,62,11,B0,26,XX
LFO2 Depth	B0,62,12,B0,26,XX
MIDI Reset	B0,79,XX

Questions & *answers*

Q I have the musical acumen of a cricket stump, so your series of articles has stimulated me to dabble in computer-generated sound and composition. I have a SoundBlaster 16 and use Evolution Audio for sequencing. The FM synthesis of the first 16 GM instruments is very good. After that, however, all instruments are just variations on an organ. How do I get more realistic instrument sounds, or is this a case of getting what you pay for? I don't have a separate MIDI Mapper Applet in the Control Panel: *should* I have one?

LOCKY@GLOBALNET.CO.UK

a *You don't have to replace your sound card if it's just higher- quality instruments you're after. The SB16 provides a feature connector that allows you to connect a WaveTable daughterboard. By far the best upgrade is Yamaha's DB50XG, which you* can get hold of for around £89, or it may be worth checking out a software synthesiser. Again, Yamaha is leading the way with its S-YXG50. This offers a better spec than the DB50XG (up to 128 voices) although there is some latency when playing the synth directly. So, the bad news is that you will

▲ YAMAHA'S VIRTUAL SYNTH. WATCH OUT! IT HAS A HUGE APPETITE FOR RESOURCES

still have to make do with more FM organs while recording parts. For a 90-day free demo, go to www.yamaha.co.uk. The MIDI Mapper applet was a feature of Windows 3.1. Windows 95 has a similar utility, although this is found in the Multimedia Control Panel.
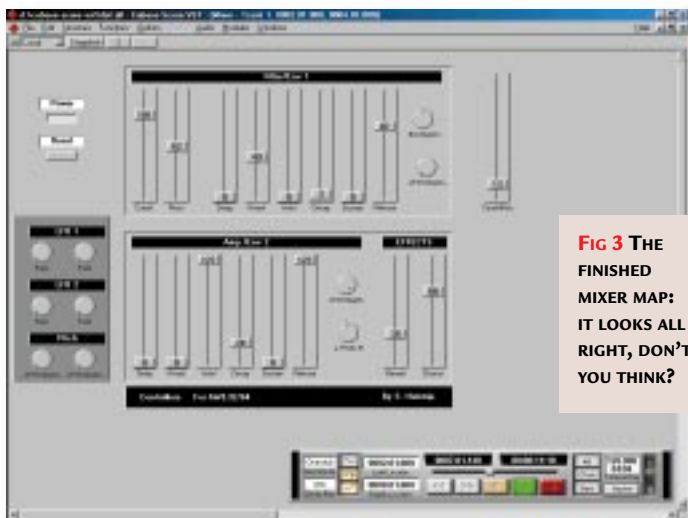

FIG 3 THE FINISHED MIXER MAP: IT LOOKS ALL RIGHT, DON'T YOU THINK?

to envelope and LFO1 depth. For the title bar, simply create a text object and choose a background colour to suit.

Envelope settings

Next come the envelope settings for amplitude, or level. This is a six-part envelope with identical parameters to the filter envelope. Using the Alt key, select the envelope objects from the filter section and drag them to a clear area on the screen. Fig 3 shows the corresponding parameter values for this envelope, along with the remaining controllers.

A standard CC:10 is used for setting the pan position. To centre the pan pot by default, check the Centred option in the object definition dialog. Continue to create new objects for each of the remaining controllers and group them under the headings: Effects, LFO1, LFO2 and Pitch. The effects parameters can be positioned beside the amplitude envelope, while the LFOs and pitch controllers are best grouped together.

To complete the mixer, all you need is a switch to reset the instrument patch in case anything should go wrong while you are tweaking away. This is a standard CC:121. However, don't forget to reinstate the NRPN MSB, or power switch, following a reset.

To create a 3D, or embossed, effect for the banks of controls, create an empty text box and select the embossed style from within the object definition dialog. When the box is correctly sized and positioned, choose Send Behind from the Mixer Local menu.

By setting up groups, it is possible to control two or more faders from just one object. This is particularly effective when the faders in question are frequency cut-

off and resonance, moving in contrary motion. To set this up, create a new object (a fader, say):

1. Within the Master section, set the mode to Prop and select Group 1.
2. Open the cut-off and resonance objects in turn and set both to group 1.
3. To achieve contrary motion, select the Reverse option from one of the objects.
4. To try it out, set both frequency cut-off and resonance to 64 and "play" the new controller.

And there we go: a virtual front-end for the often untouched AWE synth. The final mixer is on this month's cover disc.

Storing with SnapShot

The intended purpose for mixer maps is to control various parameters in real time and record your movements to a special mixer track. However, using the SnapShot feature, you can store your instrument settings, or patches, and play them back at the start of an arrangement.

Once you have the desired settings in place, select all the objects (Ctrl-A) and click on SnapShot. Up to 22 settings can be stored. To "play" them back, simply click on the newly-created icon.

PCW CONTACTS

Steven Helstrip *can be contacted via the PCW editorial office (address, p10) or email* **sound@pcw.co.uk**

Button up

Ken McMahon looks at fasteners — buttons, that is. With lighting controls and bevel filters it's now easier to create them for your web sites.

Creating great-looking buttons for a web site is a much easier business than it used to be because most bitmap editors now include lighting controls and bevel filters. For all but the most simple web sites you need to produce quite a few buttons, so it will speed things up if you can automate part of the process. By using Picture Publisher's Bevel Factory and Lighting Studio to enhance the look of your buttons, and using the command centre to automate the process, you can quickly create a bucketful of excellent-looking buttons. You can use broadly the same technique in any application that supports scripting, like Adobe Photoshop, Corel Photopaint or Metacreations Painter.

1 **CREATE A NEW DOCUMENT** of 400 x 100 pixels at 72dpi (it's easier to work on at this size). Next, select the rectangular mask tool and set the option to a constrained size of 350 x 75 pixels.

2 **PRESS F7 TO BRING UP** the swatches palette and load either the Internet Explorer or Netscape palette, depending on which browser your site is optimised for [Fig 1].

▲ **FIG 1** LOAD A BROWSER PALETTE AND CHOOSE CONTRASTING COLOURS FOR THE BUTTON PANEL AND TEXT. BY USING A NETSCAPE OR EXPLORER PALETTE YOU'LL AVOID DITHERING OR UNWANTED COLOUR CHANGES WHEN THE IMAGE IS DISPLAYED IN THE BROWSER
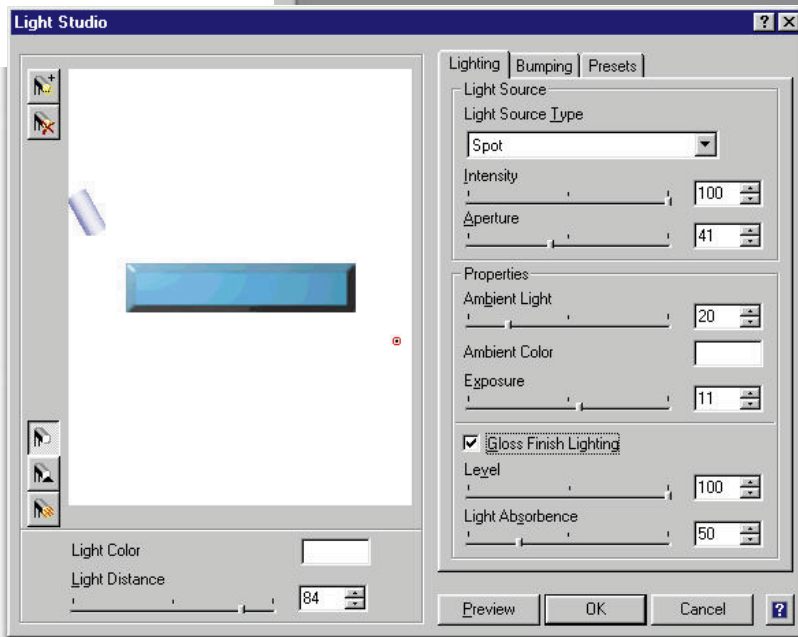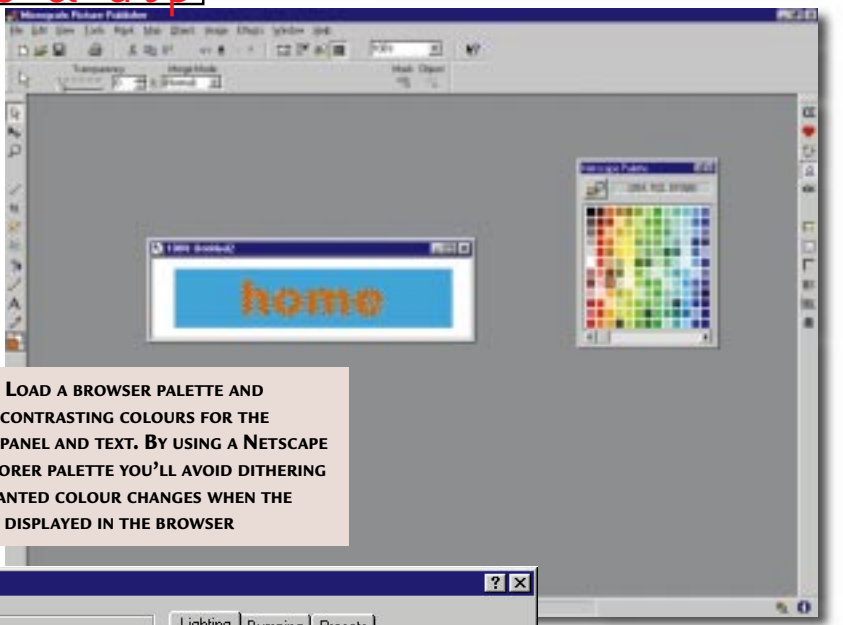

◄ **FIG 2** USE THE LIGHTING STUDIO AFTER BEVEL FACTORY TO CREATE A SPOTLIT EFFECT. IF YOU HAVEN'T COMBINED THE TEXT AND PANEL OBJECTS YOU'LL HAVE TO DO THIS FOR EACH. MAKE THE APERTURE AT LEAST **40** OR YOU'LL GET UNPLEASANT SHADOWS AT THE EXTREMITIES

▶ **FIG 3** IN THE COMMAND CENTRE YOU CAN GROUP OPERATIONS TO MAKE EDITING EASIER, BUT ALL YOU REALLY NEED TO DO IS DOUBLE-CLICK THE TEXT COMMAND AND SUBSTITUTE THE NEW TEXT. TO CHANGE THE PANEL COLOUR YOU WOULD SIMILARLY DOUBLE-CLICK THE TEXTFILL COMMAND FROM THE PANEL GROUP, THEN PRESS RESET AND PLAY
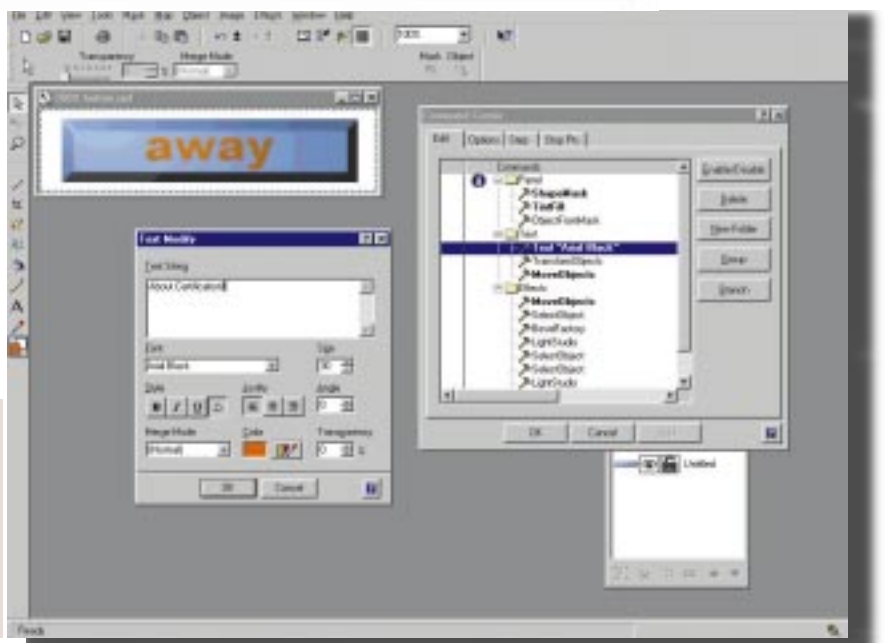
3 **SELECT A COLOUR** for the button and use the active colour fill tool to fill the mask. Then convert the mask to an object by pressing Ctrl-W or by using the object menu.

4 **PICK A CONTRASTING COLOUR** from the palette, select a suitable sans serif font (I've used Arial Black) and use the text tool to create the button wording. Don't worry if it doesn't fit exactly: you can use the transform tool to resize the text before moving it into position. Remember to leave sufficient space around the edges for the bevel we're going to apply later, and to leave space top and bottom for ascenders and descenders. It's also a good idea to start with the biggest word first, so you can be sure all the others will fit. If you create your template for the "home" button (as I have done) you're going to have problems with "about certification" or any other long text. If you combine the button and text objects using "combine

100% button.ppf — home
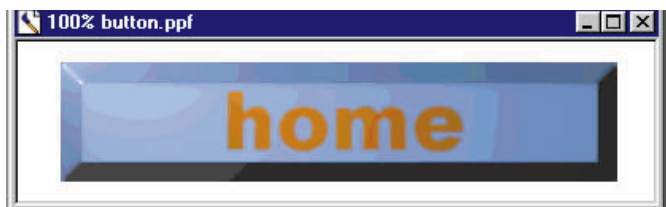
objects together" from the object menu, the subsequent light effects will apply to both the text and the panel but you won't be able to move it independently, which you may need to do for subsequent buttons [Fig 2].

Effective lighting

If you don't combine the text and panel, you'll need to apply the same lighting effects independently to each.

1 **SELECT THE NEW OBJECT** (or just the panel if you haven't combined) and choose Bevel Factory from the effects menu.

2 **DRAG THE PREVIEW WINDOW** so that you can see the top left corner of the button and set the parameters until you get the desired result. I've used a bevel width of 12 with a smoothness of 6, light intensity 85, highlight 95 and shadow depth 32.

3 **IF YOU CHECK** the light studio box and click OK, you'll go straight to the light studio dialog, but via this route it behaves strangely and gives unpredictable results. Instead, leave the box unchecked, click OK, then select Light Studio from the effects menu.

4 **IN LIGHT STUDIO** use a spotlight positioned at the top left of the button and position the focus point at the bottom right. Use a fairly wide aperture setting (I've used 50) and an intensity of 100. Check the gloss lighting box and click OK.

5 **SELECT SIZE** from the image menu and change the width to 100 pixels. The height will size proportionally, using the default settings.

That's the button finished. Save the file as a .ppf, remembering to check the save command list box. Then open the command centre from the edit menu. It helps to see what's going on if you group the steps. I've organised them into three folders: panel, text and effects. Just shift-select the relevant steps, hit the group button on the edit panel and rename the folder [Fig 3]. To create new buttons, double-click on the text step and insert your new text in the dialog that appears. Then select the steps tab, click the reset button and press play. You can edit the button colour in the same way, by double-clicking on the tintfill step.

Finally, if you want a transparent background, export the button in gif format: use the eyedropper to select the white background as the transparent colour. If you want to check how your button will look against a tiled background, hit the browse button and select your web page tile, then hit the full-screen preview icon.

Map copyright

Following Ian Cargill's question about reproducing maps (*PCW* July) a number of you wrote regarding the copyright position on copying OS maps. Andrew Newton thinks we're on dangerous ground. "As I understand it," he writes, "the law is very strict in stating that

written permission must be gained before copying a map…". My personal opinion is that if you are creating a new map, rather than a direct facsimile, and are only using an OS map as a reference, there's no problem. But where copyright is concerned, it pays to check. Andrew has provided contact details (*below*).

Maximum impact

What's packed with professional features, fairly priced, and one to watch in video production? Benjamin Woolley puts the new Infini-D in the frame. Plus, MetaStreams: will it swamp VRML?

A 3D graphics authoring package claiming to offer professional-grade features for around £600 has got to be worth a look, given that alternatives can cost three or four times as much.

The product in question, Infini-D, is a rather odd one in terms of its position in the market. Version 4.5 was launched last April and I finally got my hands on a review copy in June. I was eager to see what you got for such a reasonable price and keen to experiment with its ability to produce objects that are compatible with MetaStreams, the new file format for streaming 3D over the web.

More on MetaStreams below, but first I'll deal with the Infini-D package itself. It claims to offer "Maximum 3D for Video Professionals" and substantiates that claim by littering its publicity material, documentation and CD with examples of its use to generate title sequences for television shows such as America's Funniest Home Videos.

Cheers!

This is 3D graphics at its cheesiest: flying logos, glinting text, crude colours and messy design. I suppose someone has to do it — and they evidently do it with Infini-D. However, it would be a mistake to view this package as being as hideous as some of the images it produces. It turns out to be quite a powerful tool for creating animations for video.

It is published by MetaCreations as part of a rather haphazard kit of 3D tools that the company has acquired through various mergers (Bryce, Poser, Painter 3D). MetaCreations even boasts another complete 3D authoring suite in its line-up, Ray Dream Studio (which is only about half the price of Infini-D), now aimed at graphic designers, web developers and multimedia producers.

Infini-D bears no obvious relationship to any of these other products; it does not even support their respective proprietary file formats. It stands alone, offering a different interface and feature set.

You can tell that it is aimed at video production because the renderer includes many of the tools you need to successfully output animations to video. Probably the most important is that it will render to fields as well as to frames. This is essential because video is made up of two fields for each frame, one interlaced with the other. If an animation is rendered without fields you end up with a flickery result when it is converted into video.

Other useful video-specific facilities include automatic colour adjustment to ensure that the colours in the final render come out the same no matter whether the video is to be broadcast using NTSC, the video encoding standard used in America and Japan, or PAL, used in most of Europe (except France) and parts of the Far East.
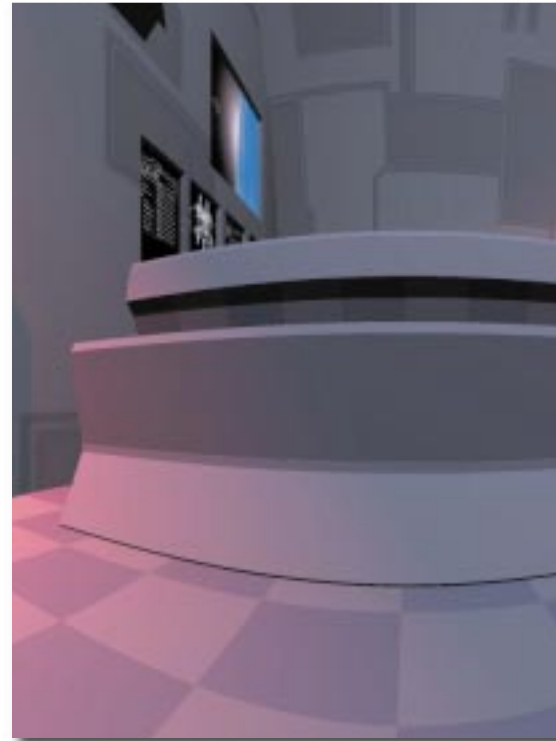
Infini-D will also check that the colours are "safe". In other words, that they do not go beyond the legal broadcast limits set by broadcasters and regulators (to stop TVs being blown up).

Another feature which produces a subtle but important difference is an ability to render "non-square" pixels: i.e. pixels that are slightly stretched to reflect the aspect ratio of a TV screen, which is flatter than that of a computer monitor.

Compositing, where you layer one image (usually a computer-generated one) over another (often live action) is well supported. For example, there is the "ShadowCatcher" facility. This is a property that can be set for an object so that when it is rendered, its shadow information is put into the alpha channel, which can then be used as a mask to add the shadow to the background.

Audio (another element of post-production) is supported via the animation sequencer. The implementation is adequate but rendered rather useless if you don't use the QuickTime movie format for sound; no other format is supported.

These are the minimum facilities you need when you are using 3D graphics to create video and it is worth looking out for them when choosing an authoring package. Infini-D provides an adequate though hardly lavish set, combined with a good modeller and texture editor.

On the Mac track

Infini-D has a few peculiarities and several omissions, though. Most of these relate to it being a Mac product almost grudgingly turned into a Windows one.

For Mac users, this turns out to be good news. Not only do you get network rendering but almost complete support for authoring QuickTime media (for example, QuickTime VR panoramas like that illustrated above). QuickTime is excellent and version 3.0 works well under Windows. The trouble is, most of the tools and conversion utilities will only run on the Mac.

The price is wrong

These are mere quibbles, however, compared to my biggest criticism of Infini-D, or rather the company selling it: you can buy it in the US for the same number of dollars as pounds in the UK — we have to pay well over a third extra for exactly the same product (the same applies to Ray Dream Studio). MetaCreations even has an online store

▲ **A QTVR PANORAMA, CREATED USING INFINI-D**

at its web site offering the product at a knockdown US price — and then informs you that only US and Canadian customers are eligible. For the (almost) £150 price difference, you could afford to fly out to America and buy a copy there!

Streaming 3D

VRML is facing competition from another quarter, other than Microsoft (*see box, below*) in the form of the new MetaStreams standard. MetaStreams was developed by MetaCreations in collaboration with Intel (which is interested in any development that

demands a fast Pentium system to be fully appreciated) and is designed to "stream" 3D content over the internet.

To use it, you need a special viewer, from <www.metacreations.com>. It works very smoothly, running as an Internet Explorer 4 plug-in on a 300MHz Pentium II. The streaming means that low-resolution versions of the model and its textures are downloaded first and these become steadily more refined as more data arrives down the line. Meanwhile you can inspect what you've received so far, using the viewer's simple but effective navigation tools.

The streaming has partly been made possible by MetaCreations' Real Time Geometry (RTG) technology, which

provides a method of dynamically controlling the resolution (i.e. number of polygons) of 3D objects, or the frame rate at which they can be animated. Infini-D 4.5 is the first package that supports both RTG and the MetaStream format, and my experience of both is that they are neat and powerful.

So is MetaStreams going to swamp VRML? MetaCreations claims it is designed to do a more specialist job, as it is about delivering 3D objects, rather than worlds, over the internet. However, the company intends the standard to become a public rather than proprietary one, which means that it clearly wants to establish its use across the web, not just in some particular niche.

Worse, from VRML's point of view, Microsoft has just negotiated a licence to integrate it with DirectX, which is already established as something of a standard on Windows 95 systems. This will mean that soon everyone with an up-to-date version of DirectX running on their Windows system will be able to view MetaStreams files without going through the bother of downloading a viewer.

FRIENDS, ENEMIES & CHROME 3D

There were once hopes that VRML, the 3D modelling language for the web, would become as widespread as HTML. It does not now look so likely. Microsoft launched an attack on VRML's technological inadequacies at the influential WinHEC

conference in March, and if you've got enemies like that, you're going to need powerful friends. Microsoft was announcing its own version of a 3D language for Windows, codenamed "Chrome". Details remain sketchy, and it could yet turn out to be another of

Microsoft's tactical manoeuvres rather than a technological development. It demonstrates, though, that at least as far as Microsoft is concerned, 3D is too valuable to leave to the public domain.
● See also, "Streaming 3D", main text

PCW CONTACTS

Benjamin Woolley *can be contacted via the PCW editorial office (address, p10) or email* **3dgraphics@pcw.co.uk**
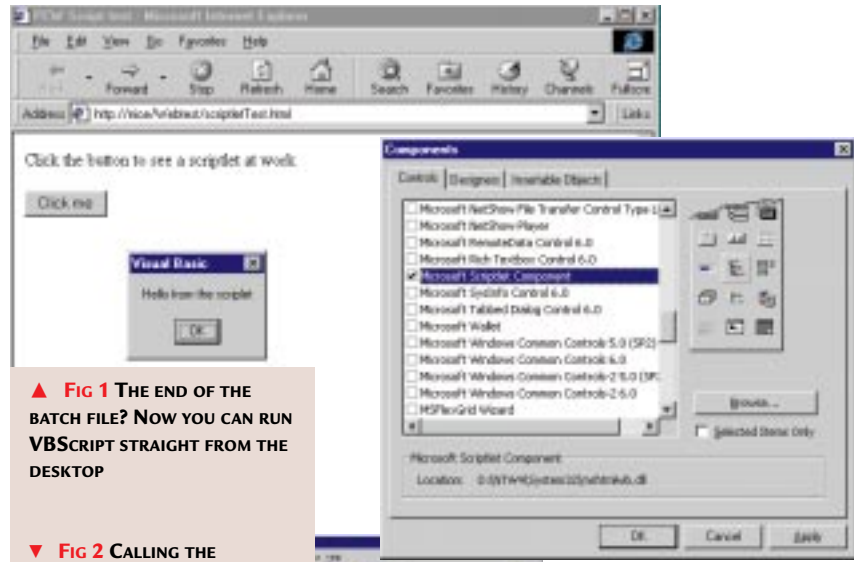
The scriptlet zone

Why bother with batch files when you can run VB Script right off the desktop? Tim Anderson explores the world of scripts and scriptlets.

I f you have an idle moment, try this: right-click the Windows 95 or NT 4.0 desktop, choose New Text Document and then double-click to open the new file in Notepad. Type some exotic code like:

`Msgbox "No more batch files"`

Save the document and then rename it with a .VBS extension. Double-click and a message should appear. If not, no problem. You need the Windows Scripting Host, which is free and is an option in Windows 98 setup, or in the NT 4.0 Option Pack, or as a download from Microsoft's web site. Once installed, you can run either VBScript or JScript straight from the desktop [Fig 1] — a neat trick which is evidence that Microsoft is serious about scripting.

VBScript started life as a rival to Netscape's JavaScript in Internet Explorer 3.0, but has developed to the point where a full COM automation scriptlet, or script object, can be created with

▲ **FIG 1 THE END OF THE BATCH FILE? NOW YOU CAN RUN VBSCRIPT STRAIGHT FROM THE DESKTOP**

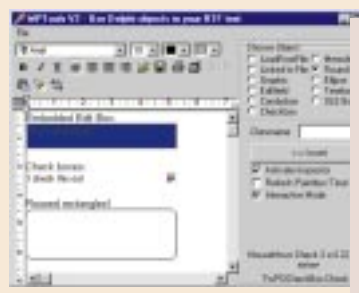▼ **FIG 2 CALLING THE SCRIPTLET FROM VISUAL BASIC**

▲ **FIG 3 ADDING THE SCRIPTLET CONTAINER TO A VISUAL BASIC APPLICATION**
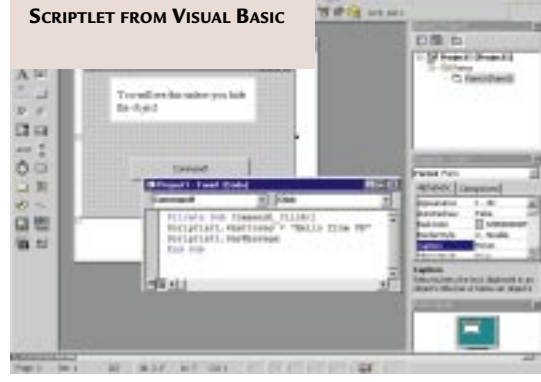
Notepad and a few lines of code. How useful this is remains to be seen, but it does mean that VB skills can now be used anywhere in Windows.

SNIPPETS

The Sax Basic Engine lets you add macro programming to your VB application or any that supports COM automation. The new version is VBA-compatible and makes it easy to add custom extensions. By using the Active Template Library, Sax has halved runtime size and removed dependency on VB or MFC runtime files.
● Delphi users should take a look at Word Processing Tools v2, a native Delphi component for working with rich text. It's useful for 16-bit Delphi users or for situations where Delphi's rich text control is not enough. Version 2.0 supports true WYSIWYG printing, embedded objects and full undo.

◄ **WPTOOLS IS A NATIVE DELPHI RICH TEXT CONTROL WITH MANY ADDITIONAL FEATURES. IT EVEN WORKS IN DELPHI 1.0**

There are some rough edges, particularly in the documentation, but on the plus side the author is responsive to problems, full source is available, and it is inexpensive. Delphi 4.0 support was not available at the time of writing.

Windows scripting

Windows scripting is based entirely on COM, ActiveX, or whatever you like to call Microsoft's object technology. At its heart is an ActiveX scripting interface which sits between client applications such as Internet Explorer or the Windows Scripting Host, and script engines such as VBScript and JScript. If you feel so inclined, you can create your own script engine (a Perl script engine is available from a third party).

You may be wondering which language to use. VB is easy, performs well, and is most likely to be familiar to Windows users. JScript is based on JavaScript and conforms to a standard laid down by the ECMA (European Computer Manufacturers Association). JScript is the best choice for web pages because used with care it will run in NetScape as well as Internet Explorer, although in this case you will need to

A simple scriptlet

```
<html>
<head>
<title>Message➡
 Scriptlet</title>
</head>
<body>
<p>You will see this unless
you hide the object </p>
<SCRIPT➡
 LANGUAGE="VBScript">
Dim public_whattosay
Sub public_sayMessage()
MsgBox(public_whattosay)
End Sub
</SCRIPT>
</body>
</html>
```
(Key : ➡ Code continued on next line)

avoid its ActiveX extensions. Internet Explorer 3.0 can run scripts but although this opens up great possibilities for dynamic web pages or web applications, it is a messy way to program.

It is hard to avoid bugs if you have little sections of script strewn all over an HTML page, and if you want to re-use code on another page the only option is copy and paste.

Scriptlets, introduced in Internet Explorer 4.0, are an attempt to bring scripts under control. Instead of including all your script in the current page, you can create dedicated scriptlet pages that become a code library. You can then reference those pages using the Object tag, set properties and call methods. Figs 4 & 5 show the simplest example. Although in this example the scriptlet has been hidden using the visibility style tag, there is no problem with having it display a user interface. Looking at it one way, you are simply embedding one HTML page inside another. Looking at it another way, a scriptlet is the easiest way to create an ActiveX control.

Container control

To prove the point, Visual Basic 6.0 comes with a scriptlet container control that lets you include a scriptlet in a VB application [Fig 2]. Yes, an ordinary application that runs from the desktop.

A simple client page using a scriptlet

(Requires Internet Explorer 4.0)
```
Note: You must change the Data tag in the OBJECT element to
the URL of where you placed the page in Listing 1. In this
example they are in a local directory, D:\WebTest.
<html>
<head>
<title>PCW Script test</title>
</head>
<body>
<p>Click the button to see a scriptlet at work</p>
<BUTTON TYPE="BUTTON" LANGUAGE="VBScript"➡
 onclick="TestScriptlet">
<p>Click me </BUTTON> </p>
<OBJECT ID="ScriptObj" TYPE="text/x-scriptlet"➡
 Data="file://d:\WebTest\pcwScriptlet.html"
style="visibility:hidden">
</OBJECT>
<SCRIPT LANGUAGE="VBScript">
Sub TestScriptlet()
ScriptObj.whattosay = "Hello from the scriptlet"
ScriptObj.sayMessage
End Sub
</SCRIPT>
</body></html>
```
(Key : ➡ Code continued on next line)

Talk to the scriptlet

```
Private Sub Command1_Click()
Scriptlet1.whattosay = "Hello from VB"
Scriptlet1.SayMessage
End Sub
```

Word the WSH way

```
setwd=createobject("Word.application")
wd.Visible = Truewd.Documents.Add
Set wd = Nothing
```

Here is how you can include your scriptlet:
1. Start a new, standard VB application, right-click the toolbox, choose Components, and select Microsoft Scriptlet Component [Fig 3].
2. Add a Scriptlet control to the form.
3. Set its URN property to point to the scriptlet page. This can be either a file location or an ht address.
4. Now you can write code that talks to the scriptlet [Fig 6].

Mein Host

Like Internet Explorer, the Windows Scripting Host (WSH) is a client application for the ActiveX Scripting interface. The difference is that WSH is small and lightweight — so much so, that you will not notice a significant loading time. Scripts such as the "no more batch files" example (*mentioned at the beginning*) have a file association with WSH, so when you open them WSH runs the script.

You also get the benefit of the Wscript object which is a COM interface to the WSH. Crucially, this has both CreateObject and GetObject methods through which you can get at any automation objects available on your system. Fig 7 shows how you could start a new Word document the WSH way.

Save this as a text file with a .vbs extension, double-click and, all going well, Word will open. I know there are easier ways to open Word but the point is that once you have a reference to the Word object, you have full control over Word with interesting automation possibilities.

This also means that when you want to know how to do something with WSH

Questions
& *answers*

Q I write a lot in VB, and over the years I've built a large repository of code which I use regularly. I believe it's possible to create an ActiveX DLL which can hold all these routines globally. But the $64,000 question is, how? I have tried, but each time I try to call a DLL'd function from within a project, I can't.

GRANT MATTHEWS

a Here's how you can do this with a VB DLL. Note that you need the Professional or Enterprise version of VB.
**1. Create a new project, ensuring that the Project Type is ActiveX DLL. DLL functions need to be in a class module so, if you do not have one in your project, add one from the Project menu. The class module itself has properties.
2. Set the Instancing to Multiuse.**

3. In Project properties, set the name as required (say, MyFuncs). Now add your functions to the class module. *Fig 8* shows an example called GetSquareRoot. Choose Make MyFuncs.dll from the File menu to compile the project.
4. Start a new Standard project. From the project menu choose References, and in the dialog check MyFuncs.
5. Write code like that in *Fig 9* to use the functions in the DLL. There are a few points to note. First, you have to create an instance of the ActiveX object before calling its functions.

[FIG 8] ## Class module

```
Code for the class module in MyFuncs.dll:
Function GetSquareRoot(num As Double) As➤
 Double
GetSquareRoot = 0
If num < 0 Then
Err.Raise vbObjectError + 600,➤
 "MyFuncs.Class1", "Invalid number"
Else
GetSquareRoot = Sqr(num)
End If
End Function
```
(Key : ➤ *Code continued on next line)*

[FIG 9] ## DLL client app

```
Code for an ActiveX DLL➤
 client application:
Private Sub Command1_Click()
Dim mf As New MyFuncs.Class1
Dim num As Double
num = Val(Text1.Text)
MsgBox "The square root is: "➤
 + Str(mf.GetSquareRoot(num))
End Sub
```
(Key : ➤ *Code continued on next line)*

This is achieved with New or, alternatively, CreateObject. You could do this with a global variable of type MyFuncs and instantiate it when your project starts up, if you want to use your code library from any point. Second, use Add Project to load both the DLL project as well as your client project, so that you can debug the code. Third, when you deploy your dll to other machines, you will need to register it either manually with RegSvr32, or by using the VB setup wizard which does this for you. Finally, once you get to the point where applications are using the DLL in earnest, you need to keep future versions compatible with your first version, and to use binary compatibility when you compile. See also, Creating an ActiveX Dll in the VB Components Tools Guide.

(how to do the equivalent of Net Use in a batch file, for instance) you need to find a COM object model that exposes the particular feature. The Wscript object itself provides many of these administrative tools and instead of Net Use you could try WshNetworkObject.MapNetworkDrive. It is documented in the Platform SDK — the set of online documents that describe the Windows API.

Sometimes you may want to run a script without user intervention. CSCRIPT.EXE is a command-line version of WSH which can suppress all display of user prompts and script errors if you use the appropriate switches.

You can also customise how the graphical version runs scripts, by right-clicking a script file and choosing Properties. This creates a file with a .whs extension, and if you run this instead of opening the script directly, then the chosen properties will be applied.

A neat feature of using WSH instead of batch files is that you can step through the code in a debugger. You can download a free script debugger from Microsoft, or use Visual InterDev for full-featured debugging with watch windows and the ability to edit on-the-fly.

Other scriptlets

Finally, there is yet another scriptlet technology, now available in beta. These are called Server scriptlets or XML scriptlets (the name may change).

Server scriptlets are full COM controls with a ProgID and optionally a ClassID. The ProgID is the name of the scriptlet object in dot notation, while the ClassID is a GUID (Globally Unique Identifier).

The easiest way to experiment with XML scriptlets is by visiting the Microsoft scripting web site and downloading the Scripting wizard. You will also find a control that lets you include a scripting

capability in your own applications. Note that you should run scriptlets on the server if your web site is open to the whole internet, as this is Microsoft technology that will not work on browsers other than Internet Explorer 4.0 or higher. Another cautionary note is that scripts are neither as fast nor robust as compiled code. All the same, scriptlets and scripting makes impressive use of COM and are great for quick-and-easy tasks as well as for structuring and re-using script on web sites.

Ghost story

No, not things that go bump in the night, but a utility that automates network installation. Bob Walder investigates.

There are still occasions when you may need to have a set of network client disks for your PC in order to attach to the network without booting into Windows 95 first. Leaving aside the possibilities of corrupt Windows installations which might force such drastic moves, I can cite one practical example of my own.

When I create new machines for the test lab, I use a nifty utility called Ghost <www.ghostsoft.com>, which is designed to automate the process of installing Windows 95, NT and OS/2. The idea is that you create a "standard installation" on one PC and then create an image of the hard drive in a special "Ghost file" that can then be written to any number of other PCs at the click of a mouse.

The spirit of DOS

The catch is that you need to Ghost from partition to partition, or from disk to disk, and when creating a client you need to run Ghost from DOS rather than Windows. The easiest place for me to store the standard Ghost files is therefore on my network drives, but this necessitates being able to boot to DOS and attach to the network in order to access those files.

This is done using the Network Client Administrator, a utility which is installed via the standard NT Set-up routine. Once installed, you must log in as
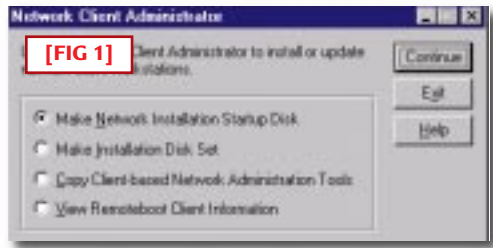
[FIG 1]

Administrator (or equivalent) and run through the following procedure:

1 Click Start, Program, Administrative Tools (Common), Network Client Administrator to fire up the utility. You are presented with the window in [Fig 1].

[FIG 2]
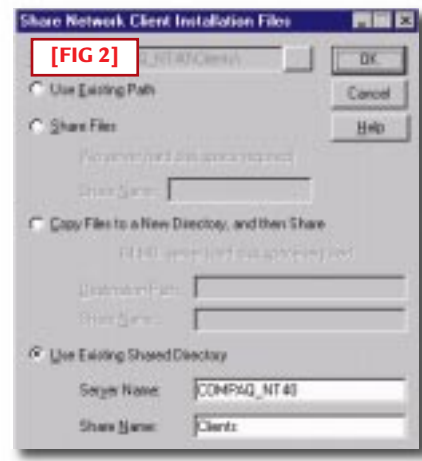
2 Making a full installation disk set is a pain, and the available client options for that are limited, so we will make a Network Installation Start-up Disk. Click on the appropriate option and then Continue. The difference with this option is that the resulting disk merely boots and attaches to the network, following which it automatically runs a full client installation from the server to the local hard drive.

3 The next window looks like [Fig 2]. If this is the first server to host the utility, you can allow it to copy the client installation files to the local server hard drive and create a share called "Clients", simply by entering the source path (the installation CD) and selecting "Copy files to new directory, and then share". Alternatively you can leave them where they are on the CD-ROM by selecting the "Share Files" option, although the CD must then be available each time you perform a client installation.

4 After the files have been copied to a server, you will simply enter the server name and the share name (usually

"Clients") where the files were copied to, and select the "Use existing shared directory" [Fig 2].

5 Select the floppy drive type, client and network card from the next window. We are creating disks containing the Network Client for MS-DOS and Windows but you might find you have a problem with the network card. There are not many to choose from in this menu, which is strange given the range of devices supported within NT.

If your network card does happen to be among those listed, congratulations, because you've got an easy life and the rest of the process is plain sailing. For most of us, however, we will have something else installed in our client machine and so we have a bit of jiggery-pokery to perform. To begin with, just select any old card — I chose the 3Com Etherlink III — and we will fix the configuration files later.

6 The next window [Fig 3] is where we specify the unique computer name we want to assign the client machine, any user name which has access to the NT Server where the client files are located (best to make this one Administrator equivalent), the name of the domain to
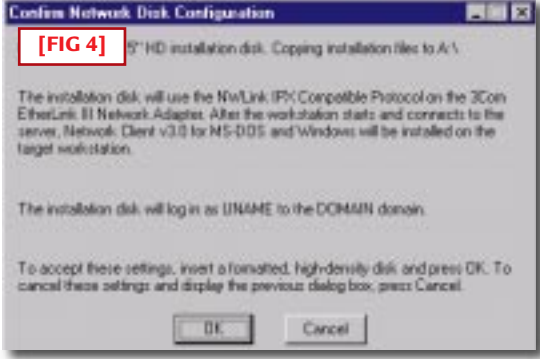
[FIG 3]
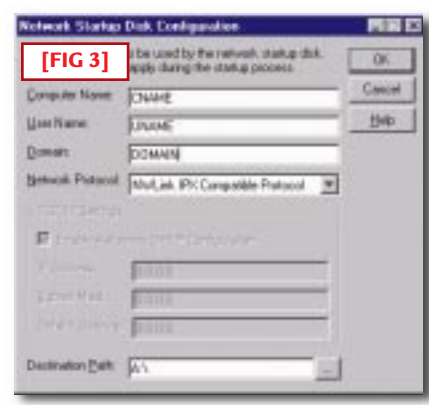
authenticate to, and the network protocol to use. You may only have one available, so the TCP/IP settings may or may not be applicable. If you select TCP/IP you can then specify whether or not to get IP info from a DHCP server. If not, you can enter the IP address, subnet mask and default gateway yourself. Either take a look at my previous column on IP addressing, or stick to IPX/SPX to keep things simple.

The final bit to enter here is the destination path, which is usually your floppy drive.

[FIG 4]

Confirm Network Disk Configuration

5" HD installation disk. Copying installation files to A:\

The installation disk will use the NwLink IPX Compatible Protocol on the 3Com EtherLink III Network Adapter. After the workstation starts and connects to the server, Network Client v3.0 for MS-DOS and Windows will be installed on the target workstation.

The installation disk will log in as UNAME to the DOMAIN domain.

To accept these settings, insert a formatted, high-density disk and press OK. To cancel these settings and display the previous dialog box, press Cancel.

OK   Cancel

7 The confirmation screen is at [Fig 4]. Insert a floppy disk which has been formatted as a system disk (i.e. format a: /s) but is otherwise blank. Clicking OK will start the file-copying procedure

Once all the files have been copied, you have a disk that contains the files COMMAND.COM, CONFIG.SYS, AUTOEXEC.BAT and a directory called NET. The important stuff is all in the NET subdirectory, which contains the basic client software, configuration files and network card driver.

If you selected the correct card in step 5, then you are home free at this point: just stick the floppy disk in your client PC,

reboot and away you go. For the rest of us, it's time for that jiggery-pokery I mentioned earlier.

The first step is to put the correct driver on the floppy disk. This is difficult to specify exactly, since every vendor constructs its driver floppies differently. In essence, however, you are looking for a subdirectory called NDIS, or perhaps DOS, which will be somewhere on the driver disk that came with your network card. In that directory will be a file with the .DOS suffix. In my case, the driver for the 3Com Fast Ethernet XL 10/100 PCI network card is called EL90X.DOS, so this file should be copied to the NET subdirectory. Just to be on the safe side, why not delete the driver that is there currently, which is called ELNK3.DOS.

OK, we now have the correct driver on the disk, so the next job is to amend the configuration files to point to it. Look in PROTOCOL.INI [Fig 5] for the line which says DRIVERNAME=ELNK3$ and change it to reflect the name of your new driver.

Leave out the .DOS suffix, but make sure you leave the $ on the end. In my case the line will now read DRIVERNAME=EL90X$.

A similar operation must also be performed with the SYSTEM.INI file [Fig 6]. Here you are looking for the [network drivers] section, for a line which reads NETCARD=ELNK3.DOS.

This time, you are going to replace the entire filename, so in my case the new line reads NETCARD=EL90X.DOS. It's not difficult to do, but it's just not that obvious if you're not used to it. All you need to do now is insert the floppy disk into the client workstation and reboot. OK, I lied. Because what actually happens, if you take a look at the AUTOEXEC.BAT file [Fig 7], is that the client software is loaded, the PC attaches to the network and then installs the full client from scratch on your local hard drive (that's what the z:\msclient\netsetup\ setup.exe /$ does).

[FIG 5]

PROTOCOL.INI

```
[network.setup]
version=0x3110
netcard=ms$elnk3,1,MS$ELNK3,1
transport=ms$ndishlp,MS$NDISHLP
transport=ms$nwlink,MS$NWLINK
lana0=ms$elnk3,1,ms$nwlink
lana1=ms$elnk3,1,ms$ndishlp

[ms$elnk3]
DRIVERNAME=ELNK3$
; IOADDRESS=0x300
; SLOT=1
; MAXTRANSMITS=6

[protman]
drivername=PROTMAN$
PRIORITY=MS$NDISHLP

[MS$NDISHLP]
drivername=ndishlp$
BINDINGS=ms$elnk3

[ms$nwlink]
drivername=nwlink$
FRAME=Ethernet_802.2
BINDINGS=ms$elnk3
LANABASE=0
```

[FIG 6]

SYSTEM.INI

```
[network]
filesharing=no
printsharing=no
autologon=yes
computername=COMPAQ_NT40
lanroot=A:\NET
username=newuser
workgroup=domain
reconnect=no
dospophotkey=N
lmlogon=0
logondomain=domain
preferredredir=full
autostart=full
maxconnections=8

[network drivers]
netcard=elnk3.dos
transport=ndishlp.sys
devdir=A:\NET
LoadRMDrivers=yes

[Password Lists]
```

[FIG 7]

AUTOEXEC.BAT

```
path=a:\net
a:\net\net initialize
a:\net\nwlink
a:\net\net start
net use z:
\\COMPAQ_NT40\Clients
echo Running Set-up...
z:\msclient\netsetup\➤
setup.exe /$
```

Of course, that means you have to go back and redo the changes you have just performed on the new installation on the hard drive. To be honest, I usually remove that last line of the AUTOEXEC.BAT and use the floppy disk itself to boot and attach to the network, replacing the NET USE Z: mapping to point to the shares I actually want to use. For instance, if you share the C: drive of your server as DRIVEC, you can replace the above command with:

```
net use z:
\\COMPAQ_NT40\DRIVEC
```

PCW CONTACTS

Return of the Mac

So it was more au revoir than goodbye. Yes, the Mac column returns to PCW with new Macmeister Cliff Joseph at the helm. This month, there's more rhapsody than blues.

The Mac is back — and in more ways than one. To tie in with this issue's redesign, *PCW* has decided to bring back the Mac *Hands On* column.

Macs may be hugely outnumbered by Windows PCs but there are lots of companies that still have die-hard Mac users in various departments. There are also more than a few people who have PCs in their office *and* a Mac at home, so we decided to keep you up to date on the practical side of dealing with the Mac.

Back from the brink

Having stared death in the face for the past couple of years, Apple seems to be on the mend at last. The new G3 Power Macs and PowerBooks have arrested Apple's falling sales, and this month sees the launch of the ultra-cool iMac, Apple's first real attempt to get back into the consumer market for several years.

There's a lot still to be done, though and Apple's not-so-interim CEO, Steve Jobs, is still rethinking the company's product line and technology strategy. So we'll also be using this column to examine various aspects of Apple's comeback strategy, such as its future plans for Rhapsody and the Mac OS.

Rhapsody is the next-generation operating system on which Apple has been working for the past couple of years. The original plan was for Rhapsody to completely take over from the current Mac OS, which is getting a bit long in the tooth.
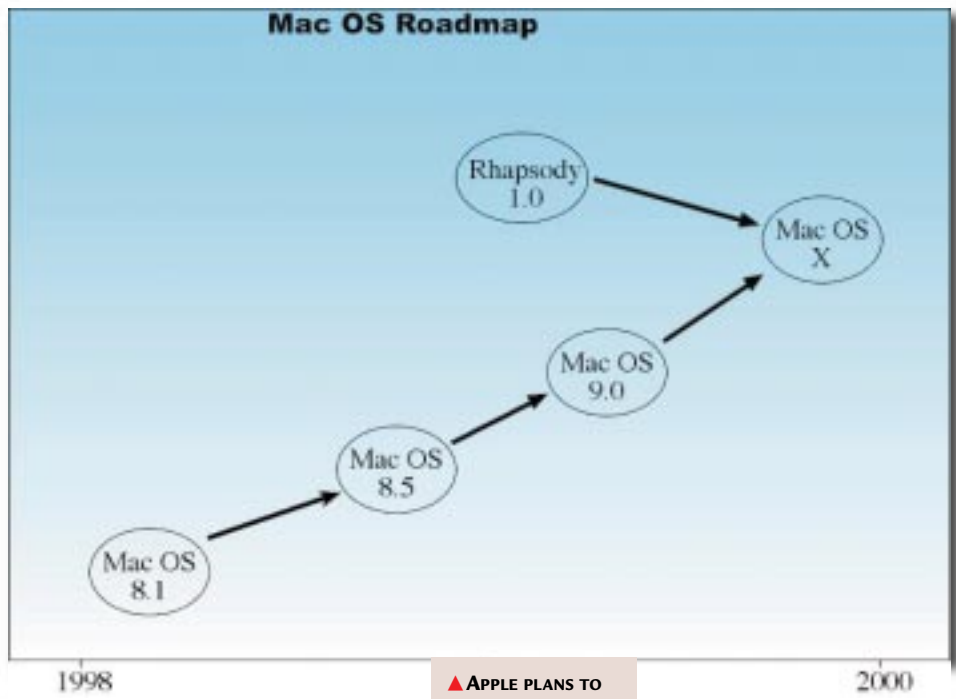
But Rhapsody seemed to get put on the back-burner when Steve Jobs mounted his coup and took over at Apple once more. At first, Apple said that it would be used as a server operating system while an updated Mac OS would continue to be the main operating system for desktop Macs.

Then, at its recent developer conference, Apple announced that Rhapsody 1.0 would be released later this year but there would be no Rhapsody 2.0 after that. This was thought to mean that Rhapsody was dead but what's actually happening is that the Rhapsody technology will be repackaged and merged with the current Mac OS.

At the moment, the Mac OS is at version 8.1, with version 8.5 planned for the end of September. Rhapsody 1.0 is due soon after that. Mac OS 9 is scheduled for the first half of 1999 and then towards the end of that year, Apple plans to release version 10, which will be called Mac OS X. This will be a humdinger of an upgrade that merges the Mac interface with the high-tech Unix architecture that underpins Rhapsody.

Some people have suggested that Mac OS X should actually be called Rhapsody 2.0, but that's incorrect. The problem with Rhapsody was that it was an entirely new operating system. Although Apple planned to provide a Mac OS emulation mode that would allow Rhapsody to run existing Mac OS software, software companies were still required to develop new Rhapsody versions of their applications to make the most of this new operating system.

Mac OS X eliminates this problem by integrating Rhapsody's new features, such as protected memory and multi-processing, into the existing Mac OS. This means that Mac users can continue to use their existing software and developers can upgrade their applications to use these new features without having to completely rewrite the applications from scratch.

Apple hasn't done a very good job at explaining all this, but it's a much better solution and should keep users and developers happy.

The Rhapsody technology will be repackaged and merged with the Mac OS

Mac OS Roadmap

▲ APPLE PLANS TO MERGE THE MAC **OS** AND **RHAPSODY** AT THE END OF **1999**

There's still a lot of detail that needs to be filled out in this roadmap (*see left*), but the MacWorld Expo starts in New York a few days after this issue goes to press and we hope to have more news on Rhapsody and Mac OS X for next month.

OS upgrades

In the meantime, a lot of Mac users have been wondering whether or not to upgrade to OS 8.1. This minor upgrade fixes quite a few bugs and updates features such as PC Exchange, which allows the Mac to read PC-formatted storage devices.

One of the most important features of OS 8.1 is a new disk formatting system that Apple calls Mac OS Extended Format. However, many people are simply calling it HFS+, as it takes over from the HFS format (hierarchical file system) that the Mac has used up until now. Just to confuse matters, Apple is now referring to HFS as Mac OS Standard Format.

Mac OS Extended Format makes more efficient use of your hard disk space and is particularly useful for disks that are 1Gb or more in size. However, Macs that are still using the old Standard Format can't see files stored on disks that use the new Extended Format. So if you try to exchange files with other Mac users on a network, or are using removable devices such as Jaz disks, they may not be able to see the contents of your disks unless you're all using the same disk formatting system.

The other problem is that hardly any of the current Mac disk utilities can handle Extended Format either, although Symantec is planning a new version of Norton Utilities For The Mac that will support the new format in a few weeks' time.

Fortunately, the new Extended Format is an option that you can choose to do without when upgrading your Mac to OS 8.1. This allows you to install OS 8.1 while retaining the Mac OS Standard Format on your hard disks. This is probably the best bet until the various

▶ **DEACTIVATING QUICKTIME'S AUTOPLAY OR AUTOSTART FEATURE WILL PROTECT YOUR MAC FROM THE AUTOSTART WORM VIRUS**

disk utility products have been properly updated. Whatever you do, remember to back up all your important files when you make any changes to the formatting of your hard disk.

You can download OS 8.1 and get further info on Mac OS Extended Format from swupdates.info.apple.com.

Virus alert

You don't hear of many Mac viruses these days, but there's a new one going around that really has been making a nuisance of itself. (Some wits have suggested that as viruses are once again being written for the Mac, this is proof of Apple's recovery).

The 'autostart worm' can be spread on floppy disks and on a network

The "autostart worm" can be spread on floppy disks and removable storage devices like Jaz and Zip cartridges, as well as between hard disks on a network. If you're running QuickTime 2.0 or higher, with the Autostart CD or AutoPlay CD option enabled in the QuickTime control panel, the virus can infect your hard disk and overwrite some of your data files with garbage.

Deactivating Autostart CD can prevent infection but doesn't help if your hard disk has already been infected.
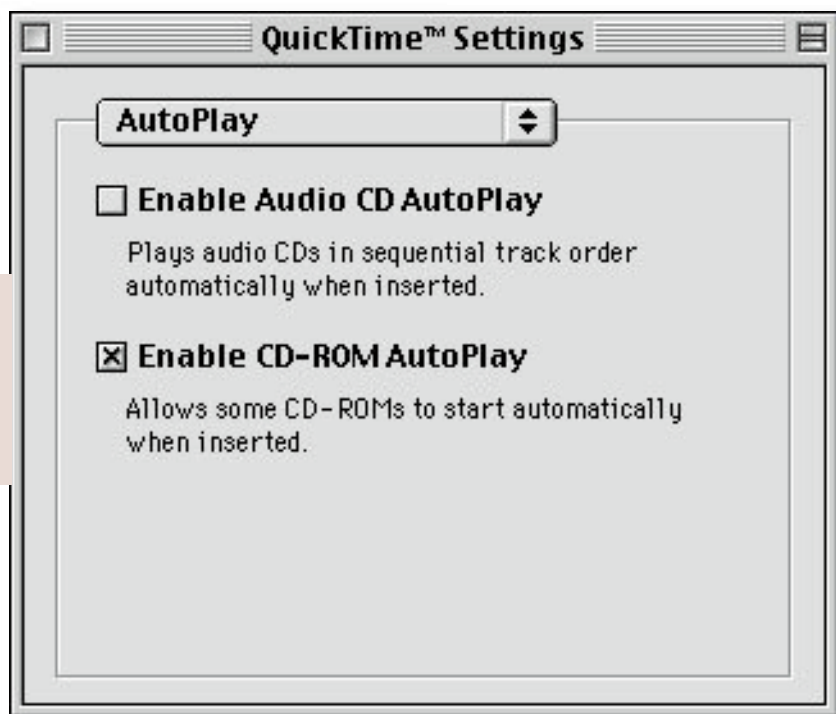
Most commercial anti-virus programs have been updated to cope with the autostart worm. If you don't want to pay for anti-virus software, you can get details of how to tackle the worm yourself from www.macintouch.com.

BOOK NEWS

If you're interested in the background to Apple's recent trials and tribulations, you might want to take a look at *On The Firing Line: My 500 Days At Apple*. It's written by Gil Amelio, the man who was toppled from Apple's top-spot by Steve Jobs' little boardroom coup. I've read a few extracts and there's quite a bit of muck-raking and score-settling going on here. If you can't find it at your local W.H.Smith, the book is available from the amazon.com online bookstore for about $25.

PCW CONTACTS

Cliff Joseph *welcomes correspondence and feedback on the Mac column. Contact him via the PCW editorial office (address, p10) or email* **mac@pcw.co.uk**

QuickTime™ Settings

AutoPlay ▲▼

☐ **Enable Audio CD AutoPlay**

Plays audio CDs in sequential track order automatically when inserted.

☒ **Enable CD-ROM AutoPlay**

Allows some CD-ROMs to start automatically when inserted.

Inside Relational Databases

(reviewed in PCW November 97, p329)

➤ Written by Mark Whitehorn,
who writes *PCW's Hands On Databases* column.
➤ Explains everything you need to know to create efficient
relational databases.
➤ Avoids the usual database jargon.
➤ Includes masses of examples using Microsoft Access.
➤ Source code for all examples is on the accompanying CD.
➤ Reader offer price is just £14.50 — a saving of £5 on the
RRP of £19.50.

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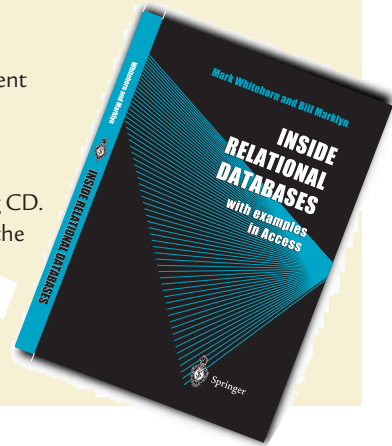
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➤ Collected interviews from *Personal Computer World*, including Bill Gates,
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➤ Reader offer price £9.95 — over 30% off the RRP of £14.95.

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➤ Wipe-clean mouse mat with
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Reader offer price £14.50
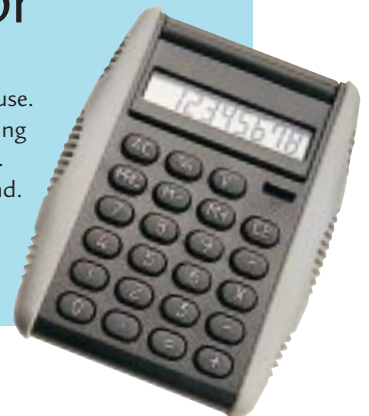**Subscriber price £12.99**
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➤ The textured side-grips keep it steady in your hand.

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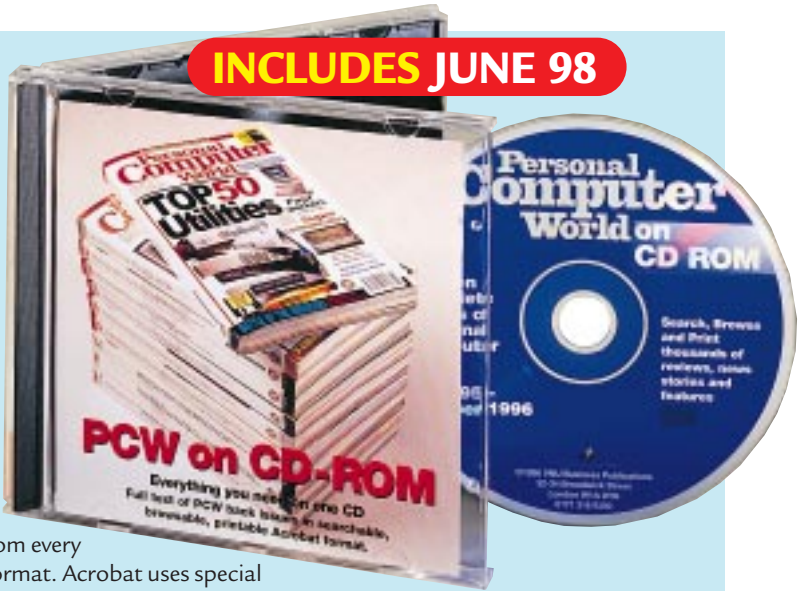
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leisure lines

Welcome to our new-look Leisure Lines section. To help you find your way around the features and reviews, each month we will be giving Leisure Lines fans a brief outline of what this jazzed-up section contains. In *Screenplay* this month you'll find that our reviewers were seriously impressed with a number of the games featured. **My teacher is an alien** is a game for the younger generation where the player has to track down their extra-terrestrial teacher, while **Commandos: behind enemy lines** is a combat game which uses real footage from WWII. Then there's **Unreal**, the game that is set to kill Quake II. There's something for everyone in the *CD section*: a Formula One racing encyclopaedia, the new IBM World Book that you *talk* to, French cuisine, and a rather peculiar piece of lusty psychological profiling software called **Tender Loving Care**. We check out the new Crayola Print Factory in our *Kids section*, and if you want to learn HTML in a weekend you'd better not miss our reviews of the month's *best books*. Try your luck at winning a **Canon printer**, a **Hayes modem** or a copy of **Windows 98** in our *great competitions*. Or if it's a copy of the brand-new Chambers dictionary you're after, just correctly complete the *crossword*. As usual we have our delightful *Retro* column which this month features **Commodore**, and life wouldn't be the same without *Brainteasers* to get those little grey cells going. If you have any comments or suggestions concerning the Leisure Lines section, then email Etelka Clark at etelkac@vnu.co.uk.
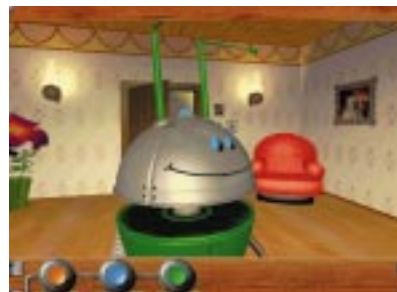
Contents

Unreal

The long-awaited 'Quake-quasher'. It's scaaaary!
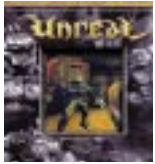
Probably the most anticipated game of the year, and touted as the "Quake II killer", Unreal delivers the goods with its majestic environments, unrivalled artificial intelligence and a powerful, eerie soundtrack. You begin as a prisoner trying to escape from a ship that has crashed on an alien planet ruled by the evil Skaarj who have enslaved the more docile Nalis. Your job is to exterminate the former, using any means available.

The difference between Quake and Unreal is evident from the start. The player starts off without a weapon and it takes a good half an hour of gameplay before you get one — time to tremble at the thought of an impending attack!

Unreal is able to depict both indoor and outdoor environments with aplomb. And it endows your enemies with

▶ **EVEN THE OPENING SCENE IS FORBIDDING**
▼ **WATCH OUT FOR THE SCARY SKARJ WARRIORS — GET THEM BEFORE THEY GET YOU!**

artificial intelligence that is strangely human: the creatures don't just charge blindly, but often hide behind pillars and wait for you to come to them.

You may need a good graphics card to achieve Unreal's full glory, but this will be one of the scariest games you'll ever play.

AJITH RAM

PCW DETAILS

PCW RECOMMENDED
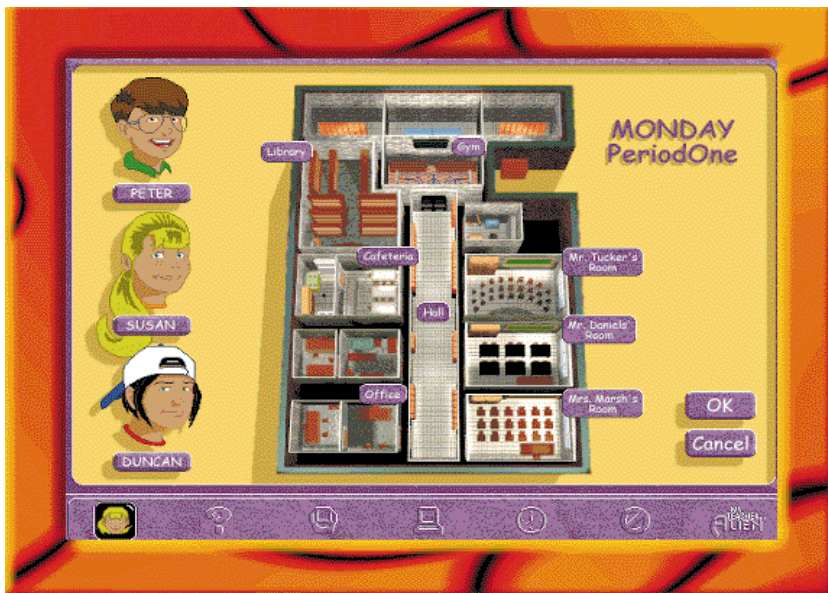
★★★★★
Price £34.99
Contact Epic 01202 521011
www.unreal.com
System Requirements P200, 16Mb RAM, Direct X compatible, 4X CD-ROM.

My Teacher is an Alien

Goodbye, Mr Chips! An alien has taken your place.

▲ **PICK YOUR CHARACTER, CHOOSE A ROOM**

Aliens have landed and only you can deal with them! Playing on the success of the book series, this game sends you back to school as one of three teenage characters. After finding a strange communication device in one of the school corridors, you know something is up. Martians have infiltrated the classrooms and it's your job to uncover the impostor — the finger points directly at your teacher!

Select your character and follow their timetable, from class to class. By clicking on the sentence options on-screen, you can talk to your friends and teachers. Listen carefully to what they say, for there is one vital clue that might give the game away. Watch out, though, because there are the school bullies. If they catch you on your own you'll find yourself trying to dodge a vicious flurry of stink bombs.

With its easy-to-use mouse-driven interface and fabulous cartoon graphics, this game cannot fail to appeal to younger gamers.

NIK RAWLINSON

PCW DETAILS

PCW RECOMMENDED

★★★★★
Price £24.99
Contact Ablac 01626 332233
www.ablac.co.uk/ablac.htm
System Requirements Windows 95, Pentium 75MHz processor, 16Mb RAM, 30Mb free hard-drive space, SVGA graphics (256 colours at 640 x 480 resolution), 4X CD-ROM drive, DirectX-compatible sound card, mouse.

Xenocracy: The Ultimate Solar War

Command your elite squadron and maintain the balance of power in space.

The year is 10,600 of the Common Era. Mankind has colonised space, founding a solar dominion. Its new-found wealth has only been made possible by the existence of a liquonide mineral called Lycosite, and tension has mounted between nations due to the desire for this mineral.

In this game of space combat you play the Wing Toucher, commander of an elite squadron of United Planet Nations warships. Your squadron is in charge of maintaining the status quo between Earth, Venus, Mars and Mercury, the solar system's four superpowers.

The gamer has three options of play: arcade, simulation or internet. The first provides you with a fast shoot-'em-up fix and I guarantee that you'll come back for more. In simulation mode you can plan your strategy, refine your ship and select your own wingman and weapons officer. When you begin to play in this mode you will soon realise that this game is far better than a simple space blaster.

With missions created randomly over more than 70 different locations, plus out-of-this-world ships and weapons from which to choose, this game is in the line-up for the best of 1998.

ETELKA CLARK

▲ **REFINE YOUR SHIP AND CHOOSE YOUR WINGMAN**
◄ **THE ARCADE OPTION PROVIDES A SHOOT-'EM-UP FIX**

PCW DETAILS

★★★★

Price *£39.99*
*Contact Grolier Interactive
01865 264800*
System Requirements *Windows 95, 133MHz Pentium processor, 16Mb RAM (32Mb recommended), 10Mb free hard-drive space, SVGA card.*

Might & Magic VI

Find King Roland and restore him to power.

◄ **YOU AND YOUR TEAM NEED ARMOUR AND WEAPONS TO FIGHT GOBLINS AND ZOMBIES**

Might & Magic VI is a single-player game in which the good King Roland has won the war against his brother Archibald, but something has gone horribly wrong. King Roland is missing and a demonic cult is trying to take over the kingdom. Has King Roland lost the divine right to rule? You are plunged into the middle of this chaos, and with the help of powers given by a mysterious sorcerer you set out to find the king. The game enthralls you as you search for clues and fight a myriad of monsters. You start with a basic set of magic spells that increase as the game progresses. You can choose the skills of the friends helping you, but choose carefully: it could determine whether you live or die.

The game has faults, though. It is not 3D accelerated and there is too much emphasis on fighting rather than mystery-solving. Also, the monsters' become tedious as they walk into walls and generally act stupid. However, the graphics are great and the gameplay is gripping.
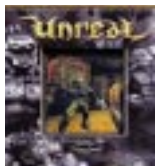
AJITH RAM

PCW DETAILS

★★★★

Price *£39.99*
Contact *Ubisoft 0181 944 9000*
www.ubisoft.com
System Requirements *P133, 16Mb RAM, DirectX-compatible, 4X CD-ROM.*

Gex3D: Enter the Gecko

Off his sofa and off-the-wall, the super-hero lizard returns.

In this game you play a wisecracking super-hero gecko whose days of saving the planet are over. Now, he can only find solace in cuddling up to his faithful TV with an armful of doughnuts. One day, his arch-nemesis, Rez, threatens to take over the country's TV broadcasting, forcing Gex to reluctantly leave his sofa and become a super-hero once more. This old platform format has received a major overhaul, with vast 3D landscapes incorporating cartoon and film images for Gex to bounce around in. The stunning graphics and use of exaggerated colour enhance the atmosphere of escapism. In one of the "toon" scenarios you hop around collecting carrots and feel inclined to jump down a rabbit hole. Reappearing in a bunny-suit at the other end you find Elma Fudd lookalikes

▲ Heyyy... far-out graphics, man
◀ Ultimate escapism

hunting down the "wabbit" with their blunderbusses. With over 125 possible moves, you get a real feel for pulling Gex's strings. A little skill is required and the game's difficulty is well weighted so you can get in some early practice. Actor Leslie Phillips gives the sharp-toothed Gex his one-liners. Although some of the quips are corny, when you eventually hear Phillips' familiar "Weeell, heelllooooo!", all is redeemed.

IAN ROBSON

PCW DETAILS

PCW RECOMMENDED

★★★★

Price £29.99
Contact 0181 944 9000
www.ubisoft.com
System Requirements Pentium 166, 32Mb RAM, 3Dfx graphics accelerator, 4X CD-ROM drive.

Commandos: Behind Enemy Lines

Become a conquering commando and bash the bosch in WWII.

Great fun, a visual feast! Making use of original newsreel footage, the events leading up to the Axis powers' real-life domination of Europe in WWII are outlined, providing the background to this engrossing game. Your first mission takes place in the snowy wastes of Scandinavia shortly after the exile of the Norwegian royal family. The Nazis have the power to attack any point in the North Sea and it's your job to ensure that they never reach Britain.

As a commando you are the best of the best, but you'll still receive extensive training. Each soldier in the platoon will have different skills and you will be instructed in the use of each weapon and various methods of manoeuvring.

With realistic sound putting you at the heart of the action, and an entirely mouse-based interface, you'll be fighting alongside the nation's best within minutes. Commandos may not require the skills of a "Street Fighter" combat expert, but this game's engrossing storyline and challenging puzzles ensure that every mission you play will be different. You'll be enjoying it for months to come.

NIK RAWLINSON

▲ Multiple views give a greater feeling of authenticity to the game

PCW DETAILS

★★★★★

Price £49.99
Contact Eidos 0181 636 3000
www.eidosinteractive.com
System Requirements Windows 95, Pentium 90MHz processor, 8Mb RAM, 60Mb free hard-drive space.

Formula 1 Encyclopaedia 1998

The exciting world of F1 racing, reduced to pedestrian level.

Koch Media has been responsible for some of the most unintentionally hilarious software ever to have found its way into the PCW office, with "The Worst Disasters" being particularly prominent. Formula 1 is the latest in this proud line, and Koch has achieved quite a coup in its presentation: it has managed to make the subject of flying around a race track at 180mph seem almost impossibly dull. The interface is relatively basic: simply click on the racing helmet for driver data, miniature track icon or racing-track history, and the like. This is where, apart from the rather cheap-and-nasty look and sound of the software, the main flaw of this CD-ROM

▲ **DYNAMIC VIDEO FOOTAGE. NOT!**
◄ **THE F1 ENCYCLOPAEDIA INTERFACE IS QUITE BASIC**

is glaringly apparent. The presentation of every facet of the sport is presented in nearly the same way, with lists of facts and figures. A comprehensive list of drivers is accompanied by rather awkward prose that is at its clumsiest when describing the death of Ayrton Senna, where the author seems to have totally lost the grasp of his tenses.

Despite the boast of 30 minutes of "dynamic" video footage, all this reviewer could find was a series of rather rough-looking full-screen scans of drivers and cars. Avoid at all costs.

PAUL TRUEMAN

A Taste of France

Vive la France, in particular its splendid cuisine. Bon appetit!

Billing itself as "a food and wine extravaganza", Taste of France features French recipes from *Thuries* magazine, a gourmet guide as important to the French as garlic. Choosing from courses or menus you can sift through a variety of appetisers, first and main courses, and some delicious desserts. As well as recipes, prospective "chefs de cuisine" are given an idea of what kitchen tools and utensils they may need.

Four options are available from the menu bar: recipes, regional tour, images of France, and trivia. Recipes and menus aside, there is not much to keep you really enthralled. Who cares how many cups of chocolate Voltaire put away over the course of a day? The regional tour splits France into four regions and concentrates on a fairly general overview of each, plus several slides to keep you interested. "Images of France" is a slight misnomer, as it actually includes a spot of vocabulary, information on wine, and a singularly useless section called "table etiquette".

Overall, if you cut out some of the floss, the recipes and menus are interesting and at the price it is *pas très cher*.

JIM HARYOTT

▲▲ **THE SLIDE SHOW OF DIFFERENT REGIONS IS NICE TO WATCH**
▲ **THERE ARE MANY ENTICING FRENCH RECIPES TO CHOOSE FROM**

Tender Loving Care

How this story ends depends on your answers and your psyche.

Based around the story of a family who have lost their only daughter in a car accident, Tender Loving Care is an enticing exploration of the human psyche. The actor John Hurt leads the player through this computer fantasy, playing a psychiatrist who has a close involvement with the family. He explains that something strange happened to the household following the appearance of a nurse who came to assist the grieving mother. The player is asked to become a "fly on the wall" and observe the story from beginning to end. Meanwhile, the software is assessing the player. The format is split into three parts: video clips of the story, exploration scenes where you can snoop around the house

looking for clues, and Thematic Apperception Test sessions which consist of deeply personal questions for the player to answer. As the story unfolds, it becomes clear that this is a tale of lust and deception, featuring scenes suitable for adults only. The answers to the questions actually determine the way the story ends and features a psychological profile of the player.

This is a unique and gripping piece of software for adults who have 50 hours to spare — that's how long it lasts — and who want to discover their hidden self.

ETELKA CLARK

▲ WATCH AND SEE HOW THE STORY UNFOLDS
◄ THE PLAYER IS ASKED PERSONAL QUESTIONS

IBM World Book 1998 Speech Ed.

If you want to know, ask: no keyboard, just your voice will do.

IBM's World Book encyclopaedia is nothing new and neither is its ViaVoice dictation software, so it was inevitable that the two would be combined. The result is an extensive research book that can be navigated without the keyboard, which is great for kids, the elderly and those who suffer from RSI.

The content is impressive, successfully matching a result for each of our searches. We could then ask for the text to be read to us, which makes this package great for users with impaired vision. The sticky-notes function allowed

▲ THE CONTENT IS IMPRESSIVE
◄ YOU CAN NAVIGATE WITHOUT NEEDING TO TOUCH THE KEYBOARD

us to dictate memos and short reminders to save us making paper-based notes while browsing the encyclopaedia. A version of the standard Windows Notepad is included and integrated with the added functionality of voice recognition to allow the dictation of this review; although the results were fairly accurate, extensive editing was necessary. Even on a fairly fast PC, though, it would have been quicker to have typed it instead. To keep the encyclopaedia up to date, an online section will allow users to download new information to their local hard drive and receive day-by-day news from around the world. And for those using the software in education, there are homework tips or curriculum pointers for teachers.

NIK RAWLINSON

Byko and the Numbers

'On yer bike, Byko,' says our nonplussed reviewer, astounded at some basic – and serious – errors.

Byko and the Numbers is hyped as an educational game that will teach basic maths and calculus. Featuring the eponymous monocycle robot, you set off on a quest to find the scientist, Doctor Why, who has swallowed one of his own concoctions and turned into a plant. By solving various maths problems and interrogating the Why household, you can find out where the scientist is and change him back into a human.

The sounds and the graphics are excellent and Byko is a rather charming hero. But there are a lot of fundamental problems with the game. Both the grammar and the spelling are atrocious; so much so that I fear for Finson's planned "Byko and the Letters" series.
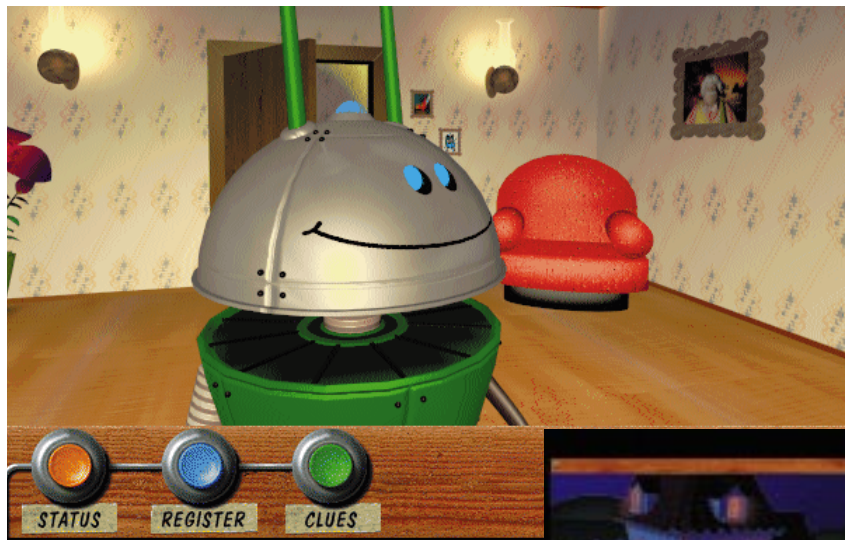

▲HE'S CHARMING, BUT HE CAN'T SPELL
▶YOU'LL HAVE TO SOLVE SOME PUZZLES TO GET INTO DOCTOR WHY'S HOUSE

The introductory screen included this gem: "I'm not like those lumps of metal, Trash and Pako. All they do is wonder round the house loosing bolts and leaking oil." The instructions for the "educational puzzles" are also frustratingly obtuse, and many of them do not seem educational at all. Finally, it asked me to solve a non-existent puzzle, at which point I threw my hands up in despair and decided to leave Byko to it.

SUSAN PEDERSON

PCW DETAILS

★★

Price £19.99
Contact Finson 0171 723 4003
System Requirements *Pentium PC, MS-DOS 5.0 or above, Windows 3.1 or above, 8Mb RAM, mouse, SVGA graphics card (video resolution at least 16-bit).*

IBM and Crayola Print Factory

Colour 'em in, fold 'em up and have fun. We did!

The best thing about these computerised crayons, apart from the fact that two of them talk and introduce you to the package, is that, unlike the real thing, their labels don't come off and there is no chance of them melting onto the carpet. Split into five main sections, this package helps kids

PCW DETAILS

PCW RECOMMENDED

★★★★★

Price £19.95
Contact *Iona Software (Rep. of Ireland) 00 353 1 836 6328*
http://indigo.ie/~ionasoft/home.html
System Requirements *Windows 3.x or 95, 486/33 processor, 8Mb RAM, double-speed CD-ROM, 19Mb free hard-drive space, SVGA monitor, printer.*

create everything from greetings cards and posters to frogs and paper planes. Use the on-screen brushes, pens and crayons to colour your choice of pre-drawn design, before printing them in glorious colour. Two pages will appear in the printer's "out" tray — the first containing your design, and the second showing how you should fold it to achieve the desired effect.

A quick "Blue Peter" session in the *PCW* office proved that it was a design of which even Boeing could be proud. The 3D fold-up frog was replicated many

▶IT MAY LOOK LIKE IT'S JUST BEEN RUN OVER, BUT FOLD IT UP AND IT'S A FROG

times and sat atop various monitors, proving this package to be great fun. Every office should have one to stave off the onset of RSI.

NIK RAWLINSON

WIN an ACCURA 56K modem

The Hayes modem shares its 20th anniversary this year with *Personal Computer World*! So, to celebrate this, Hayes is giving away five of its External ACCURA 56K speakerphone modems, each worth £129.

The ACCURA 56K modem supports Rockwell and Lucent's K56flex technology, and essentially doubles the speed of downloading information from the internet. Main features of this modem include: V.42 standard error control that prevents line noise from corrupting data; fax send and receive; voice answerphone; hands-free speakerphone; and microphone.

The origins of the modem go back to 1978, when you couldn't buy a modem, you could only rent one. The GPO ran the UK's telephone network and did not allow connection of non-GPO devices to its network. Meanwhile, in Georgia, USA, a young engineer called Dennis Hayes,

together with a colleague, was looking for a way to enter the emerging market for home computers. They decided to try to break into the market by assembling modems. And so, by hand-building five modems a day on a kitchen table, they began what was to become a multibillion-dollar business.

If you'd like the chance to win one of Hayes' External ACCURA 56K speakerphone modems, just answer the following question:

Q. How old is the Hayes modem?
   (A) 10 years?
   (B) 15 years?
   (C) 20 years?

See the box at the bottom of this page for details on how to enter the competition.

WIN a Canon BJC-7000 printer

Canon would like to give away two of its recently launched bubblejet printers. The BJC-7000, worth £269, is capable of producing photo-quality colour — even on plain paper, exceptionally clear text, and water-resistant printing on all media.

The BJC-7000 is the first printer to use bi-level inks, with Canon's exclusive seven-colour ink printing technology. By combining low-density photo inks with conventional inks, the BJC-7000 is capable of nine levels of graduation — more than four times the levels of competitive printers.

This BJC-7000 printer, which has a print resolution of up to 1200 x 600dpi and a colour print speed of up to 3.2ppm, also has truly flexible media handling, supporting A4 full-bleed printing, as well as Canon's extensive range of media, from high-gloss film to T-shirt transfers.

To try your luck at winning one of Canon's BJC-7000 bubblejet printers, just answer the following question:

Q. How many colours does Canon's exclusive ink printing technology have? Is it:
   (A)   5?
   (B)   6?
   (C)   7?

See the box below for details on how to enter.

RULES OF ENTRY
These competitions are open to readers of *Personal Computer World*, except for employees (and their families) of VNU Business Publications, Hayes and Canon.
The Editor of *Personal Computer World* is the sole judge of the competitions and his decision is final.
No cash alternative is available in lieu of competition prizes.

HOW TO ENTER THE COMPETITION
1. Via our web site at www.pcw.co.uk or,
2. Write your name, address and daytime telephone number on a postcard, or on the back of a sealed envelope. Mark your card(s) with the name of the competition(s) you are entering and send to: P.O. Box 191, Woking, Surrey GU21 1FT, by Friday 31st October '98.
Please state clearly on your entry if you do not wish to receive promotional material from other companies.

competition

Win a copy of Windows 98

We're sure that by now, most computer users are aware of Microsoft's new arrival, Windows 98. If you are intending to upgrade but haven't got round to it yet — it could be that you're unsure whether you actually *need* to upgrade — then why not try your luck at winning one of the ten upgrades we have on offer this month?

Windows 98 builds on the breakthrough features in Windows 95 to offer many benefits. Among many notable features, there is:

● **improved ease of use** through internet integration;

● **the use of key Internet Explorer** technologies to unify and simplify the desktop, making it quick and easy for users to find and navigate information, whether it resides on their PC or on the internet; and

● **finding help** has been dramatically simplified with the addition of new troubleshooting wizards and web-based help features.

Windows 98 ushers in a new range of hardware and entertainment functionality. Not only do games run better on Windows 98-based PCs than on traditional console devices, but Windows 98 includes native support for USB, which makes adding hardware devices as easy as plugging in a toaster.

In addition, Windows 98 provides DVD and television broadcast capabilities, allowing a PC with a television tuner card to seamlessly receive and display TV and other data distributed over broadcast networks.

To enter this competition, just answer the following question:

"Windows 98 includes native support for USB, which makes adding hardware devices as easy as plugging in a..."

   A)   Hairdryer
   B)   Toaster
   C)   Kettle

See the box on the right for details on how to enter the competition.
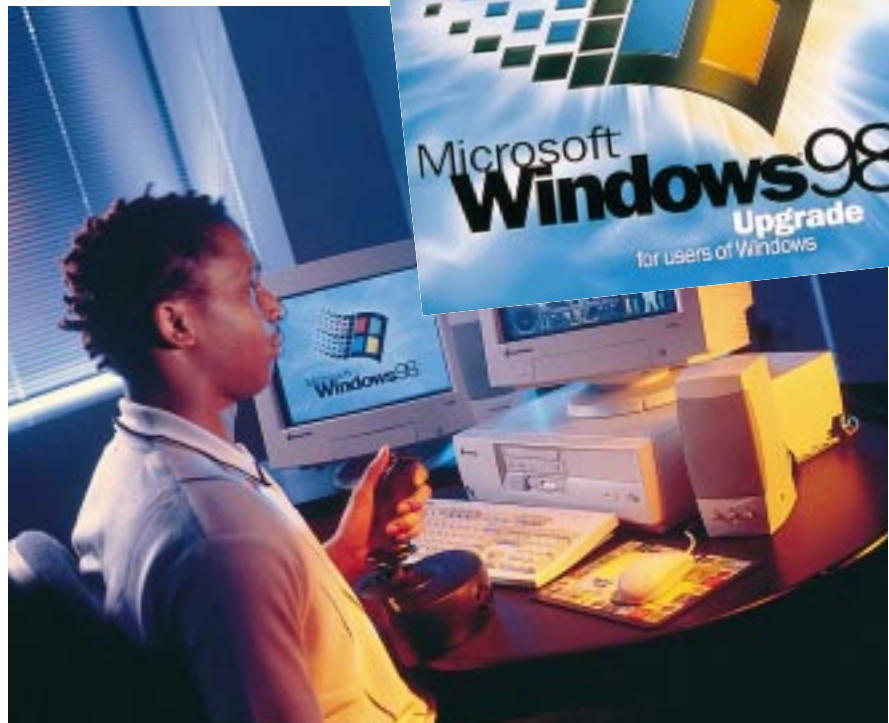
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books

It's easy when you know how: Networking, the Internet, and Quark XPress, step by step

Recently I was confronted for the first time with the task of putting a plug onto a network coax cable, a tricky task if you don't know how. Not one of some ten expensive US networking books I consulted gave any advice on the matter. Days later *Networking in Easy Steps* plonked through the *PCW* portals with the best part of an entire chapter on the subject, complete with detailed diagrams. Clearly the author, Peter Ingram, had a good sense of priorities.

The title is a little misleading as it only covers networking using the facilities bundled with Windows 95, together with internet access via modems and ISDN. The book came with

two others in the same series from UK publisher ComputerStep: *QuarkXpress in Easy Steps* and *Internet UK in Easy Steps*. All are written in English, with UK references where approp-riate, which is a welcome change in a market flooded with US works. The networking book, for instance, refers you to UK suppliers and its internet stablemate includes a Demon sign-up disk. There is some overlap between the two, though *Internet UK* concentrates more on what you can do online rather than how to get there.

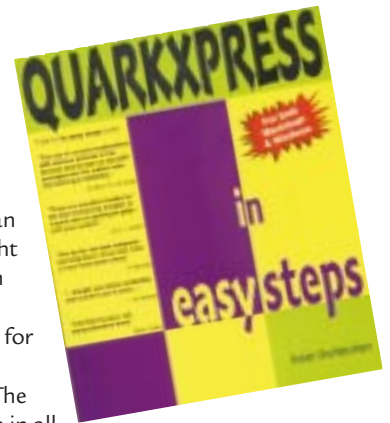The Quark volume covers both the Mac and PC versions of the desktop publishing suite. The coverage seems fairly comprehensive, although I found no warning in the pagination section about the program's annoying

habit of shuffling pages around without warning if you delete an opening right page, which can be devastating for a novice in a hurry. The information in all three books is rudimentary but no less than you need to make a good start on the subject. In general, publishers are too aware of the fact that people buy computer how-to books when they really need them, which is why manuals tend to be twice the price of more general reference works. ComputerStep deserves support for bucking this trend: each of these volumes costs just £8.99 — about the same price as the network plugs I messed up due to a lack of good advice. Note there are about 40 titles in the same series.

CLIVE AKASS

PCW DETAILS

★★★★

NETWORKING IN EASY STEPS
Author *Peter Ingram*
Publisher *Computer Step*
ISBN *1-874029-92-X*
Price *£8.99*

PCW DETAILS

★★★

INTERNET UK IN EASY STEPS
Author *Chris Russell*
Publisher *Computer Step*
ISBN *1-847078-006-1*
Price *£8.99*

PCW DETAILS

★★★★

QUARKXPRESS IN EASY STEPS
Author *Robert Shufflebotham*
Publisher *Computer Step*
ISBN *1-874029-99-7*
Price *£8.99*

Have a nice weekend with HTML

With the explosive growth of the World Wide Web, many books are making an appearance in an effort to explain to beginners how to get started with HTML and web publishing. *Learn HTML In A Weekend* is another in the same vein as the "Dummies guides" that have proven very popular. It is written in a

tutorial style, and offers you the chance to structure your entire weekend around a set of lessons, should you really have nothing better to do with your time. You can of course make the decision to spread these lessons over a more convenient period. The framework and history of the

internet is explained, along with the basis of the World Wide Web and other aspects such as File Transfer Protocol (FTP). The tutorials begin with basic formatting and move on to incorporate images, lists, links, tables and frames. The commands, or "tags", used to achieve these are explained, with additional information

PCW DETAILS

★★★★

LEARN HTML IN A WEEKEND
Author *Steven E. Callihan*
Publisher *Prima*
ISBN *0-7615-1293-4*
Price *£23.49*

on the extra attributes you can use to further enhance your HTML documents. The differences between web browsers and computing platforms are also mentioned so that you know how to design for as wide an audience as possible. One of the book's shortcomings is that it doesn't acknowledge that most people will start to write web pages using an HTML editor. As such, it doesn't mention how to use popular authoring software such as Microsoft FrontPage or Netscape Gold. Neither does it tell you how to publish your pages once you've written

them, which is likely to leave most people at this level confused and irritated. The book comes with a CD-ROM that has a range of shareware and freeware software for creating web sites. Software packages notably absent from the CD — even in demo format — are popular HTML editors and browsers such as Netscape and Internet Explorer. This book is one of many routes into DIY web publishing and overall is quite extensive, but you would ideally need to combine it with another source of information to gain a basic knowledge.

DAVID CUSHING

Master plan: Microsoft Office

With Microsoft recently announcing that its next version of Office is to be called 2000 (even though it could come out as early as December this year) users have only a limited amount of time to get acquainted with the current incarnation, Office 97, before those Microserfs needlessly obsfucate and complicate it with the new release.

If you are the average home user and have Microsoft Office installed on your computer, the chances are that you probably use Word for typing letters, Excel for the odd graph or table, and you've never even looked at Powerpoint. You may even wonder how Microsoft can get away with charging exorbitant amounts of money for what seems to amount to little more than clever word-processing software. Well, I know I did, even though I knew there was a lot more to it than that. Which was why I was intrigued by the latest release from the Macmillan Master series, a rather smashing range of books that covers a bewildering variety of topics from C++ programming to Shakespeare. The book covers the three Office programs
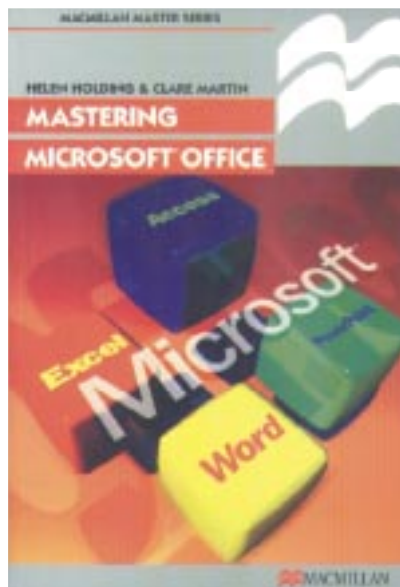
already mentioned, plus the database program Access included in MS Office Professional 97. The book aims to cater for both beginner and intermediate Office user, with each program getting three or four chapters to itself, starting with the basics. It was rather disheartening to realise that, even after a few years of using Office, I'd never heard of half the tricks taught in the chapters dealing with Word.

Mastering Microsoft Office is a lucid read. It's not exactly fun-packed, but its methodical approach pays dividends the next time you sit down to write a letter. It covers Office 97 specifically, and whatever does not apply to its predecessor is explained in the two versions. I still can't figure out how to uninstall the damn office

Carry On, Commodore

Simon Collin remembers a company that's long gone, but still has a very dedicated following.

Trawling through the cupboards at Retro Towers, I kept coming across dusty computers with the Commodore badge. Here was a company that helped define the personal computer market and produced a fantastically popular and influential range of home computers.

I visited Commodore HQ in the last year of its existence and there was still a buzz about the place, although it was nothing compared to the days when it was one of the world's most prolific computer manufacturers. Everyone knows the Commodore PET, a business computer legend that we have covered in past Retro columns, but it was the VIC-20 and C-64 that made Commodore a household name. What is rather less well known is Commodore's attempt to enter the portable computer market.

The VIC-20 helped to kickstart the home computer market. It enjoyed the support of software and third-party hardware suppliers. The electronics were crammed under the comfortable keyboard and a standard TV was used for display. The VIC had masses of great features aimed at the home user, and the games player in particular. At the heart of the machine was a custom chip that provided 320x200 colour graphics, with multiple sprite levels that gave VIC games programmers one of the best platforms around. This custom chip also managed the neat sound synthesizer, the MIDI port and the connections for the lightpen and joystick. Software was supplied either on cartridges that fitted into the back of the computer or by loading from a cassette tape. Cartridges provided instant access but were expensive.

The VIC-20 sold out across the world. Encouraged by its success, Commodore launched the more sophisticated C-64 in 1982. More than 18 million C-64 computers were sold and it still has an extraordinary following on the internet, where games, tools and utilities are available. The C-64 looked just like the VIC-20 but doubled the graphic resolution, upped the memory to 64Kb and improved the main processor.

The main unit was brown, with brown keys, and the stubby, fat keyboard look won no contemporary design

▲ **MORE THAN 18 MILLION C-64S WERE SOLD BY COMMODORE**

prizes. However, this computer had features for everyone, from the programmer to the games enthusiast. Its games were state-of-the-art — there are still more than 1000 Commodore games titles available to download from the internet.

Commodore then decided to re-market the C-64 as a business computer — or, rather, as a portable business computer. In January 1983, it released the SX-64. This bore a striking similarity to the Osborne 1 portable computer and was housed in a similar steel case about the size of a personal filing cabinet. The SX-64 was a neat, matt-black unit with a wonderful padded handle; you flipped the top down to use the keyboard and view the internal 5in composite colour monitor. Packed in to the right of the monitor were either one or two 5.25in floppy drives and a slot to accept Commodore program cartridges.

But the SX-64 did not sell well. Commodore released this make in the US under the Executive-64 brand name,

but its sales trailed. There was competition from the dominant Osborne range, and the Commodore machine was too expensive and too heavy. To its credit, the colour monitor was impressive, and if you could afford it, the steel box made a great portable games machine.

Commodore did not waste too much time on the still very new executive portable market. It moved on from the C-64 to the C264, a computer with a few extra hardware features and a suite of applications supplied in firmware. Then came the Commodore 128, which included a second Z80A processor to support the CP/M operating system. It had great graphics features and was popular with video and design companies; I even saw it used by two broadcast TV companies to produce quick titles and animated title effects.

The Commodore products provided a host of ground-breaking innovations and a wide range of software. The SX-64 provided an interesting diversion and the best range of games software on any colour portable. ❏

brainteasers

prize crossword

It's only words — and there's millions of them in the new Chambers Dictionary. Each month, one lucky *PCW* crossword entrant wins one. This time, it could be you. Send your completed crossword to "*PCW* October Prize Crossword", VNU House, 32-34 Broadwick Street, London W1A 2HG, to arrive not later than 25th September, 1998.
Please state clearly if you do not wish to receive promotional material from other companies.
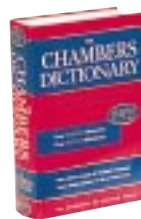
DOWN

1 Dull pain (4)
2 One involved with machinery or physical structures (8)
3 Treatment (7)
4 Javelin (5)
5 Japanese car company (6)
6 Rind (4)
10 Storm (7)
14 Musical drama (5)
17 Become mature (5)
18 Love story (7)
21 Act of passing on to another (8)
22 Stuff your face? (7)
24 Obstruct (6)
27 Read closely (5)
29 Ellipse (4)
31 Cooker (4)

ACROSS

7 Pictorial objects in a window (5)
8 Integrated circuits, commonly (4)
9 Instruct an application that a file is required (4)
11 Machine such as a printer, modem, scanner and so on (6)
12 Not capable of being erased or modified (4-4)
13 No place like this page? (4)
15 Protocol for e-mail message storage (3)
16 Instruction replaced by a sequence of other instructions (5)
19 Frequency of screen display regeneration (7)
20 Like data or files damaged or unusable (7)
23 Fundamental language? (5)
25 Old colour graphics standard (3)
26 A set of particular letters, numbers and symbols (4)
28 The C of *PCW*! (8)
30 Blinking screen indicator (6)
32 Section of the frequency spectrum lying between certain limits (4)
33 Small drink for dynamic memory! (4)
34 Crispy biscuit for integrated circuits? (5)

September solutions

ACROSS

7 Explorer 9 Output 10 Tape 11 Encrypted 12 ASCII 14 Manager 18 Cookies 19 Fortran 22 Traffic 24 Modem 26 Sound card 28 Drag 29 Access 30 Machines

DOWN

1 Expansion 2 Clue 3 Greed 4 Gory 5 Statue 6 Fund 8 Racial 13 Ink 15 Atom 16 Beef 17 Caretaker 20 Two 21 Disarm 23 Roused 25 Edict 26 Sack 27 Dusk 28 Drip

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DISCOUNT	
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SURCHARGES	
VAT	
TOTAL	

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ISSUE NUMBER (debit cards only) ....   EXPIRY DATE .... / .... / ....

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☐ COST OF EXTENDED WARRANTY   ☐ HELPLINE

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DIRECT BUYERS WORLD

All the best buys are here

Sometimes you just want to know the names of the best products, when they were reviewed, how much they cost and where you can get them. That's where our new, no-nonsense buyer's guide comes in. Over the following four pages we've picked out the outstanding PCs, peripherals and software packages that we can recommend without hesitation. To make it even easier, we've included the current manufacturer's contact number and price (inc VAT), as well as details about when and where we reviewed the product.

For the full review, why not check out *PCW* on CD-ROM? Updated quarterly on a rolling basis, *PCW* on CD-ROM contains the full editorial from the past 24 issues, in searchable Adobe Acrobat format — it even comes with a copy of Acrobat for viewing, searching and printing. Each CD costs just £9.95 including postage and packing, or £8.96 for subscribers. **Call 01795 414870** to order your copy, or turn to our *PCW* Reader Offers on pages 306 and 307 for further details.

GORDON LAING, Editor

Contents

Personal Computer World Buyer's Charter

If things go wrong
Mail order protection scheme
Anthony George, our Customer Services Manager, is here to help you if things go wrong or if you have a complaint about advertisements that have appeared in Personal Computer World. Write to him with details of the complaint and he will contact you.

Anthony George
Customer Relations Department
VNU Business Publications
VNU House, 32 - 34 Broadwick Street
London W1A 2HG

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When you order goods as a private individual reader from a UK supplier's advertisement in Personal Computer World and pay by post in advance of delivery to that Mail Order Advertiser who subsequently ceases to trade and goes into Liquidation or Bankruptcy prior to delivery of such goods, you may, under the "Buyers Charter", qualify for compensation, providing:
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IN WRITING, summarising the situation and lodged strictly within the time schedule stated.
Claims received outside this period will not qualify for consideration for compensation under the "Buyers Charter".
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a) £2,000 for any one advertiser so affected.
b) £100,000 in respect of all advertisers so affected in any one year.

These sums define the Publishers maximum liability under the scheme, and any additional payments above and beyond these thresholds will be entirely at the discretion of the Publishers.
As soon as legal confirmation that a state of liquidation or bankruptcy exists, the processing of claims will immediately commence. If, however, assets are available and the receiver/liquidator appointed confirms that an eventual payment will be made by way of a dividend, all claims under the "Buyers Charter" will be subject to re-processing and will take into account any shortfall which may then exist.
Payments under the scheme will take into consideration the obligations and liabilities of other interested parties such as credit card and/or insurance organisations etc. This guarantee only applies to advance postal payments made by private individuals in direct response for goods itemised/illustrated in display advertisements. It does not cover goods ordered from inserts, classified advertisements, or catalogues obtained from any advertiser.
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best buys

ENTRY-LEVEL PC

Mesh
K6 3D 300A

Sporting AMD's K6-2 processor, this system from Mesh has everything you could want: 1Mb of L2 cache, a 40X CD-ROM drive, a superb set of six speakers with an AWE64 sound card and a lovely ADI 5GT monitor. But it's the blistering speed that will have you reaching for your credit card.
➡ *PCW October 1998, p187*

> **Price** £1,198.50, **Contact** Mesh 0181 452 1111 **Also Recommended:** *Mertec Home Media* **Price** £1,173.83 **Contact** *Mertec 01792 473700* •*Panrix Nitro 3D*, **Price** £1,173.83 **Contact** *Panrix 01132 444958 (both PCW Oct '98)*

MID-RANGE PC:

Dotlink
Power Tower-400SE

If you want a PII 400 for under a grand ex VAT, you could do a lot worse than this Dotlink. It has 64Mb of RAM and a 5Gb hard drive, as well as a 56K modem and SmartSuite 97. And with a BX board there is plenty of room for later expansion.
➡ *PCW October 1998, p89*

> **Price** £1,174 **Contact** *Dotlink 0181 903 6508* **Also Recommended:** *Mesh Elite Professional PII* **Price** £1,145, **Contact** *Mesh 0181 452 1111* •*Dan Dantum II/W5* **Price** £1,175 **Contact** *Dan 0181 830 1100 (both PCW July '98)*

HIGH-END PC

Evesham
PII 450

Built around Intel's fastest PII yet and running at 450MHz, this machine surpassed the scores achieved in tests by 400MHz PCs. Add to this a lightning-fast 10Gb hard drive and you have got the ultimate performance machine.
➡ *PCW Oct '98, p79*

> **Price** £2,231 **Contact** *Evesham 01386 769600* **Also Recommended:** *Viglen C2 Plus 400* **Price** £2,349 **Contact** *Viglen 0181 758 7000* •*Roldec Predator XL* **Price** £2,349 **Contact** *Roldec 01902 456464 (both in PCW Sept 1998)*

HIGH-END NOTEBOOK

IBM
ThinkPad 600

Built for the road warrior, this thin, light, notebook excels in its build quality. Based around a variety of processors, ranging from a Pentium 233MMX and going right up to a Mobile PII 266, it also has a huge 4Gb hard drive, 32Mb RAM and a 13.3in TFT screen.
➡ *PCW July 1998, p79*

> **Price** £4266.43, **Contact** *IBM 0870 601 0136*
> **Also Recommended:** *Gateway Solo 9100* **Price** £3876.33 **Contact** *Gateway 0800 282000 (PCW June 1998)*

MID-RANGE NOTEBOOK:

Gateway
Solo 2500-S6266SE

With a fantastic spec for an incredibly low price, the Gateway Solo 2500 is enough to keep any mobile professional happy. It comes with a Mobile PII 266MHz processor, a whopping 64Mb RAM as standard and a huge 4Gb hard drive. Add in a glorious 13.3in TFT screen supported by 2Mb of graphics RAM and you have yourself a perfect system.
➡ *PCW October 1998, p94*

> **Price** £2,500 **Contact** *Gateway 0800 55200*
> **Also Recommended:** *Viglen Dossier M* **Price** £2,466.33 **Contact** *Viglen 0181 758 7000 (PCW August '98)*

PDA

Hewlett-Packard
620LX

For cutting-edge technology in your pocket, Hewlett-Packard's 620LX has to be the only choice. It's based on the latest Windows CE2 operating system and is the first PDA we've seen with a colour screen. It's utterly gorgeous and, at £799, a serious threat to many notebooks. PDA fans should also check out the Psion Series 5 and the 3Com PalmPilot.
➡ *PCW May 1998 p262.*
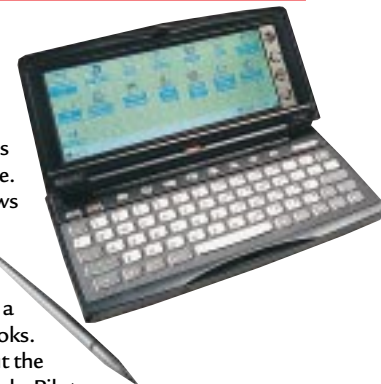
> **Price** £799 **Contact** *HP 0990 474747.* **Also Recommended:** *Psion Series 5* **Price** £429.9 **Contact** *Psion 0990 143050* • *3Com PalmPilot Pro* **Price** £229 **Contact** *3Com 0800 225252 (Both PCW May 1998)*

Hewlett-Packard
DeskJet 890C

As all-round colour inkjet printers go, Hewlett-Packard's DeskJet 890C is hard to fault. Equally happy with photos or business graphics, it's our choice for the home or small office. Meanwhile, those on a budget should look no further than Canon's BJC-250, but those wanting the bigger picture will not be disappointed with HP's DeskJet 1120C A3.

➡ *PCW September 1998 p186.*

Price *£317.25* **Contact** *HP 0990 474747* **Also Recommended:** *Canon BJC-250* **Price** *£116.33* **Contact** *Canon 0121 680 8062* •*HP DeskJet1120c* **Price** *£446.50* **Contact** *HP 0990 474747 (both PCW Sept '98)*

Epson
Stylus Photo 700

Colour inkjets have split into two categories, with this type clearly designed to reproduce the most realistic colour photographic prints. Epson has for a long time been the undisputed leader and its Stylus Photo 700 is our choice for inkjet photo printing. However, Lexmark comes very close behind with its 5700.

➡ *PCW September 1998, p188.*

Price *£273* **Contact** *Epson 01442 261144* **Also Recommended:** *Lexmark 5700* **Price** *£229* **Contact** *Lexmark 01628 481500 (PCW September 1998)*

Panasonic
KX-P6300

A decent laser printer at under £200 excluding VAT? That's Panasonic's KX-P6300, which not only turns out great results in fast time but also boasts one of the smallest footprints of any printer. Its unusual vertical design, along with being a great-value all-rounder, made it our Editor's Choice in our entry-level laser group test.

➡ *PCW February 1998, p194*

Price *£217.38* **Contact** *Panasonic 0500 404041* **Also Recommended:** *Kyocera FS-600* **Price** *£280.83* **Contact** *Kyocera 01734 311500* •*Minolta PagePro 6* **Price** *£351.33* **Contact** *Minolta 01908 200400 (both PCW Feb '98)*

Hewlett-Packard
LaserJet 4000TN

King of the laser printers, Hewlett-Packard has impressed us yet again with its latest office machine. Being 25 percent faster than the LaserJet 5, with 10,000-page toner cartridge, two 250-sheet input trays, network interfaces as standard and boasting superb output, the 4000TN should be the first choice as an office workhorse.

➡ *PCW February 1998 p77*

Price *£1662.63* **Contact** *HP 0990 474747* **Also Recommended:** *QMS DeskLaser 1400P* **Price** *£938.83* **Contact** *QMS 01784 442255 (PCW March 1998)*

Hewlett-Packard
LaserJet 3100

Good laser-print quality from this quiet machine. It's intelligent enough to detect a document dropped into its feeder and it will launch an idiot-proof menu for scanning, copying and emailing. Fast, accurate OCR and 2Mb memory for incoming faxes when the paper supply is exhausted, makes the 3100 an ideal multifunction device.

➡ *PCW June 1998, p83*

Price *£629* **Contact** *HP 0990 474747* **Also Recommended:** *Canon MultiPASS MPC20* **Price** *£370.13* **Contact** *Canon 0181 773 3173 (PCW January 1998)*

Umax
Astra 610P

Once again, the Umax Astra 610P parallel-port scanner has won our budget flatbed scanner group test, boasting an unbeatable combination of performance and value. Note that our three recommended scanners require enhanced parallel ports found only on modern PCs, so older systems, or users wanting top performance, should stick to SCSI.

➡ *PCW September 1998, p229.*
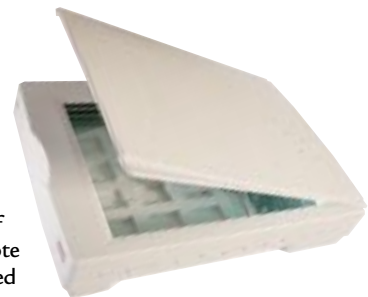
Price *£69.33* **Contact** *Umax 01344 871329* **Also Recommended:** *Agfa SnapScan 310P* **Price** *£116.50* **Contact** *Agfa 0181 231 4200* •*Microtek Phantom 330CX* **Price** *£75.95* **Contact** *Microtek 01908 317797 (PCW Sept '98)*

best buys

DIGITAL CAMERA

Kodak
DC260

Once again Kodak has produced the best digital camera for under £1,000. Not only does it have a high resolution, producing excellent images at 1,536x1,024 pixels but also has a 3X zoom. Add its advanced features, including scripting facilities and you have a highly desirable and indispensable camera.

➧ *PCW October 1998, p226*

> **Price** £899 **Contact** *Kodak 0800 281487* **Also Recommended:** *Epson PhotoPC 700* **Price** *£587.50* **Contact** *Epson 0800 289622* •*Ricoh RDC-4300* **Price** *£599* **Contact** *Ricoh 01782 753355 (both PCW October 1998)*

MONITOR

Nokia
Multigraph 447Za

No matter what you do, it's vital to get a good monitor with a clean, flicker-free display. In April 1998's group test we looked at 17in models and found Nokia's Multigraph 447Za to be the best in our entry-level category. Those with more to spend should check out the Mitsubishi, (*see panel, below*) which was our Editor's Choice in the high-end section.

➧ *PCW April 1998 p204.*

> **Price** *£440.63* **Contact** *Nokia 01793 512809* **Also Recommended:** *Mitsubishi DiamondPro 700* **Price** *£569.88* **Contact** *Mitsubishi 01707 276100 (PCW April 1998)*

MODEM

BT
Prologue K56EV Plus Modem

This smart little K56Flex modem features a headset, allowing it to be used as a hands-free telephone. Add a pair of speakers and you've got a full duplex speakerphone. The K56EV also supports AudioSpan (SVD) operation, enabling voice and data to be transmitted simultaneously.

➧ *PCW July 1998 p80*

> **Price** *£119.95* **Contact** *Direct Source 0118 981 9960* **Also Recommended:** *Pace 56 Voice* **Price** *£139* **Contact** *PMC 0990 561001 (PCW November 1997)*

REMOVABLE STORAGE

SyQuest
SparQ

With such differing capacities, interfaces and prices, there's no one removable storage device to satisfy all needs. As an overflow for your existing hard disk, the SyQuest SparQ is a clear winner, boasting excellent performance and low price. The external Iomega Zip Plus offers a good combination of ease of use and portability.

➧ *PCW May 1998 p196*

> **Price** *£169.99* **Contact** *SyQuest 01189 880207* **Also Recommended:** *Iomega Zip Plus* **Price** *£143.83* **Contact** *Iomega 07000 466342* •*Iomega Jaz 2Gb* **Price** *£441.71* **Contact** *Iomega 07000 466342 (both PCW August 1998)*

SOUND CARD

Terratec
EWS64 S

A cut-down version of the heavyweight EWS64XL, Terratec's S model still boasts much of the same sampling and processing capabilities and is also a great games card with accelerated DirectSound and positional 3D audio. There's a digital I/O option, upgradeable sample memory and the decent software bundle includes Cubasis AV.

➧ *PCW July 1998 p210*
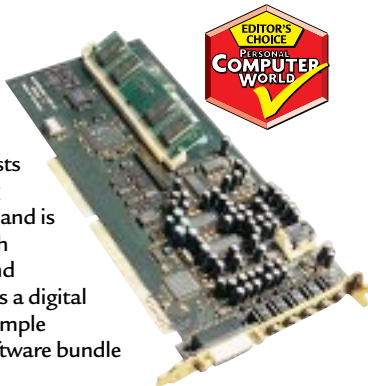
> **Price** *£149.23* **Contact** *Terratec 01600 772111* **Also Recommended:** *Creative Labs AWE 64 Gold* **Price** *£129.25* **Contact** *Creative Labs 01245 265265 (PCW July 1998)*

GRAPHICS CARD

Matrox
Millenium G200

Blisteringly fast both on 2D and 3D applications, the the Matrox Millenium G200 is based around a new 2D/3D chip, the G200. Not only is it the fastest 2D/3D card we have seen, it also produces Matrox's legendary image quality. It conforms to the AGP 2X standard and supports up to 16Mb of RAM.

➧ *PCW October 1998, p92*
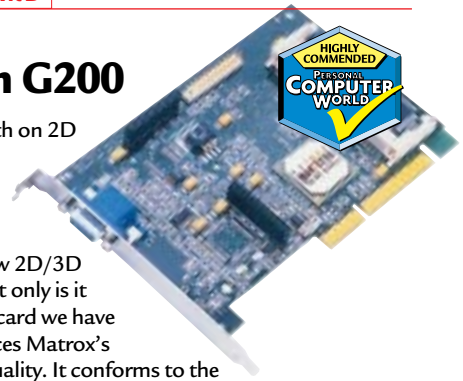
> **Price** *£129,* **Contact** *Matrox 01753 665544* **Also Recommended:** *ATI Xpert@Play* **Price** *£139.83* **Contact** *ATI 01628 533115 (PCW December 1997)*

ACCOUNTING

Tas Books
MYOB

Ideal for the owner-manager and good for bookkeepers too, Mind Your Own Business (MYOB) is our choice for accountancy software. We also recommend TAS Books which offers good bookkeeping and very powerful analysis.
➠ *PCW June 1998 p198*

Price £229.13 **Contact** *Bestware 01752 201901*
Also Recommended: *TAS Books* **Price** £116.33 **Contact** *Megatech 01372 727274 (PCW June 1998)*

DATABASE

Borland
Visual dBase 7

The first 32-bit version of Borland's classic database manager is a significant upgrade from version 5.5 and a must-have for dBase developers so long as 16-bit compatibility is not required. Access is particularly good value when bought with Office 97 Pro.
➠ *PCW March 1998 p92*

Price £292.58 Contact *Borland 01734 320022*
Also Recommended: *Microsoft Access 97* **Price** £276.13 **Contact** *Microsoft 0345 002000 (PCW October 1997)*

IMAGE EDITING

Adobe
Photoshop 5

With version 5, Photoshop is better than ever, although some web designers will want a little more. The legendary Paint Shop Pro and fun PhotoDeluxe cater at entry level.
➠ *PCW June 1998 p88*

Price £763.75. **Contact** *Adobe 0181 606 4001* **Also Recommended:** *Adobe PhotoDeluxe 2* **Price** £57.58 **Contact** *Adobe 0181 606 4001* •*Paintshop Pro 4* **Price** £58.69 **Contact** *Digital Workshop 01295 258335 (both PCW Dec '97)*

PERSONAL FINANCE

Microsoft
Money Financial Suite 98

Microsoft Money Financial Suite 98 is our choice for personal finance. It offers online banking and updating facilities, plus Sage compatibility, all at a bargain price.
➠ *PCW May 1998 p196*

Price £49.99 **Contact** *Microsoft 0345 002000*
Also Recommended: *Quicken 98* **Price** £39.99 **Contact** *Intuit 0181 990 5500 (PCW June 1998)*

DTP

Serif
PagePlus 5

Inexpensive, easy to use and surprisingly well equipped. PagePlus 5 offers extremely capable desktop publishing. Those wanting the choice of professional publishers will have to fork out more for Quark XPress 4.0.
➠ *PCW June 1998 p132*

Price £99.95 Contact *Serif 0800 376 7070*
Also Recommended: *Quark XPress 4* **Price** £1,169 **Contact** *Quark 01483 454397 (PCW June 1998)*

DRAWING

Corel
CorelDraw 8

Not one of Corel's classic years but this is still the Windows drawing package to own. Version 8 of the giant suite boasts better drawing and new interactive tools. Budget drawers should check out the Micrografx Windows Draw 6.
➠ *PCW October 1998, p203*

Price £464.13 **Contact** *Corel 0800 581028* **Also Recommended:** *Adobe Illustrator* **Price** £351.32 **Contact** *Adobe 0181 606 4000* • *Freehand* **Price** £327.82 **Contact** *Macromedia 01344 458600 (both October 1998)*

chipchat

Lean times

Is someone trying to tell us something? Have our contacts in the PR world been spying on *PCW* journalists as they sneak into the Star Café on the morning toast run? Maybe we're all just getting too self-conscious after receiving not one, not two, but three missives promoting slimming products. First there was a fax for the diet that would see us losing a rather worrying 17 pounds in just seven days. This was closely followed by a promo for the Ultratone Futura: a portable electronic slimming device consisting of four pads strapped to the waist, it sends impulses that cause your muscles to flex. No sooner had this landed on the ChipChat desk than we received notification of CLOtherapy — clothing that actually makes you thin. As the badly-designed web site <www.adrenalin.tm> explains, wear one of these sweatshirts and the mesh panel running up the back will keep you cold, causing your body to burn more fat in its efforts to keep warm. Any other bizarre get-thin-quick schemes, send them this way. Makes a nice change from get-*rich*-quick spams.

Kitchen devils

"Strawberry Pop Tarts may be a cheap and inexpensive source of incendiary devices. Toasters which fail to eject Pop Tarts cause the Pop Tarts to

▶SCORCHING COMBINATION: THE TV/MICROWAVE COMBO IN ACTION

emit flames 10-18 inches in height." With an opening like that, we just had to read on. The "Strawberry Pop Tart Blow Torch" homepage < http://www.sci.tamucc.edu /~pmichaud/toast/>, sister site to Fun with Grapes (the same address, but replace the word "toast" with "grape") was the inspiration for much frenzied activity in the *PCW* kitchen last week. Two broken microwaves, a broken

toaster and a flame-licked ceiling later, we deduced that maybe this is not the best way to pass an empty lunch hour, and so moved on to <www.glubco.com/ weaponry/mag.htm>, the temptingly-titled "When your microwave stops working the fun begins", a site that demonstrates exactly what it's possible to achieve using components from a broken television when they are combined with the internal workings of a non-functioning microwave oven. Undaunted, we turned to the Twinkies Project <www.twinkiesproject. com>. Finding Twinkies in London was not an easy task, but once they had been located we were able to recreate the rapid oxidation (burning) and gravitational response (dropping from the roof of our building) tests with moderate success. We were also on the look-out for a new toaster to replace the one we had ruined with our Pop Tart experiments, and happened across the Talking Toaster <www.the4cs.com/ ~corin/cse477/toaster/>. No longer, it seems, is it necessary to twiddle with heat-setting dials or even to lower the bread into the machine. The toaster will

instead ask how well done you want your toast, recognising your spoken answers. The only downside is that it seems to be a one-off model. If anyone knows where we can get one, send your ideas this way.

Oops!

■ Our August "Small Business" section stated that BT was the only company installing ISDN2. A list of other installers can be found on the net at <www.cable.co.uk>. Further, the name Zyxel Cambridge ISDN should have read simply Cambridge ISDN, who can be reached on 01223 495929.

■ In our September group test we quoted £2461 inc VAT at the end of our Lexon review. The real price was £2109 inc VAT, as shown in the features table.

■ Also in the September issue we stated that Eudora Pro Email 4.0 ran on Windows 3.1. It in fact runs on Microsoft Windows 95 or Windows NT 4.0 or greater.