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PERSONAL COMPUTER WORLD

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December 1998
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PERSONAL COMPUTER WORLD

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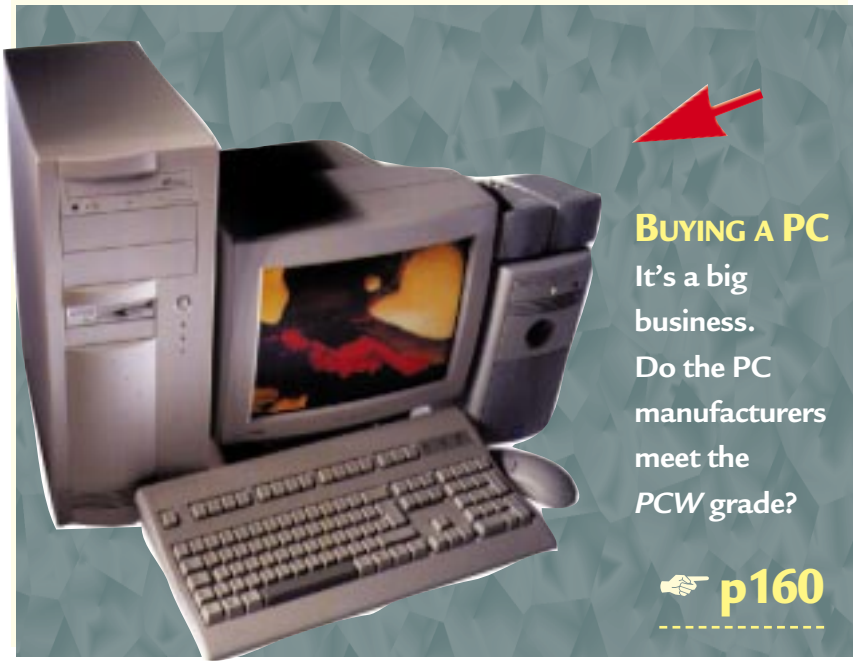

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PERSONAL COMPUTER WORLD

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They're keen for your cash, but do PC suppliers deliver the goods?

Stealth shopping

So you're about to buy a PC. What are your greatest worries? That the machine may not perform as well as you had hoped? That poor design and choice of components will result in a system which cannot be upgraded? These are certainly valid technical concerns, and ones which we address in every review and group test within *PCW*. However, there are other pressing issues which you may feel other magazines are neglecting – namely, customer relations. We've all dealt with companies which are inexplicably offhand, or even downright unhelpful, when you call to place an order. Then there are those which are eager for your business but not interested in following through with care or support once your cheque has been cashed.

How can a magazine test a company on these essential matters? How can an independent lab be sure they're being sent the same equipment under the same conditions as a genuine customer, and not some tweaked system delivered personally by the managing director? I'll tell you how: by going undercover and posing as real buyers.

Then there are those companies which are eager for your business BUT NOT INTERESTED IN FOLLOWING THROUGH WITH CARE OR SUPPORT once your cheque has been cashed

PCW secretly bought PCs from ten direct mail-order companies. They had no idea where their systems were going. We called them twice: to ask for advice on system configurations and to see whether they would try to sell us equipment we didn't want, and then to check whether they had remembered our call from the day before. Once the machine arrived, we tested it in our VNU Labs to see how it performed. Then we were back on the phone with an identical set of problems for each of the technical support lines to solve. Were they friendly? Were they helpful? Could the staff answer our problems? For all the answers, as well as the facts about buying a PC direct, turn to page 160.

We've also put together the ultimate guide to communications. Everyone wants to stay in touch with email and, of course, use the web. But what system should you choose? We've put every means of electronic communication we could find under the spotlight and advised whether your home or small business would be better off with an analogue modem, ISDN (be it BT's HomeHighway or otherwise), a high-bandwidth leased line, some kind of wireless or satellite system, or perhaps a forthcoming cable solution.

Hardware's no good without software to back it up, so we've also looked at packages for email, remote access, faxing, internet telephony. We've even examined how you can go about marketing and selling on your own web site. Everything you need to know about communications starts on page 208.

With everyone talking about the latest feature-complete beta of NT5 and the actual final release of NetWare 5, we thought it was time to pitch the two head-to-head, to see whether it's worth waiting up to a year for Microsoft or to plump for Novell right now. I suppose it depends on where you want to go today.

Gordon Laing, Editor

WELCOME TO THE DECEMBER 1998 PERSONAL COMPUTER WORLD CD-ROM

December COVER DISC

APPLICATIONS | GAMES | LIBRARY | ENTERTAINMENT | INTERNET

If you are really getting into this web thing and want to bring your graphics up to scratch, this CD is where its at! There's a great *full version* of Xara Webster 1 in our *Featured Software* section. With an upgrade to version 2 on offer, and the version 2 demo actually on the disc, you've got to take a look!

Those of you who enjoyed our debut *Entertainment* section in the November issue will love the collection on this month's CD which includes music videos *and* an exclusive and candid interview with motor-mouth-car-star Jeremy Clarkson. There's loads more software, too, so load up the *PCW* CD-ROM now and enjoy yourselves.

Xara Webster 1 Full Version
Xara Webster 2 Demo

To install and use the full version of Xara Webster 1 you will need to enter this serial number: **103-500054063**.
Xara Webster is a general purpose graphics tool for creating and optimising vector and bitmap graphics for the web, including animated GIFs. Import and combine ready-made graphics in a wide range of vector and bitmap formats and then scale, rotate, colour and fade them (great for producing soft shadows). Images can be anti-aliased and dithered for the best on-screen quality and kept compact using colour reduction and palette optimisation. The CD contains hundreds of ready-made web images for buttons, bullets and backgrounds which you can personalise to be any size, angle, colour, or text you choose. These can be found at <cd drive>:\software\featured\applic\webster *and then* \Clipart *or* \Animated GIFs.

PCW DETAILS

Operating system
Windows 95 or NT 4.0
Limitations
Webster 1 (Full version)
Webster 2 (15 day trial)
Sales contact
01442 350 000
Fax: 01442 350 010
Technical support
01442 350 000 between 1:30pm and 4:30pm

UPGRADE OFFER — SAVE 50%
In addition to the full version of Webster v1, the *PCW* disc also contains a demo of Webster version 2. *Personal Computer World* offers you the opportunity to upgrade to the full version 2 for just £18 — that's half the normal retail price. This is a special offer available until 31st December, 1998. Upgrade via the web at https://secure.commerce.xara.com/webster/pcw.asp or phone 01442 350 000.

Technical information to help you use the CD

✔System Requirements
You will need a PC running Windows 3.1 or Windows 95. The disc will run under Windows NT but functionality may be reduced. 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 do not have to do this but you will get better performance if not too many other applications are running.
Put the disc into your CD drive.
Windows 95 — If you have Windows 95, the *PCW* interactive loader will appear on your screen. But if your CD does not autoload, go to Start/Run and type <CD Drive>:\pcw.exe
Windows 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 company contact details.
If you have general problems with the CD, the technical helpline is open on weekdays; 10:30am-12:30pm and 1.30pm-4:30pm. Phone 01685 354726.
A live technical information page is available through CD Online direct from our CD-ROM (*see p19*).
If you experience hardware problems with the CD-ROM (such as a message "Cannot read from drive D:") return the disc, with a covering note, marked "PCW CD December '98" to: TIB plc, HelpLine Returns, Unit 5, Triangle Business Park, Pentrebach, Merthyr Tydfill, CF48 4YB.
A replacement disc will be sent to you by post.

✔Getting your software onto our CD
PCW is keen to promote quality software and would like to hear from you if you would like to have your product included on our disc. Please telephone Afshan Nasim on 0171 316 9592 or email him at afshan_nasim@vnu.co.uk.

IMPORTANT NOTICE

The publisher, VNU, has checked the Personal Computer World CD-ROM for known viruses at all stages of production but cannot accept liability for damage caused either to your data or to your computer system which may occur while using either the disc or any software contained on it. If you do not agree with these conditions you should not use the disc. It is good practice to run a virus checker on any new software before running it on your computer and to also make regular backup copies of all your important data. Unless otherwise stated, all software contained on the CD is for demonstration only. This means it may be restricted in some way. For example, it may be time limited or have certain functions disabled.

CD-ROM HELPLINE 01685 354726

Bryce 3D

Bryce is an ideal application for anyone who is interested in 3D but has been intimidated by the cost of professional applications and the hardware required to run them. Using presets, it's possible to get immediate results. Alternatively Bryce allows you to create sophisticated custom 3D images with full animation and camera control.

Looking quite different to most applications, with a refreshing and easy-to-use interface, Bryce 3D dedicates itself to the task of designing and animating natural-looking 3D worlds and abstract 3D landscapes. Using a wide selection of 3D tools, you literally sculpt your own peaks, valleys and plateaux and then add natural-looking erosion for extra realism.

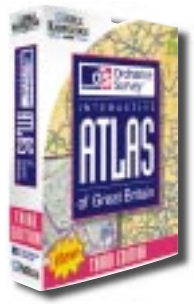
PCW DETAILS

Operating system
Windows 95/NT 3.5/NT 4.0
Limitations *Save disabled, limited demo*
Sales contact
Computers Unlimited 0181 358 5857
Technical support
None

The program mimics nature so that your landscapes contain realistic atmospheric effects and, once your world is complete, the entire scene can be brought alive by getting the application to set it all in motion.

Acceleration methods such as Direct 3D are employed by the program to reduce the render time, so you will spend more time creating and less time waiting. Your final images and animations can be saved in the most popular formats, including TIFF, PICT, BMP, QuickTime, and AVI.

Upgrade Offer — Ordnance Survey Interactive Atlas of Great Britain, from Attica



If you bought last month's issue of *Personal Computer World* you will have received your free CD of the "Ordnance Survey Interactive Atlas of Great Britain — Second Edition". Were you impressed? What did you think? We'd like to know your views.

Attica has now launched the Third Edition of this best seller and is offering *Personal Computer World* readers and users of the First and Second Editions the opportunity to upgrade for the very special price of just £24.99 (inc VAT and P&P). New features include a searchable street map of London, Personalised Map Pins, letting you customise maps with text about places of interest to you, and thousands of interactive tourists symbols. There are 56 City Centre Plans and Multi-Point Distance Measuring so you can measure the distance between any number of places around the country. In addition, there are new video clips and photographs, too.

■ Call Attica FREE on **0800 072 0171**. Lines are open 9am-5.30pm (answerphone at other times). Visa, MasterCard and Switch cards are accepted, or send a cheque (payable to Attica Interactive Limited) to Attica, Angel Court, St Clements, Oxford, OX4 1AW. Previous-edition disc must be returned to qualify. You can visit Attica on the internet at www.attica.com.

IMPORTANT NOTICE: ORDNANCE SURVEY ATLAS OF GREAT BRITAIN 2ND EDITION (PCW NOV 1998)

Last month we brought you a copy of the Interactive Atlas of Great Britain, Second Edition, as a cover disc. We apologise to anyone who had difficulty with the product as we are aware that some defective discs were issued. We would also like to draw your attention to the user licence conditions associated with the CD-ROM, which should have been included. The key points are as follows. You are licensed to use the software on a single machine only, you may not modify the software in any way, and it is your responsibility to ensure that you have adequate backups of the software and data on your computer before loading the software. Printouts of the maps and other content, except photographs and video, may be made for your own use, including educational and personal research projects and documents, however, copyright in this material is vested in the owners, Ordnance Survey and Attica Interactive Ltd. Printouts or copies of the maps and other content may not be used for re-publication, promotional purposes, or sale. Copying or reproducing any of the photographs or video sequences is strictly prohibited. The depiction of any road, path or track on mapping is no indication of public right of way. In no event will either Ordnance Survey or Attica Interactive Ltd be liable for loss or damage of any kind associated with the use of this product.

For a copy of the full terms and conditions of this licence, please contact Attica Interactive Limited, Angel Court, St. Clements, Oxford, OX4 1AW. Email attica@attica.com.

Small Soldiers

This is a fun game for the whole family and features all-out warfare in a battle to save the neighbourhood! The game is based on the film, Small Soldiers Squad Commander and sets out to provide an entertaining action strategy game that kids (from 8-year-olds upwards) can play. You can choose to fight as either the mighty Commando Elite or as one of the noble Gorgonites. The action takes place over a number of challenging missions. Intricate puzzles are layered into each mission to encourage players to use their wits and problem-solving skills while under enemy fire. Battles become increasingly difficult and desperate as your enemy reinforcements flock to aid their comrades. Small Soldiers features upgradeable weapons, bonus artillery and special power gadgets and, to ensure children stay interested, there are impressive graphics, dynamic music and an overall kid-friendly design. The full version of Small Soldiers allows you to build your own armies and contains 20 intense levels of explosive action. There are dangerous traps, awesome weapons and the voice of Tommy Lee Jones as Major Chip Hazard!

PCW DETAILS

Platform
Windows 95 or NT 4.0
Limitations
Restricted characters and levels.
Sales contact
01429 855038
Technical support
0990 745745

Recoil

Recoil puts you among the rebels and in command of a state-of-the-art battle tank in a bid to overcome forces from the future who have taken over all military computer systems. Players are transported to a futuristic 3D world where fast shooting and quick thinking are required to save the entire world. Your battle tank possesses unprecedented agility and speed, and has the ability to navigate swiftly through different environments. You can manoeuvre it from first to third person perspective or morph it into a hovercraft. The full version of the game features 18 high-tech weapons and action that takes place across six explosive mission-based worlds. Save the world alone, or compete in a 32-player deathmatch to save the planet.

PCW DETAILS

Operating system
Windows 95
Limitations
First level only
Sales contact
0171 368 2255
Technical support
0171 368 2255 between 9:00am and 5:00pm

Jagged Alliance 2

In Jagged Alliance 2, you will recruit your ideal team of mercenary soldiers and interact with merchants, assassins and scientists in a deep, entirely character-driven game. Strap on your M16 and step into new levels of role-play, strategy, and tactical combat. This is a pre-release demo of the final product, which will feature more than 150 characters.Your customised mercenaries will run, duck, climb and crawl as they battle a horde of enemies in environments of high-colour, high-resolution graphics.
** Note: information about this product on the CD-ROM is incorrect.*

PCW DETAILS

Operating system
Windows 95
Limitations *Special two-level demo version (set characters)*
Sales contact
Fax: (613) 736 5301 (Canada)
Technical support
www.sir-tech.com

Swat 2

Take command of the Special Weapons And Tactics squad to bust Los Angeles' worst criminals. Alternatively, you can play the bad guy and go on the ultimate crime spree! Many of the SWAT 2 scenarios are based on real events, (although sometimes adapted to balance the odds!). Playing as a SWAT officer means following the rules while playing as a terrorist means cooler weapons and weaker combat skills than SWAT's. Enjoy the feeling of paranoia and persecution when the SWAT officers start closing in, or else you can use your training as a SWAT officer to outwit the enemy.

PCW DETAILS

Platform
Windows 95/98
Limitations *Limited levels*
Sales contact
0118 9209144
Technical support
0118 9209111 9:00am - 5:00pm

V2000

V2000 is the follow-up to the classic eighties hit, Virus. Alien creatures are hell bent on spreading a deadly virus wherever they go, as they venture from world to world via their hives. Your mission is to save the remaining worlds from these deadly creatures by putting to use all that each world can offer. You can rescue members of each indigenous population to be used for your own gain, but you must make your own weapons and solve strategic puzzles in order to rescue the world in time. Features include a multiplayer option and different flight modes.

PCW DETAILS

Operating system
Windows 95
Limitations *2-level Interactive Demo.*
Sales contact
01865 264800
Technical support
01865 245 770 between 9:00am and 5:00pm

Software Library

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

Essential Utilities

• **Adobe Acrobat Reader 3.01 + Search**
(*Win 3.1/95/NT*)
The free Adobe Acrobat Reader lets you view, navigate and print PDF files across all major computing platforms.
(Fully-functioning reader).

• New
Awave 4.9 *(Windows 95/98/NT)*
Reads audio-carrying file formats from different platforms, synthesisers and trackers. It can be used in a variety of ways: as an audio file format converter, audio editor, player, and as a generic wavetable synthesiser instrument editor and format converter.
(30-day shareware).

• New
Catch-UP 1.2
(*Windows 95 or NT, or Windows 3.1 with Win32s*)
Catch-UP is a worldwide web-based software updating service that automatically searches for the newest versions of many popular internet-distributed software applications and hardware drivers. The Catch-UP Scanner helper application will run with your browser to generate a custom list of software updates as well as the corresponding download sites.
(Freeware).

• Latest set
DirectX 6
(Windows 95)
The latest set of essential video and audio drivers required to run today's processor-hungry games and applications.
(Fully-functioning drivers).

• New
ED for Windows 3.80
(*Windows 3.1/95 /NT*)
ED leads the way in intelligent language-sensitive editing. It is the one-stop productivity tool for programmers that slashes coding time while placing all your tools just a mouse click away. It powers-up your development environment without tying you in to any particular language or platform.
(45-day trial).

• New
Go!Zilla 3.1
(*Windows 95/NT*)
Recover from download errors and resume failed downloads, manage and categorise files to download later and get those files from the most responsive site, with Go!Zilla.
(Freeware)

• New
Graphics Workshop Professional 2.0a
(*Windows 95/NT*)
Graphics Workshop is a superlative image management package which allows you to view, convert and catalogue your images in a wide variety of formats.
(Shareware).

• New
Macro Express 1.0k
(*Windows 95/NT*)
Macro Express is the foremost macro utility, allowing you to create macros manually or by recording them. Macros can be created and edited with a powerful, yet easy Scripting Editor which allows you to see each step and command.
(30-day trial).

• New version
Microangelo 98
(*Windows 95*)
Provides access to icons of all sizes and colour formats used by Windows 95. Browse, manage, create and edit icons from 8 x 8 to 64 x 64 pixels in size, and up to 256 colours.
(30-day shareware).

• New
Neotrace 1.22
(*Windows 95/NT*)
An internet utility used to trace the connections between computers on the internet. NeoTrace enables you to trace the connection from your computer to other sites on the internet and analyse this information.
(Shareware).

• Latest version
Netscape Communicator 4.06 — Standard Edition
(*Windows 3.1/95*)
Latest version of the premier internet suite, including Netscape Navigator.
(Free version).

• Latest trial version
Norton AntiVirus 5
(*Windows 95/NT*)
The latest trial version of Symantec's Complete Virus Protection Suite (30-day trial) enhancements.
(30-day evaluation).

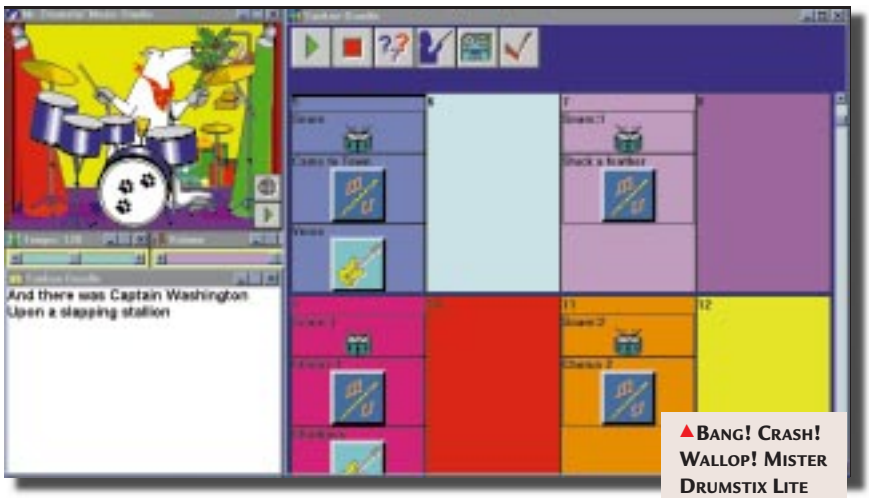
• **SpellWrite for Windows 1.6/2.1**
(*Windows 3.1/95*)
A unique utility which can spell-check any Windows program instantly (email, accounts, database and so on) from a designated hot key. It has an 85,000-word dictionary in UK format.
(30-day shareware).

• **Spinner Plus 1.0.13**
(*Windows 95/NT*)
Spinner Plus is a free application which gives you access to more than 100 channels of continuous music. You can launch it, start the music and then continue to listen while you use other programs on your computer, surf the web, or take a break!
(*Freeware*).

• **VuePrint Pro 6.0f**
(*Windows 3.1/95*)
VuePrint is the most widely used Windows program for viewing images. You don't need to know anything about images or file formats to use VuePrint — just tell it to open a file and it automatically displays any images it finds in this file.
(15-day evaluation).

• **Web Leech 2.2**
(*Windows 95/NT*)
The purpose of this application is to enable the user to download files which are attached to web pages, but *without* having to click on each link/file individually to save them. Instead, a list of available files is created and either all or selected files can be downloaded.
(Freeware).

• **WinZip SR 6.3 SR-1**
(*Windows 3.1/95*)
Industry-standard compression/decompression utility with automatic built-in disk spanning support for multi-disk Zip files.
(21-day evaluation).



▲ **Bang! Crash! Wallop! Mister Drumstix Lite lets kids enjoy the sounds of drumming and preserves their parents' nerves**

New software titles this month

• **3D Goldrush 1.0**
(*Windows*)
A multi-feature 3D slot machine game. True to life animation and classic sounds give this game brilliant realism. You will feel the tension as you gamble your winnings for more, and more... feel the frustration when you lose!
(Shareware).

CD-ROM HELPLINE 01685 354726

• **3D Proslots 1.0**
(*Windows*)
3D Proslots is the very latest slot machine simulation to be released by Gamescape Studios. It includes a whole stack of new features, many ways to win, the usual great 3D-rendered graphics and brilliant casino-type sounds.
(Shareware).

• **Crossword Construction Kit 3.0**
(*Windows 95*)
Crossword Construction Kit is the Desktop Publisher for creating theme-based crossword puzzles. You can design your own puzzle page layout and drop, place and size the puzzle, graphics and text components. Select fonts, colours, columns, borders, alignment and more.
(21-day shareware).

• **Medieval**
(*Windows 95*)
Medieval is a tactical combat game depicting various field battles that took place in the period from about 500 AD to 1500 AD.
(Limited demo).

• **Mr. Drumstix Lite 2.0**
(*Windows 3.1/95*)
Teach your children the joys of music without spending a bundle. With Mr. Drumstix, music education is built right into the fun.
(Limited demo).

• **Optio 1.10**
(*Windows 95*)
OPTIO helps you to sort out your long-term finances, without having to rely on insurance salesmen and other financial advisors. It builds a permanent record of your entire financial position and then identifies any gaps in your long-term plans.
(Save-disabled demo).

• **SmartDoc 95 2.1**
(*Windows 3.x/95*)
SmartDoc allows you to extract all the text from a Windows Help file and put it into a plain-text file which you can then print or load into your favourite word processor.
(30-day shareware).

• **SmartSum 1.6b**
(*Windows 3.x/95*)
SmartSum is a Windows-based implementation of an adding machine/printing calculator. It also adds a number of tricks that a normal printing calculator cannot do.
(Shareware).

• **SnagIt 4.2.1**
(*Windows 3.x/95*)
SnagIt captures anything on the Windows desktop quickly and easily. From one-step capture of scrolling web pages to video capture and text conversion, SnagIt does it all.
(45-day evaluation).

• **UBE 98 1.8**
(*Windows 95/NT*)
UBE 98 is a security program which can encrypt your work in hand. It also has the ability to create encrypted self-extracting .exe files for distribution to others. The program uses 2,048-bit encryption technology.
(Shareware).

• **WordSearch Construction Kit 3.0**
(*Windows 95*)
WordSearch Construction Kit is the desktop publisher for creating word-search puzzles. Design your own puzzle page layout. Drop, place and size the puzzle, graphics and text components. Select fonts, colours, columns, borders, alignment and more.
(21-day shareware).

• **And,** there are lots more utilities, too.

PhotoDisc

PhotoDisc offers a unique internet photo-library service, and the images on offer are of the highest standard. On this month's CD-ROM we offer a preview of this collection.
In addition to the ten images on our cover disc, PhotoDisc offers access to 74,990 other stunning images direct from the web.
PhotoDisc has become one of the world's leading sources for royalty-free, innovative, diverse and compelling images. You can visit the PhotoDisc website at www.photodisc.com/uk, where you can search, select, purchase and download their entire collection of 75,000 images.
If you need an image, fast, it is easy to visit the site direct from the CD by going to the CD Content Links section of CD OnLine (accessible from our front screen).

ICV Entertainment Section

Our entertainment section this month, is again packed full of exclusive material. There is a preview of Virgin Records' music videos and an advance preview of the Robin Williams film "What Dreams May Come", plus an exclusive interview with Top Gear's Jeremy Clarkson.

Jeremy Clarkson

This is the first and last place that you will be able to see this candid interview with motoring journalist Jeremy Clarkson. Click on any of the video boxes on-screen and experience Top Gear's Clarkson at his best. This exclusive interview coincides with the release of "The Most Outrageous Jeremy Clarkson Video in the World...Ever" which sees him put the world's fastest cars through their paces.

The Raft

The Raft is a taster of what you can get from the official Virgin Records web site at www.raft.vmg.co.uk. It includes excerpts from the music videos of Placebo, Malcolm McLaren, Whale and Wagon Christ.

What Dreams May Come

An opportunity to see the trailer for the forthcoming Polygram film starring Robin Williams and Academy Award winner, Cuba Gooding Jr. Released in the UK on 26th December, this epic romantic drama boasts an outstanding cast including Annabella Sciorra and Max Von Sydow.

CompuServe trial

The UK's leading Online Internet Service offers fast and easy access to the internet and a one-month trial which includes *free*: 650 hours' online time, personalised email address and web space. The offer is valid for the first month only and the free online time must be used within the first month. All prices are set in US Dollars but will be charged in your local currency, based on the prevailing exchange rate.

PCW DETAILS

Platform
Windows 95 and 3.1
Limitations
One month free membership. 650 free online hours to be used in the first month.
Sales contact
(Account enquiries)
0990 134819

VNUNET WWW.VNUNET.CO.UK

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 in a wealth of in-depth articles, news analyses and product reviews from our stable of monthly publications, including such titles as this (*Personal Computer World*) and *Management Consultancy*, plus some of the best editorial material from our portfolio of 15 business and consumer titles.

JOBWORLD WWW.JOBWORLD.CO.UK

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 extra freedom by sending only 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 — you could be the first to know!

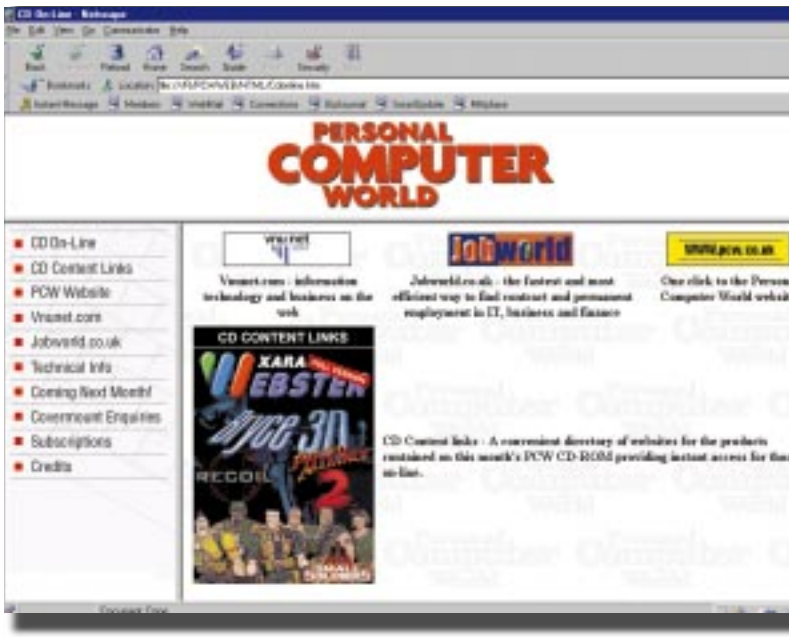
PCW CD OnLine

Access the internet direct from the opening screen!

If you want to find out more about any of the software products that are included on this month's cover-mounted disc, and you are connected to the internet, you can go to the particular company web sites via the Content Links of the CD-Online section on the CD. Simply click on the web link banner at the top of the main screen to run your browser and access PCW CD-OnLine direct from the disc. CD-OnLine gives you access to the *Personal Computer World* web site, Vnunet.com and Jobworld.co.uk.

If you are interested in any product or section on the CD, the Content Links Section gives you direct access to live company web sites. You will also find live, up-to-date, technical information about the CD and there's even a preview of what will be on next month's disc!

Remember, if you have enjoyed the magazine and our CD, you can subscribe via email while you are online!



CD-ROM HELPLINE 01685 354726

PCW Cover Disc Questionnaire

Now that you've seen what's on this month's PCW CD, it's your turn to tell us what you'd like to see in the future. Please spend a few moments filling out this questionnaire, and remember — the more help you give us, the more we are able to deliver the product you want! If you don't want to cut this questionnaire out of the magazine, just photocopy it and send it to the FREEPOST address at the foot of this survey — no stamp required.

1. Please indicate how free software, cover-mounted on the front of our magazine, influences your purchase decision of PC magazines (the scale ranges from strongly DISAGREE 1, to strongly AGREE 5).

I am more interested in the content of the magazine than the free software	1	2	3	4	5
I would buy a magazine that I didn't necessarily want to buy if it had software that interested me	1	2	3	4	5
I look at all the free software before deciding which publication to buy	1	2	3	4	5
I always buy the same publications regardless of the free software	1	2	3	4	5
I choose the magazine with the highest-value software	1	2	3	4	5

2. What type of software are you most interested in? Please tick your preferred 1 and second option 2:

Office (word processor, spreadsheets)	1	2	PDA software	1	2
Programming languages	1	2	Strategy games	1	2
Operating systems	1	2	Simulator games	1	2
Accounting and finance	1	2	Arcade games	1	2
Desktop and web publishing	1	2	Home improvement (DIY, gardening)	1	2
Photo and drawing	1	2	Reference (encyclopaedias, dictionaries, maps)	1	2
Music, audio and MIDI	1	2	Tutorials and training	1	2
Maintenance and anti-virus utilities	1	2	Children's stories	1	2
Web and internet utilities	1	2	Clipart	1	2
Schedule and contact management	1	2	Other (*please specify*) _____		

3. Which format of software do you prefer to receive *(please tick)***:**

Full working versions of recent programs	☐	Free internet access trials	☐
Full working versions of older programs	☐	Drivers, updates and large downloads...	☐
"Time-bombed" trial versions	☐	...if "yes" to drivers or updates, please tell us which are the most useful _____	
Limited functionality demonstration software	☐		

4. Have you ever bought the full version of a software package after trialling the demo version from a magazine?
If so, please tell us which software _____

5.What other types of free gift or offer would motivate you to purchase the magazine on which they appear?

	Yes	No
Booklets or supplements	☐	☐
Price reduction of the magazine	☐	☐
Internet trial discs	☐	☐
Show tickets (Windows/Networks/Live 98 etc)	☐	☐
Mouse mats	☐	☐
Other	☐	☐

(*please specify*) _____

6. If you could name just one piece of software to go on the PCW CD, what would it be?
(*please specify*) _____

Once you have completed this questionnaire, please return it to: Katy Lefevre, PCW Software Questionnaire, Freepost 2532-34, Broadwick Street, London W1E 6EZ. REMEMBER — YOU DO NOT NEED A STAMP!

NEW COMMS

BT prices ADSL out of homes

The first UK pricing for an **ADSL (Asymmetric Digital Subscriber Line)** service has dashed hopes that the technology will give homes cheap bandwidth.

ADSL lets BT piggyback fast links relatively cheaply onto its existing lines using a high-frequency carrier signal. But net service provider I-way is asking £350 a month (£4,200 a year) for a trial "always-on" link provided by BT in North London, giving 2Mbit/sec downstream and 256Kbit/sec upstream.

I-way managing director Glen Rothwell points out that this is cheaper than a slow, leased, line (Cerberus charges £6,600 ex VAT a year for an 0171 64K link). He agreed BT prices were pitched to protect profits on fast corporate lines.

However, BT faces stiff competition from fast cable and satellite links which are rapidly coming online.

I-way 0118 958 0058

INTERNET

Shakeout time on web as Dixons offers free access

Subscription-based web service providers face their biggest threat yet with a free-access scheme from Dixons. CDs with all the software (Windows 9x or NT only) needed for the scheme are freely available at any Dixons store.

The Freeserve offer includes perks like 5Mb of free web space, email addresses and information channels. The major snag is a £1 a minute charge for support, which is unlikely to deter experienced defectors from other ISPs.

The infrastructure for the scheme is provided by Energis and Planet Online. It will be financed by online shopping, sponsorship, advertising and a small cut of phone charges.

How Freeserve will handle mass use remains to be seen. But first reaction from *PCW* readers was favourable; they reported easy access and few advertisements. It is not Britain's only free-access offer, but it is the first with such heavyweight backing.

Launched at much the same time was BT's long-flagged **Click+** offer of access at 1p a minute on top of line charges. Its one edge over Freeserve seems to be Win3.x support — although few PCs of that vintage boast the necessary 16Mb RAM.

Richard Woods, spokesman for backbone/service provider UUNet Worldcom, welcomed free services as certain to bring in new users: "Ultimately they'll bring more business to us."

Another result is likely to be a two-tier web in which users pay for better service. UUNet (ex-Pipex), which sells mainly to businesses, has just launched service-level agreements guaranteeing access and speeds.

Richard Furniss, marketing manager at Scottish Telecom-owned Demon, said ISPs not aligned to a telco may feel the squeeze. He predicted that Freeserve will eventually be flooded with ads and e-trade offers. "The money has to come from somewhere. There is always a catch," he said.

Dixons www.freeserve.net;
Click+ www.clickplus.com;
Demon www.demon.net;
Uunet www.uk.uu.net

PROCESSORS

Intel plans 1GHz for Y2K

Intel plans a 32-bit processor running at 1GHz within two years. The chip, code-named Foster, will have a new micro-architecture and will be a successor to the PII.

The plan was revealed in an Intel "roadmap" outlining the future of IA-32 beyond the IA-64 Merced processor, also due out in 2000.

Foster, designed for use in workstations and servers, will likely run some 32-bit apps faster than Merced, giving Intel a fallback in case Merced flops.

A slightly less powerful 32-bit processor, codenamed Willamette, will enter the US sub-$3,000 desktop market.

The new designs, which will start appearing next year, seem to indicate that Intel is attempting to play down the importance of Merced.

Tanner, a PII using Katmai 3D technology, will be released early next year. This will be followed by Cascades, a 0.18 micron PII.

Merced's successor, McKinley, will appear at the end of 2001 with speeds of 900MHz, Intel says.

SUSAN PEDERSON

• There's more chip news on pages 28 and 31.

INPUT

Superpen types text

This X-Files lookalike is BT's way of publicising a "space age pen" that is said to translate hand-writing into typed text. The **Smart Quill** will also be an organiser with a calendar, notebook, diary, calculator, and contacts database, and will be able to receive email and pager messages.

The pen will connect to a PC, printer or modem by insertion into a special "inkwell". BT claims it will read what is "written" on any flat surface, or even in the air. No release date has yet been announced.

www.innovate.bt.com/showcase/smartquill

DIGITAL TV

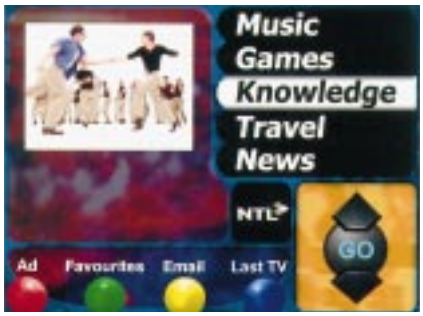
BSkyB launch snubs PC users

PC users are being largely ignored during the first phase of the digital TV revolution (which, for once, is not too strong a word).

The potential for delivering multimedia streams to the UK's eight million-or-so PCs will remain unrealised, in the short term at least.

Terrestrial, satellite and cable companies are focusing on set-top boxes (STBs) and have the mindset of entertainment providers seeking a mass market — an attitude credited with preventing UK cable companies cashing in on the initial internet boom.

The BSkyB digital launch did at least prod these out of their customary torpor. NTL, one of Britain's Big Three, announced that it will be starting an interactive digital TV service next March using STBs equipped with cable modems passing 3Mbit/sec; a bandwidth that may be shared by up to 500 users.



NTL's Jonathan Thompson said he was not aware of any way in which the set-top boxes can link to a PC. "It will be some months before we get around to thinking about standalone cable modems," he said.

NTL hopes also to get a deal to provide phone-based interactivity for free-to-air terrestrial digital services.

Its sample web pages (*pictured, left*) show how inferior TV interactivity will be to PC-style web pages. Video can be used freely in broadcast material; otherwise, designs are simpler, with larger text for family viewing across a room.

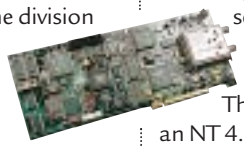
TV companies will offer access to the wider web, but hope to retain surfers within a so-called "walled garden" of compelling content.

CLIVE AKASS

• *See Analysis Special, pp50/51.*

Adaptec hives off its DVB unit

Adaptec has separated its satellite networking division into a new company called Broadlogic. The division develops DVB cards which can be used to access PC-friendly broadcasts from the likes of Eutelsat. The move follows a narrowing of its product line after poor financial results.



Meanwhile, in the UK, Wavelength Electronics is selling a PCI DVB card from French vendor Comatlas. The CAS 2043A uses an NT 4.0-ready driver.

Adaptec 01276 854500; Wavelength 01843 602869

Acorn PC rescue bid

There were reports as we went to press that a rescuer might be at hand for the Acorn RISC PC.

A leaked report said that the company had been in talks with Applied Risc Technologies (ART), which was willing to take over its RISC operating system and its shelved Phoebe Risc PC. It said ART, run by former Acorn technical director Peter Bondar, aimed to base a new business "on the sale, design and production of Risc-based personal computers and thin clients".

Acorn was not returning calls, but details of the deal were expected to emerge by the end of October.

Acorn announced in September that it was closing its workstations division to concentrate on thin-client and digital-television technologies.

Acorns are still widely used in schools and have a small but enthusiastic user base.

• *See Analysis, p40.*

NCR introduces web via the oven door

A combined **microwave oven and web browser** is under development at the London Knowledge Lab of US cash-machine firm, NCR.

The oven's usual viewing window is replaced by a screen which lets you cruise the net as your food cooks. NCR believes it will appeal to users who might be intimidated by a PC browser, but it has yet to overcome the small matter of how to prevent the microwave from cooking the browser.

All I get is a message reading "Cannot contact the microwave server"

short stories

WIN CE THINKS BIGGER
A new class of mobile, the size of a mini-notebook or the super-thin Sony Vaio 505 (*see David Fearon's rave review on page 79*), is likely to emerge with the release of Win CE Pro. The spec, based on Win CE 2.11, permits full-size VGA and SuperVGA screens. It has already been backed by most existing CE-handheld vendors.
• *See Tim Bajarin, p31*

1999 — YEAR OF USB
The USB will have superseded the PC's traditional RS232 serial port by mid-1999, says Clive Hudson, new Euro-head of USB specialist Entrega. He is selling a range of sub-£100 hubs providing multiple USB ports as well as RS232 or parallel connections.
Entrega 0118 951 9549

WRITE YOUR OWN FONT
French vendor Mediatic is looking for a UK distributor for a package which allows you to create a font from your own handwriting.
Mediatic 0171 706 2043

short stories

DOSSERS FEAR Y2K
Thousands of firms still use DOS accounts packages, claims Pegasus Software. It believes Y2K fears will persuade many to upgrade to its new Capital Gold 2 for firms turning over between £35,000 and £5m. Product manager David Gordon said: "Many will be upgrading hardware to get rid of Y2K bugs so they may as well move on to Windows." Gold was written "from the ground up" as a 32-bit Y2K-savvy product offering easy migration from Windows and DOS packages.
Pegasus 01536 495000

ISDN VIA USB
Exterior ISDN adapters can overload serial ports. But the Drak Tec Vigor 128 connects via the faster USB. PC and Apple iMac models cost £149 and £154 (ex VAT) respectively.
Action UK (dealer) 01276 855770

OPERATING SYSTEMS

Linux gets a triple boost

Netscape and Intel have bought a stake in Linux specialist Red Hat Software in a major boost to the open-source operating system developed by Linus Torvalds.

Oracle also jumped on the bandwagon with a Linux version of its database and application server. It also announced that it intends to licence and support the OS.

Perhaps as important were reports that IBM, which is to stop making Cyrix-designed x86 chips (*see p31*), will take up the slack in its fabs by using designs from Torvalds' new employer Transmeta. There was speculation that Transmeta will develop Linux-optimised RISC chips.

Links with Intel should help Red Hat optimise Linux for the 64-bit Merced chip, now delayed until 2000. The new investments could also help make Red Hat's Linux 5.1 the standard "flavour".

Linux source code is free, but companies like Red Hat and Caldera sell and support commercial "distributions". Apps written for one will not always run on another. Intel vice president, Sean Maloney, said Intel's support for NT would be unaffected. "It's a heterogeneous world," he said. "We have to be agnostic because there's going to be a wide range of operating systems for a long time." Maloney also said Intel is "looking forward to working with other distributions." But **Netscape's** John Paul said his company would certify its products only for Red Hat's. Other distributors would have to do their own testing, which could put them at a disadvantage.

Netscape said its Linux-based server products will not come with source code. But co-founder Marc Andreessen has been a vocal supporter of open source code which Netscape will use for its next Communicator browser.

Oracle marketing senior vp Mark Jarvis claimed: "Microsoft is quaking in its boots about Linux."

• Digital Networks UK is selling a 300MHz K2-based Red Hat Linux workstation with 64Mb of RAM, 6.8Gb hard disk and 32X CD drive for £688 (ex VAT).

FROM REPORTS BY DOMINIQUE DECKMYN AND MIKE MAGEE

Digital Networks 0161 339 8555; http://dnuk.com.
Red Hat www.redhat.com

New kernel will be 'stable soon'

Linus Torvalds conceded at ISPcon that Linux is not ready for some high-end applications. He said the kernel's next version will offer better multiprocessor support and will be "stable" in a month or two.

He said Linux, which runs on Alpha and SuperSparc chips, has a head start in moving to 64-bit Intels. "We have solved all the problems already...few operating systems can say that."

Torvalds predicted that more apps will be ported to Linux. "In three to five years we will have all the office suites and all the games."

Indian summers

POINT OF VIEW

It took a three-week break in India for me to realise the extent to which cybercafés have become the new post offices, used by foreigners and natives alike as the quickest way to send letters.

Cybercafés are at the high end of the market, as this shot (*right*) of Delhi's funky Pahar Ganj bazaar shows. Back streets in the capital exhibit grassroots parallels to Britain's comms revolution: we sprout firms reselling phone and web capacity; there, someone's entire livelihood may depend on selling STD calls or web time on a single phone or PC in a shack of an office. This is a big deal in a country where, until recently, few enjoyed the rapid comms and varied information sources we take for granted.

Don't let the quaint signs, the rickshaw and the rickety buildings deceive you. India invented modern maths — at least, it invented the zero, which amounts to the same thing. There are a lot of good programmers there, many of them down south in Bangalore, India's answer to Silicon Valley. They speak good English (often as a first language) and, with the help of excellent communications, they are winning a lot of work from Western programmers.

Clive Akass sees the comms revolution, India style

STORAGE

Tiny IBM disks show new uses for CF slots

Details have emerged about IBM's 170Mb and 340Mb microdrives, which are about the size of a book of matches. They use the new Compact Flash II (CF II) slot which is challenging the larger PCMCIA slot as a way of adding peripherals to mobile devices.

Future capacities could reach 1Gb or more, IBM says.The drives are expected to be used mainly for digital cameras and handhelds but they cannot be used on most current models, which use the CF 1 slot (*see box, below*). Solid-state RAM is preferable to the microdrive in terms of ruggedness and battery drain. But it is far more expensive. Peak Development quoted £172 for a 48Mb CF nodule, currently the biggest capacity.

SanDisk, developer of the CF II specification, says bulk prices could drop to as low as $100 for up to 80Mb by mid-1999, when IBM plans "limited availability" of the microdrive. It quoted US reports that prices would start at $170 for the IBM.

Mitsubishi and Hitachi have jointly developed a

256Mbit flash memory chip that lets CF modules hold up to 192Mb. PC Card versions will hold up to 640Mb.

Current drain of the chips is quoted as 1 microamp on standby, and 20milliamp (ma) on read/writes at 3.3v. IBM was coy about the microdrive's drain, other than it is less than 500ma, the relatively hefty maximum for CF II devices.

But Sony's Mavica digital camera, which uses a floppy for storage, shows that battery life need not be an issue when a disk is used intermittently.

More details at www.storage.ibm.com and www.sandisk.com
Peak Development 01489 796979

CF II ... no flash in the pan?

The original 3.3mm-deep CF I slot was designed purely for solid state flash RAM modules measuring 42.6mm x 36.4mm — about half the size of a PCMCIA card.

CF 1 devices can be used in CF II slots; but the reverse is not true because CF II devices are deeper (5mm) and have extra pins which enable the slots to be used for hard drives, ethernet cards and modems — much the same kind of devices that go into PCMCIA slots.

An adapter will allow CF II devices to be used in PCMCIA slots.

Faster PCI

Faster and smaller versions of the PCI bus are in the pipeline. A proposed Mini PCI will cram it on to a small (699 x 457 x 56mm) daughter-card to help vendors integrate network cards, modems and other devices into small products such as notebooks.

A PCI Special Interest Group (SIG) workgroup is also examining a proposal called PCI-X, jointly developed by Compaq, Hewlett-Packard and IBM, which defines a 64-bit bus running at up to 133MHz.

Both proposals have to go through a lengthy review procedure and are unlikely to be accepted until next year.

For more information see www.pcisig.com

Virtual tour takes in old school ties

This is your reporter's old school, cruelly morphed into a shopping centre in Bedford. We print it less to point out the window (*behind*) in which his backside was often thrashed, than to show how comprehensive is the "virtual tour" on a new CD called Eye2Eye Britain. It provides a map on which each of 3,000 marked towns and other sites calls up one or more captioned pictures. It is a simple idea, well implemented, with scope for expansion into an impressive resource. At £49.95 it will probably find a market more in schools and libraries than among private buyers. CLIVE AKASS

Eye2Eye 01223 293886

short stories

EASY DVD
Sony claims inexperienced users can get its £212 (ex VAT) DVD pack up and running within ten minutes. The internal DDI220E drive reads at 5X speed, giving a claimed transfer rate of 6925Kb/sec. The drive can also read CD-ROM, CD-R and CD-RW disks.
www.sony-cp.com

RUGGED LASER
This LS-1200 laser scanner is likely to make a splash with anyone who needs to read bar codes in harsh conditions. The device, from rugged notebook specialist Husky, has already been adopted by Rover to track production.
Husky 01203 604040; www.wphusky.com

PRO MOUSE
Microsoft has launched a new £44.99 Pro version of its IntelliMouse. It claims ergonomic improvements with the ability to scroll in any Windows 9.x application.
Microsoft 0345 002000

KEY MOVE
Mitsumi is offering a Euro key for its keyboards. Just send an international reply coupon to Mitsumi Hotline, Schumannstr.18 d, 52146 Würselen, Germany.

PC prices reach TV level

A US company called emachines (*sic*) has set a new **low price point** for a well-specified PC — just $499 (£311), less than the cost of a mid-range television.

Some UK vendors might match this price for a basic PC, but from emachines, £311 buys you a 266MHz Cyrix M2-based mini-tower with L2 cache, 32Mb of DRAM, five expansion slots, a 2.1Gb hard drive, a 24X CD-ROM, a 56K modem, a 3D video graphics card, two USB ports, a game port and a 14in monitor. A similar 300MHz Celeron-based model with 3.2Gb drive costs $599, including monitor.

By December, emachines plans to produce a version of the Cyrix-based sealed box with no expansion slots, but with a 3X DVD drive and IBM DVD MPEG decoder with S-Video and a rear antenna, all for $499 including a monitor.

Also planned is a $599 eStation, which copies the revolutionary look of Apple's all-in-one iMac but is a PC. Company officials admit that they will make little on the cheapest models, but say they expect to sell more of the $599 systems which do offer good profit margins.

The Cyrix M2, known as a PC-on-a-chip, costs less then $99 apiece in bulk; but even so, many in the industry were surprised that emachines could sell its products so cheaply. Yet the company claims that this year's production run has already sold out.

TIM BAJARIN

emachines
www.emachinesinc.com

PROCESSORS

IBM drops 6x86s

National Semiconductor (NatSemi) has paid IBM Microelectronics $55m to stop making 6x86 Intel clone chips. The money ends a manufacturing deal with Cyrix (now owned by NatSemi).

▲ CYRIX-BADGED 6x86 CHIPS

Under the terms of the deal, **Cyrix** designed the chips and sold half the production run; the rest were branded by IBM. But there had been constant friction between the two companies. IBM was accused of undercutting Cyrix, and even hinted at one point that its version was better than the Cyrix one.

Odder still, IBM used rival AMD chips (albeit manufactured by IBM) rather than its own-brand 6x86 chips in its cheaper Aptiva PCs, which have helped 6x86 clones gain credibility among PC buyers.

NatSemi will ramp up production of the Cyrix chips at its own Portland, Oregon, chip fabrication plant. IBM is expected to license chip designs from elsewhere, possibly including one for a "system of chips" designed for cheap home personal computers.

• *Drew Cullen (VNU Newswire) writes*: Clone chips were given a further boost with news that Sony is to use AMD's 350MHz K6-2 in a new line of consumer PCs called Vaio Compo. And sources close to the company said AMD will launch a 400MHz version of its K6-2 in November.

ADDITIONAL REPORTING BY MIKE MAGEE

Bigger Win CE handhelds

Microsoft ended months of speculation on 8th October by unveiling its Jupiter reference design for business-orientated handhelds. Jupiter, now renamed **Handheld PC Professional**, was supposed to use Windows CE 3.0, but this is still six months away so Microsoft has used CE 2.2, with crucial support for 256-colour 640x480 VGA screens and better battery management. Microsoft is pushing the idea that staff who might not qualify for a fully-powered Windows 98 portable could still benefit from a 2lb, sub-$1,000 portable with a 12-hour battery life, email and full internet access.

Jupiter machines will be available from as many as nine vendors including IBM, Compaq, Hewlett-Packard and LG Electronics. The most interesting design will come from Vadem and Sharp. Called the TriPad, it can be used as a standard laptop, a reading device or a pen-driven tablet. IBM, Compaq and HP are mapping a form factor similar to that of the Sony Vaio 505 mini-notebook, with a 10.4in screen.

Here's my take on this year's Microsoft analyst conference. The company seems to have bought in to the idea that the computer is the network. The move is on to architect applications for the network, which means Office will migrate to some form of Java implementation for delivery across the network as components. These will be designed specifically for Windows, but they still mark a new age in PC software. Microsoft is quickly hiring staff and training them to help customers with back-end customisation. This will change the company's place in the market dramatically over time, and will pit it against some of its system-integration and software partners.

When I first visited Microsoft, in the early eighties, it had 29 staff and you could walk into Bill Gates' office to chew the fat at any time. Now Microsoft is worth more than General Electric and is transforming itself into a network provider — and seems on track to own that space as well.

Tim Bajarin
letter from Silicon Valley

NEW PUSH FOR JAVA

With Lotus, life is eSuite

▲ THE NEW ESUITE PROMISES FASTER PERFORMANCE

Lotus is hoping that its recently launched version of eSuite for the PC will give the Java productivity suite a much-needed shot in the arm. Release 1.5 of the PC version of eSuite, which was in the shops in October, incorporates a Java development kit called DevPack, and WorkPlace, a set of office applications. These applications include a word processor, project scheduler, spreadsheet, calendar, address book and email and are all 100 percent pure Java.

Lotus says that it has focused on faster performance for version 1.5 of eSuite, which was a bugbear for version 1.0 of the product. Code execution takes place at the client side, making the applications at least 10 percent faster than before — although customers using IE4 are reporting speed improvements of up to 40 percent.

Early versions of eSuite were aimed at the thin-client NC market and sales proved sluggish. Lotus eSuite product manager, Tom Crawford, says that the PC version will open up new doors. "We all know that the market hasn't taken off on NCs," he said. "But we haven't changed our strategy. We planned to deliver a PC product all along." UK prices for eSuite 1.5 have not yet been released.

Lotus 01784 455445
www.e-suite.lotus.com

IBM hits home with its new Aptiva range

IBM has refreshed its **high-end home PC range** with the release of the Aptiva S49.

The S49 has a 450MHz PII processor, 16.8Gb hard drive, DVD-4 ROM drive and a 56K modem. The package also includes a 19in monitor, a ScrollPoint mouse, Infinity speakers and the IBM Rapid Access Keyboard for quick access to the web. Prices start at £2,499 including VAT, although you can choose a 15in TFT monitor instead for £2,699.

IBM 0870 601 0136
www.ibm.com/pc/uk/aptiva.html

NSI contract extended

The US government extended the **Network Solutions (NSI) contract** in October, allowing the company to continue administering domain names for another two years.

Under the plan, NSI will continue to register addresses with the suffixes .com, .net and .org until September 2000, but must develop software to allow other companies to register those addresses by June 1999. It must also start transferring technical control of the domain system to an international non-profit organisation by March, as well as working to the regulations set out by this company.

In June of this year the Clinton administration announced plans to hand management of the domain name address system from NSI to a global body by September. However, as it is still considering several proposals from industry groups on how to form the new organisation, the government has extended NSI's contract to enable a smoother changeover.

VNU NEWSWIRE

Fujitsu's space saving exercise

Fujitsu has broken a few space and design barriers with the launch of the Intecra PC. The **all-in-one system** takes up only one third of the room required by a conventional PC and monitor, and comes with a 13.8in LCD flat screen that can be rotated through 90 degrees. It uses only 30 percent of the power consumption of a regular PC. The Intecra has a 266MHz PII processor, a 2.0Gb hard disk, and costs £1,049 (inc VAT).

Fujitsu 01344 475 555
www.fujitsu-computers.com

Moving pictures

A new product from Tiny Computers can help **bring your emails to life**. VideoMail allows users to send each other videos using a USB camera and a simple piece of software. VideoMail is available free on Tiny's Home Entertainment PCs and the Super Power 350 Plus, or with any of its other PCs for £99 ex VAT.

Tiny 0800 821 333 www.tiny.com

ISDN

Sounds good

This £149 (ex VAT) Power 1000 kit gives PCs, video or TVs Dolby Pro Logic surround sound at up to 160W per channel. It includes an amplifier, subwoofer, two satellites, one central and two frontal loudspeakers, and a remote control kit.

Teac 01923 225235

Cambridge claims cheaper ISDN

A new German-made **ISDN switchboard system** designed for small firms is up to £400 cheaper than similarly-specified boxes, claims vendor, Cambridge ISDN.

The basic £599 (ex VAT) Agfeo AS40 PBX supports two ISDN lines (up to four simultaneous calls) and three extensions, plus features like music on hold, call transfer, three-party conference calls and caller line identity. It comes with Windows-based Computer Telephony Integration (CTI) software which, for example, enables you to call from any Windows application by clicking an on-screen button or by pressing a hotkey.

The box contains four expansion slots, each of which can take either an extra twin ISDN card (£249 ex VAT) or a £149 (ex VAT) card, allowing four extra extensions. Eight-extension cards will be available shortly.

◀SMALL FIRMS CAN NOW PURCHASE A WELL-FEATURED ISDN SWITCHBOARD FOR LESS MONEY

Cambridge ISDN claims similar systems have previously cost more than £1,000.

Cambridge ISDN 01223 495929; www.Cambridge-isdn.com

Flute and fibre plans for cheaper comms

Internet millionaire Peter Dawe says communication costs within Europe are a "rip-off"; a situation he plans to change with Flute, a firm he set up with former Pipex general manager, Richard Nuttall.

Dawe, who made some £30m selling his Unipalm-Pipex stake in 1995, plans to extend his English Channel cable network with a 24-pair cable ring linking Britain, Belgium and the Netherlands. The plans are to lay the fibre next spring and be operational by summer. He also plans links to Germany, Denmark, Sweden, Norway and Scotland. Dawes asks: "Why does it cost more to call Europe across 300 miles of North Sea than to call the US, across 3,000 miles of water?"

Flute, unlike other cross-channel systems, will offer customers dark fibre for rent; a strategy used successfully in the US long-distance market. Dawes explains: "We are building fibre as if it were a shopping mall — a capital project in which you don't operate the shops but, once developed and built, is an asset. In our case, [the project] is cable, which has a guaranteed rental income for its whole life."

He claims Flute is "coming in at one sixth of existing prices". Of course, there is the mere matter of the £20m investment the company needs. But Dawe believes profit guaranteed on the first cable will pay for a second by 2001.

www.flute.ltd.uk

• **Radiant Networks** is developing technology to deliver multimedia wireless services to a mass market at rates of up to 25Mbit/sec. Its "mesh network" was conceived, developed and funded by Cambridge-based comms consultancy, Plextek.

Technical director Tim Jackson tj@radiantnetworks.co.uk also sees the novel, low-cost system delivering video telephony, email and interactive TV, with first products developed over the next two years. The company is raising £14m for R&D funding through a share placing. The new mesh system overcomes "line of sight" problems of cellular networks, says Jackson. It uses subscriber units rather than a base station to exchange data with other nodes, routeing signals around obstacles like buildings.

A demonstration network is running in Great Chesterford, Radiant's home town. Managing the new spin-off are md Will Gibson, who developed datacoms business Transmit International, and Alan Bates, a previous chief executive of Bell Cablemedia.

• **Adaptive Broadband**, which uses technology pioneered over five years at the Olivetti & Oracle Research Laboratory, has been acquired for up to $17m (depending on performance) by US supplier, California Microwave. The technology enables unprecedented data rates over point-to-multipoint radio links: currently 25Mbit/sec in the 5.8GHz unlicensed frequency band. Prototypes are being evaluated for countries with poor land lines, and pilot deployments are expected in the Spring.

www.adaptivebroadband.com

Caroline Swift  *continues her reports from Silicon Fen*

short stories

PAPERLESS OFFICE
Email may have helped to cut down on the deluge of paper pouring across the average desk, but the office will never truly become paperless, a survey has found. While 90 percent of IT managers interviewed by document management company AFP Technology said that electronic document filing was more efficient, only three percent thought paper would disappear entirely.

IT CHARGES TOO HIGH
UK businesses are paying way over the odds for their ISDN connections, according to a survey by consultants Phillips Tarifica. The survey found that connection and rental charges for BT's basic ISDN package were as much as six times more expensive than in Europe. This financial disadvantage means that Britain could fail to adopt new technologies such as videoconferencing, the survey warned.

24 AUCTION

One of the oldest forms of business is taking the plunge online at www.24auction.net. Its backers say that 24Auction is the first European-wide internet auction service.
The service, which will initially concentrate on the business market only, hopes to eventually attract mainstream retailers wanting to cut out the middleman (saving money in the process), as well as consumers looking for a bargain. For more information on how to get your products on the electronic block, ring 0171 917 6047.

ELECTRONIC BANKING

Citibank offers net banking

Another bank has pushed ahead with an **online banking service** only weeks after a top management consultancy warned of the dangers of banks' goldrush approach to the internet. The Citibank Internet Banking service, which was launched in September, gives users direct access to a complete range of bank facilities. They pay no setup or transaction charges, and they also get a year's free access to the internet from Virgin Net.

Customers can access the service from any PC with internet access and pay their bills online, set up standing orders or transfer money to other bank accounts in the UK or Citibank accounts across Europe. Citibank says that because it doesn't have a history of high-street branches, it is ideally placed to offer this kind of direct service. Barclays, Nationwide, Lloyds, First Direct and the Bank of Scotland have all come out with similar services over the past year.

The consultancy firm Ernst & Young warned banks against rushing to invest in a medium without knowing what they want to get out of it. In a survey of retail banks, it found that banks are worried about losing their customers to companies without a financial background, such as supermarkets and even software companies. Just over one-third of European banks thought that investing in internet services would help them to keep their customers. However, most of them acknowledged that they could not yet cope with customer questions by email, with over half of them taking at least a day to reply.
Citibank Internet Banking uses 128-bit secure encryption. Account information can also be downloaded into personal finance packages, such as Quicken or Microsoft Money.
For more information and a demo of the service, ring Citibank (freephone) on 0800 008100.

SUSAN PEDERSON

▲ MONEY MAKES THE WORLD GO ROUND

Alternatively, visit the Citibank web site at www.citibank.co.uk

HUMOUR

Comic capers

Help *Beano* wrap up its sixtieth birthday celebrations in style by visiting its web site. You'll have the chance to guess the name of Dennis the Menace's new baby sister, sing along with the Bash Street School Birthday Choir or try to solve some puzzles. There's also a quiz hosted by Roger the Dodger and a selection of birthday cards, presided over by Minnie the Minx.


◀ OH BABY: IS SHE AS BAD AS DENNIS?

Have a chuckle and a chortle at www.beano.co.uk

Great oaks from little Acorns? No.

No more Acorn brand PCs as the company concentrates on other areas. Ian Burley reports.

The Acorn brand name appeared to be on its death bed as we went to press. Acorn plc, one of the last bastions of home-grown PC technology, remains in business but is closing its Workstations division to concentrate on developing digital TV and thin-client technologies to sell to third-party manufacturers.

It is rumoured that the Acorn name will be abandoned in favour of a new brand which will exorcise any link with the past and the company's conservative image as a schools computer maker. Many of Britain's IT professionals cut their teeth on Acorn computers, which were often technically ahead of commercially more successful US models. Acorn still commands a sizeable, if declining, following in schools, various vertical commercial markets, and enthusiasts who hate Wintel PCs.

The new direction was announced before the annual Acorn World jamboree, with the Workstation division preparing production of a technically interesting new computer, codenamed Phoebe. Some 75 marketing and admin staff were made redundant.

Stan Boland, Acorn's new CEO, said in a statement: "Today's announcement marks a significant watershed in Acorn's history. While we are sad to be announcing the redundancies, we are making these important changes to Acorn's market position and business shape to recognise that the future of this company lies as a leading player in digital TV system components and in partnership with other technology companies." Another statement indicated that unsuccessful attempts had been made to find a buyer for the Workstations division. Reports indicate that computer games magnate Stephen Streater, of Eidos fame, had co-incidentally made a £0.5m bid, including a retained shareholding for Acorn, for the rights to Acorn's PC range. But the offer came just as Boland was authorising the death of the Workstations division. As we closed for press, various parties interested in reviving Acorn PCs were due to make formal representations to Acorn to acquire the Workstations business under the leadership of former Acorn director, Peter Bondar. He told *PCW* that he feels there is a reasonably good chance that something can be salvaged, but even then, the Acorn name may not be used by any new company which could be formed.

▲ A NEW DIRECTION FOR ACORN PLC MAY SEE AN END TO THE ACORN BRAND NAME

Acorn has outlived some illustrious competitors and the Acorn brand's time looks like it's up. But the technology may survive to fight another day.

TIMELINE

Acorn plc: the company that took computers to school

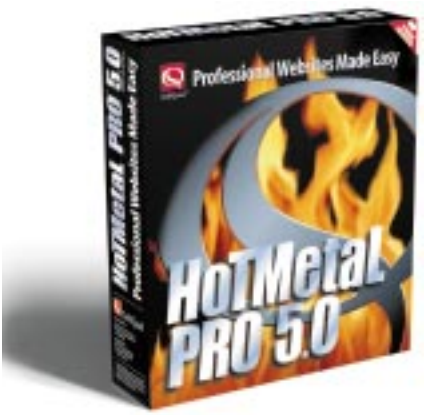
1979 Ex-Sinclair employees, Chris Curry and Hermann Hauser, form Acorn Computers in Cambridge, selling an 8-bit 6502-based hex-input kit computer, the System One.
1980 The 6502-based Atom launched, with optional colour.
1982 BBC Micro launched. Over ten years, more than a million were produced. Guaranteed Acorn's long-term survival through dominance in the schools market.
1983 The £199 Electron, a slower version of the BBC Micro, is introduced using a highly integrated custom chip. More than 100,000 made, but one in three were never sold.
1984 Acorn designs its own 32-bit RISC processor, the ARM (Acorn RISC Machine). Radical ABC business machine launched, but with few sales, was eventually cancelled.
1985 Acorn nearly goes bust. Becomes Olivetti subsidiary.
1987 ARM -based Archimedes desktop launched, with primitive half-finished BBC-like OS. Some 250,000 derivatives made over eight years. Ambitious ARX Unix-like OS project cancelled after missed deadlines.
1988 Modest co-operative (not pre-emptive) multitasking windowing RISC OS introduced.
1991 Acorn A4 notebook, based on Archimedes A5000. ARM RISC technology spun off as independent Advanced RISC Machines Ltd (ARM) with backing from Apple which later used ARMs in its Newton PDAs. Acorn and Apple each have 43 percent share.
1994 Radical dual slot-in processor "pizza box" modular Risc PC with 30MHz ARM610 processor and optional Intel-compatible second processor for PC compatibility. 50,000 produced to date.
1995 Oracle "discovers" that Acorn can make its Network Computer (NC) a reality.
1996 Acorn and Apple form Xemplar to fight growing PC competition in the schools market. Risc PC gets Digital-made 200MHz StrongARM upgrade.
1997 Online Media division, focusing on networked interactive multimedia TV boxes, is closed. Oracle abandons its NC relationship with Acorn. Turnover falls dramatically.
1998 ARM Ltd floats; a stock market high values ARM at $1bn. Acorn retains a quarter share.
1998 Risc PC replacement, codenamed Phoebe, shelved just weeks before first production run.

short stories

HOTMETAL PRO 5.0

The latest version of SoftQuad's popular HTML authoring package is now on the shelves. HoTMetaL PRO 5.0 has expanded source code editing facilities, as well as the Site Maker wizard for new users. It costs £99 (ex VAT), although anyone with an existing version can pick it up for £49.

For more information, call 0181 387 4110 or see www.softquad.co.uk



JET SET ON THE NET

CommUnity is now offering its Jet Set "international roaming software" to anybody with internet access. Jet Set enables users to log on to their email using a local call to one of 3,050 POPs rather than having to make an international call.

For information and prices, ring 01865 856000 or see www.jetset-roam.net.

TRAVEL

Online travel is flying high

Leisure travel booking is booming on the internet, thanks to consumer acceptance and aggressive marketing campaigns by travel companies and hotels.

Forrester Research is predicting that, by 2003, the internet booking explosion will produce US$65.5m-worth of travel reservations. The rise in direct booking will force the rest of the travel industry onto the internet, commented James McQuivey, an analyst for Forrester.

Online consumers are becoming increasingly at ease with making travel and holiday reservations through the internet. By the end of 1997, 27 percent of all households in the United States had purchased airline tickets online. Forrester believes that the European travel market is now set to follow in the footsteps of the United States. Europeans are more accustomed to booking vacations in packages, which will provide travel companies with even greater opportunities to attract people online with special offers and so on, said McQuivey.

Forrester thinks that one-stop shops, packaging everything from air flights and hotel reservations, to car hire and theatre tickets, will attract more people online because of two key factors: choice and convenience. As demand increases, travel companies are already shifting strategies from providing information to enabling direct booking. The cut-price airline, EasyJet, switched to an online booking option this year and said it has been well received by customers. Go, British Airways' budget service, ran a promotion in October offering flights to any destination for £100 return, if they were booked online.

In addition to creating a new revenue stream, online booking helps firms to reduce administration costs and, in some cases, cut out the middlemen.

Net gains for Amnesty charity

A leading human rights charity is looking to the internet to help give its fundraising and campaigning a boost. **Amnesty International** unveiled its own **branded internet service** at the end of September, which includes internet and email access, 5Mb of web space and local call rates. The service, which is being provided by UUNET Pipex, costs users £11.66 a month. For each new account that is signed up, Amnesty receives £15 from @ffinity access, the internet marketing company which negotiated the deal with UUNET. It also receives a further £1 per month from the subscription fee. Amnesty also hopes the service will encourage more of its members to use email for its Urgent Action Appeals.

Amnesty International UK

For information on the new service, call 0800 328 1756 or go to www.amnesty.org.uk.

Choose charity cards online, for Christmas

The Charity Christmas Card Council (4C) has made its **executive range** catalogue available over the net at www.charitycards.org. The catalogue, which features around 170 different card designs, has started to receive interest from around the world. Visitors can search the catalogue either by the type of charity or type of design, and 4C hopes to develop an online ordering and payment scheme by the end of next summer.

Compaq risks

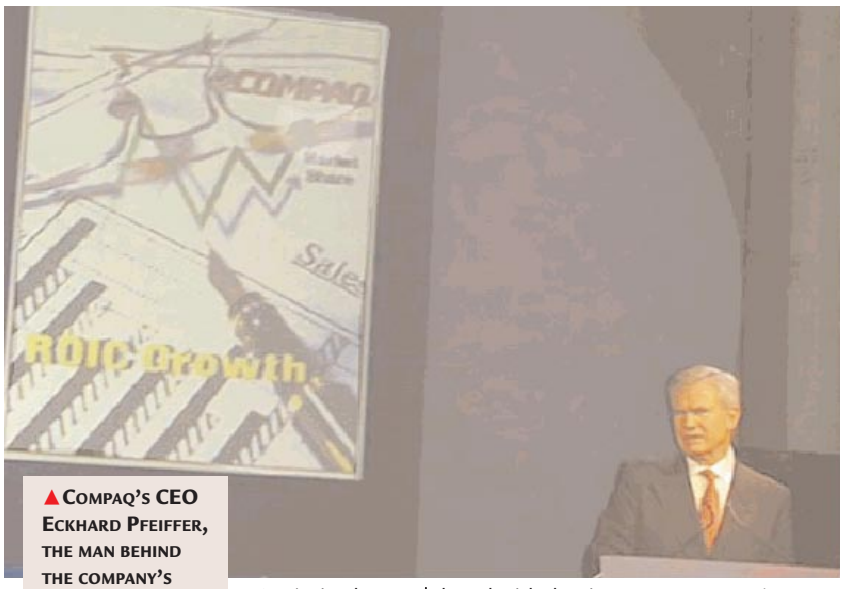
Tim Bajarin reports on the stakes for Compaq after one of the biggest mergers in history.

Compaq held its first analyst's summit last year at a time when it was trying to integrate newly bought Tandem into the company. It hit 1998 running with the proposed acquisition of Digital, which would make the integrating process even more difficult. But you have to hand it to Eckhard Pfeiffer, Compaq's president and CEO, for taking on the task and making it happen. Sure, there were some significant layoffs and the integration may not always have been smooth. Yet you still have to marvel at the new, combined Compaq, with its ability to provide world-class services and products across the entire business and consumer spectrum.

I spent some time with Pfeiffer at his second analyst's summit in Florida last month, and quizzed him about Compaq's strategy on the 64-bit Alpha chip it inherited from Digital. Pfeiffer said Compaq is very committed to 64-bit computing, but had shed the loss-making manufactures of Alphas, which will now be made by Samsung and others. Compaq has only to pay for Alpha's R&D, which is now properly budgeted and manageable.

Pfeiffer is making the Alpha the cornerstone of his high-end 64-bit NT Server strategy, paticularly because he does not expect Intel's IA 64 to be available before mid 2000 — and demand for 64-bit servers that can run Unix and NT won't wait that long. Pfeiffer believes that Alphas are well positioned to meet these IT needs in the short term; Sun and HP are competitors in the 64-bit Unix area, but Compaq has the edge with NT.

Pfeiffer believes Alphas will outperform Intel's IA 64 over the next five to six years, because they are already so far ahead. He stressed that Digital's world-class service organisation allows Compaq to take IBM head on; he claims already to be beating IBM on major accounts. It seems the Tandem and Digital brands will be absorbed into the overall Compaq line over the next year. The road map is still unclear, but Compaq plans to merge Digital models into a single Compaq brand this year. Compaq has also set up what it calls an Optimized Distribution Model (ODM), giving customers the choice of buying PCs off the shelf or to their own specifications either from dealers or over the web. Compaq recently launched 800 kiosks for in-store customisation in the US, and plans to have 2,000 operational by mid 1999. It kicked IBM out of some 2,500 Radio Shack stores that now exclusively carry Compaqs.



▲ COMPAQ'S CEO ECKHARD PFEIFFER, THE MAN BEHIND THE COMPANY'S SUCCESS IN THE HIGHLY COMPETITIVE PC MARKET

Rod Schrock, head of Compaq's consumer division, outlined Compaq's desire to lead the market in home networking. Compaq helped found the Home Phoneline Networking Association (HomePNA) to create a standard for delivering home networking through phone lines. It invested in Tut Systems, which is delivering a key component of the HomePNA standard.

The other area Compaq hopes to exploit is the Y2K problem

A key interest of analysts was how the Asian financial crisis would affect Compaq. Pfeiffer and other officials believe strong branding and distribution wil keep Compaq's 1999 Asia sales flat, while others dip. But Pfeiffer believes that this is a good time actually to expand Compaq's investments in this region, especially China and Japan, and has decided to increase Compaq's development budgets for all of Asia. He sees the crisis bottoming out at some point, when the demand for computers and related services will take off again.

The other area Compaq hopes to exploit is the Y2K problem. This might drain IT budgets to the extent of stalling purchases of new equipment, but Compaq is partnering with various consultants and software vendors to provide services that help correct the bug.

I left Florida rather impressed by the new Compaq. I was one of the first analysts brought to Compaq in 1984 to see its first computers; there were only four analysts at this first informal meeting with founder Rod Canion and chairman Ben Rosen. But in my wildest dreams, I could never have envisioned the Compaq we have today. With the acquisition of Tandem and DEC, Compaq is a completely different company. Some problems remain in the integration of the companies, but Pfeiffer and his management have a clear understanding of how to correct them. Compaq looks set to be the number one PC company for a long time to come.

TIM BAJARIN

short stories

PRESARIO PREZZIES
Buyers of a PC from the new Compaq Presario range will get a free bundle of goodies from AOL. It includes one month's free AOL membership and 99 free hours online. The new Presario features the Easy Access Internet Keyboard which gets you online at the touch of a button.
More information: call 0845 2704000, www.compaq.co.uk.

PATENTLY SIMPLE
Got an invention to share? Now you can pick up your patent application form over the internet. Unfortunately, though, you'll still have to pay for postage; existing law doesn't allow applications to be submitted electronically.
www.patent.gov.uk

UPGRADE

US O.K. but disc delay for UK

AOL in the United States has cracked open the champagne for its latest upgrade, except European subscribers will have to wait until the new year before they can get the software on disc.

AOL is pulling out all the stops to launch version 4.0 into the market in the US, including an online sweepstake and the mailing of a million free AOL 4.0 CD-ROMs every week. AOL UK refused to comment on preparations for 4.0's rollout here, but confirmed it would be available for download at the end of November and on disc from January 1999. "It's a relatively large file, so the majority of our AOL.COM subscribers will probably wait until we mail out 4.0 on disc in January or at the beginning of February," a company spokesperson said. "The European version of 4.0 is launching later than the US, basically because the software has to be adapted for localised services and this takes time." Version 4.0 requires 16Mb RAM and 30Mb of hard-disk space. Downloads can take from one to two hours.

AOL remains a proprietary online service, but version 4.0 further integrates the service with the internet, which is something its subscribers have been demanding. Analysts estimate that one in five internet surfers are AOL account holders and that the majority spend 20 percent of their time on the internet.

The new user interface includes more tips on using email and exploring the internet than did previous versions. By adding a tool bar, subscribers can set up click access to their favourite internet sites. Photo images can be embedded directly into email.

Although 4.0 includes the core of Microsoft Explorer 4.0, subscribers can run other browsers, including Netscape Navigator, over the AOL internet connection.

Yell Top 10 web sites

It is said that pets can start to look like their owners. But if so, why is the biggest, burliest guy often seen with the daintiest slip of a greyhound? You can find out more about these lovely dogs at the Official British Greyhound Racing Board at www.thedogs.co.uk. Learn how to choose a puppy or place a bet, then check out the race results. You can also find out how to help greyhounds that have been abandoned.

1. Electronic Share Information www.esi.co.uk
2. Emu Net www.euro-emu.co.uk
3. Frequency www.frequency.co.uk
4. Health Gate www.healthgate.co.uk
5. Hypertribes www.hypertribes.org.uk
6. The Official British Greyhound Racing Board www.thedogs.co.uk
7. Q Web www.qonline.co.uk
8. Scalextric www.scalextric.co.uk
9. Soccernet www.soccernet.com
10. TFI Friday www.tfifriday.com

Intrepid Explorer catches up

Microsoft is winning the web browser war, according to a new study by IDC, which shows that Netscape's Navigator no longer has the lion's share of the market. Last autumn, Navigator held over 50 percent of the installed base but by mid-1998, that was down to 40 percent while Internet Explorer's share went up from 22.8 to 27.5 percent. Some analysts say that Netscape is not overly concerned, arguing that the move to internet portals is more significant. A portal combines search, contents and directories, offering more potential as a lucrative e-commerce site.

Still looking for the perfect Christmas gift? You may find it at www.officiallondontheatre.co.uk where there are theatre listings as well as information on how to get Theatre Tokens valid at over 180 venues across the country, including London's West End. And, you can place your order by email. For more information, call 0171 240 8800.

The digital dilemma

Can Digital TV match the same high standards of DVD, or will it have to settle for second place?

Digital TV's ad campaigns assure us of superb picture quality because it uses 0s and 1s instead of wavy lines, but we decided to dig a little deeper. Between four and eight digital TV channels can be squeezed into the same space as one current analogue UHF TV channel using MPEG-2 video compression. Since DVD movies also employ MPEG-2, will digital TV boast the same high quality?

Premium DVD movie titles currently take some time to encode, with settings often being adjusted and optimised scene by scene. Digital broadcasters don't have this luxury, and have to squirt their video through real-time MPEG-2 encoders.

DVD employs a variable rate averaging around 4Mbps but capable of peaking anywhere up to 10Mbps, while digital TV is likely to be fixed around 5Mbps per channel — at the BBC anyway. Other providers may use rates on non-premium channels of nearer 2 or 3Mbps, although dynamic reallocation of resources could aid complex video: note that most set-top boxes can decode up to 16Mbps.

In terms of sound, most DVD movies boast 5.1 digital surround, usually employing AC-3 compression under the guise of Dolby Digital. Unfortunately for all the home cinema enthusiasts, digital broadcasters seem content with plain old stereo, similar to NICAM, limiting us to analogue ProLogic surround sound at best.

Broadcasters outside the BBC believe we'd prefer quantity over quality

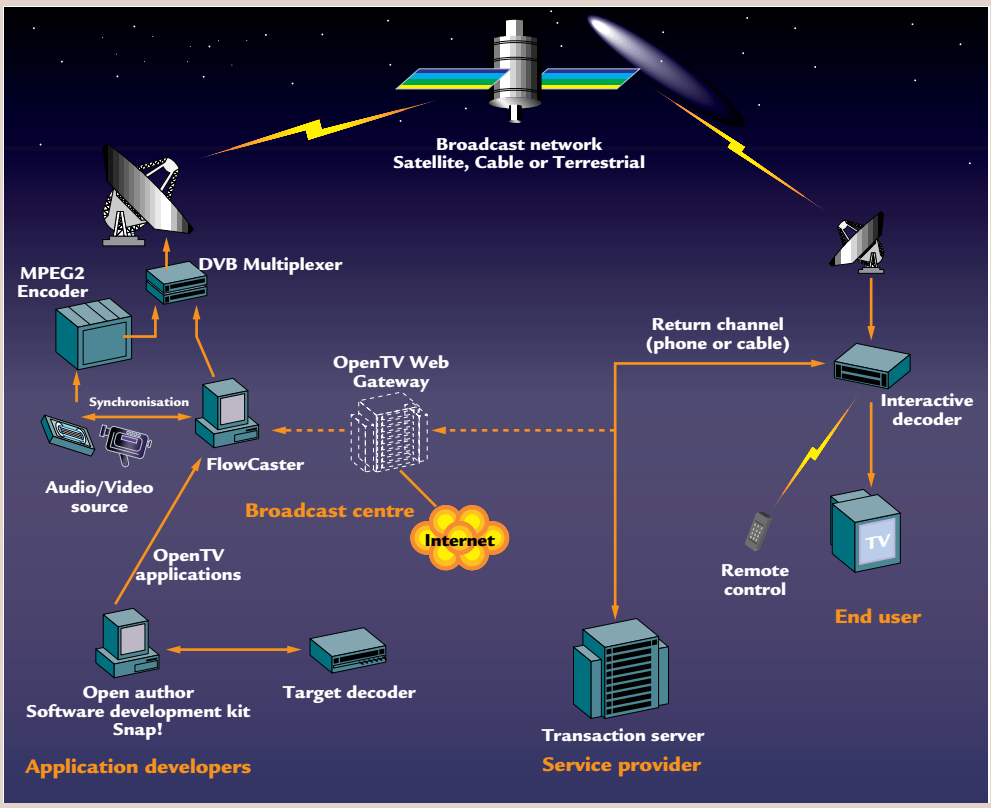
We could of course have better-looking pictures and 5.1 sound today, but it's a question of using higher bit rates, and broadcasters outside the BBC believe we'd prefer quantity over quality. Encoders will improve in time, but it seems that the viewers who'll most benefit from Digital TV in terms of picture quality are those in areas of poor analogue reception. Channel 5 viewers, take note.

Personally speaking, I'd sacrifice the convenience of near video on demand, where the same Hollywood blockbuster starts on, say, four channels at 30-minute intervals, for the hassle of getting home on time to watch a single channel with four times the digital resources. But then, I was the bloke who bought Betamax, Laserdisc and DAT.

GORDON LAING

OpenTV: digital broadcasting as seen by BSkyB

This is a sketch of the OpenTV system being used by BSkyB. It is independent of the broadcasting medium and can be used on cable systems. The web gateway, flow-master, decoder and development kit are all OpenTV applications. The set-top box will have enough memory to allow simple games to be downloaded and played. At least one model has a 1394 port, but OpenTV's Regis Saint Girons said little can be done with it as yet. He admits some free channels may suffer from poor-quality images. OpenTV's software, as one industry insider drily observed, is the very reverse of its name, being very much a proprietary system.



Competitors jostle for position

The race is on to supply the consumer with the Digital TV software standard.

The software side of digital television, which hit a mass market with the October launch of BSkyB's service, is at a stage similar to that of personal computers before the market coalesced around DOS and Windows. The signals are all based on Digital Video Broadcasting (DVB) standards, but rival operating systems are favoured by different operators. Satellite-based BSkyB has gone for OpenTV's FX system, from a company founded jointly by Sun and Thomson Multimedia. This is used by several European and US companies and is proprietary, which means set-top boxes (STBs) can be made only under licence. Many critics have argued that Sky owner, Rupert Murdoch, did this deliberately to lock users into his system.

▲ OpenTV's Regis Saint Girons

Interactivity comes in two forms: via a slow modem phone link (*see diagram, opposite*) or directly with the STB which will be able to cache a limited amount of information for viewing when the user requests it. My bet is that this cache will not be enough, so that these STBs will soon start sprouting mass storage. But Regis Saint Girons, OpenTV's general manager for Europe, says the satellite link itself can act as a "virtual cache" by repeatedly broadcasting information such as weather reports, rich-format teletext and even games for accessing as needed.

OnDigital, which uses earth-bound transmitters, employs the open MHEG-5 standard which was designed for set-top boxes as a way of overcoming some of the limitations of HTML. The open API means any manufacturer can make the boxes, but OnDigital's implementation comes from Canal Plus, which developed a European rival to OpenTV's FX called Media Highway. OnDigital will offer no interactivity except email.

Cable operator Cable & Wireless will use a US system called MCNS, apparently because the DVB return channel standard (DVB-RC) is yet to be set in stone. The good news is that this provides for a 10Mbps cable modem, although the bandwidth will have to be shared by others on your cable loop.

Rival cable operator NTL, which is also pitching to add interactivity to terrestrial broadcasts (*see page 27*), claims to be committed to open systems. It is using PowerTV's operating system, which is based around web standards like HTML and Java. Ominously, its back-end software comes from Microsoft in the form of the first major deployment of Commercial Internet System 2.0. NTL's Jonathan Thompson said he was satisfied that this would not impose any Microsoft-specific software on the user device.

The satellite link can act as a 'virtual cache' by repeatedly broadcasting information

For the moment, each service will need its own set-top box. "To be honest, there has been a mad scramble to get the system working," said Peter Marshall, technical director of the Digital TV Group, the industry body. "Some of the questions about combined boxes have been passed over for the moment." The current confusion stems partly from a decision by the DVB group not to set standards for STB software. This is now seen as a mistake. "The Great White Hope is that there now seems to be a common agreement to move ultimately to a common standard, DVB Java, which is being developed by the DVB group." This is part of the work on what is called the MultiMedia Home Platform, which looks forward to a time when home devices are connected together.

DVB Java "allows existing boxes to be maintained with the level of performance that they have, and for new and better things to be introduced," Marshall says. In practice, current STBs are likely to become dated because their price level has not allowed for easy upgrades. Marshall says PC Cards capable of accessing various digital channels will come in perhaps in two or three years, but are unlikely to start as cheap as today's analogue cards.

Joker in the digital TV pack is Eutelsat, which is the only company actively encouraging access by PCs, with the potential of relatively small-scale business and entertainment use. Both Marshall and Saint Girons agreed that it offers an alternative business model to that of huge companies churning out content to mass audiences. Marshall said: "It is very hard to predict how it will work out, but there are some fundamentals. One is that if you want to convey pictures and sound to a lot of people, TV broadcasting is the obvious way. Internet push is not. At the other extreme, a satellite is not an efficient way to push one piece of information to an individual. There is some middle ground between the two extremes which is where Eutelsat could come in."

He was sure of one thing though: the launch of BskyB was "the start of a revolution of which there is a lot more to come."

Clive Akass

Top 10 products

Peripherals

			Last month
1	**Astra 610P**	**Umax**	1
2	Astra 1220P Scanner	Umax	3
3	56K V90 Voice/FX EXT	3Com	4
4	P75 TO P200MMX Evergreen	Evergreen	5
5	Natural Keyboard Elite	Microsoft	-
6	SoundBlaster Live PCI	Creative	-
7	ScanJet 5100C	HP	-
8	Evergreen 486/586 proc UG	Evergreen	-
9	Astra 1220S Flatbed	UMAX	-
10	Heatsink+Fan large		-

Windows software

1	**Windows 98 UG CD**	**Microsoft**	1
2	Masterclips 150,000 Clipa	IMSI	2
3	OfficePro+BookshelfU/G	Microsoft	3
4	Office 97 STD C/VUP UG CD	Microsoft	5
5	PaintShop Pro V5 FP CD	Digwork	7
6	Home Essentials 98 C/U	Microsoft	10
7	Windows Plus! 98	Microsoft	12
8	Back Office SVR CAL V4	Microsoft	17
9	PC Anywhere V8 CD FP	Symantec	18
10	Via Voice 98 Exec Edition	IBM	19

DOS software

1	**Turbo Pascal v7.0**	**Borland**	2
2	Turbo Pascal v7 DOS Educ	Borland	3
3	DOS v6.22 Upgrade	Microsoft	4
4	FSFX Upgde For MS Flight Sim		-
5	Mail PC Remote 3.2	Microsoft	5
6	Intranetware 10 user Addition	Novell	11
7	System Commander V3.0	POW	-
8	Novell 3.2 5 User	Novell	-
9	DOS 2 Win 95 UG with Int	Microsoft	-
10	DataEase v5.12	DataEase	-

CD-ROMs

1	**Dance Ejay**	**Fast Trak**	2
2	Rave Ejay	Fast Trak	6
3	Titanic: Interactive Journey	Europress	3
4	X Files: Unrestricted Access	EA	1
5	Encyclopedia Britannica	Acclaim	4
6	Babylon 5: Ultimate Reference	Cendant	-
7	Windows 98	Microsoft	7
8	Mavis Beacon Teaches Typing	Mindscape	5
9	Davi Music 98	Davilex	8
10	Money 98	Microsoft	-

Games

1	**Cannon Fodder**	**Sold Out**	2
2	Championship Manager 2	Eidos	8
3	Titanic: Adventure Out of Time	Europress	6
4	Commandos: Behind Enemy Lines	Eidos	4
5	Theme Hospital: Classic	Bullfrog	-
6	Carmageddon: Replay	SCI	7
7	Premier Manager 97/98	Gremlin	3
8	Lula The Sexy Empire	Take 2	-
9	Special Ops	Take 2	-
10	Urban Assault	Microsoft	-

Games and CD-ROM figures supplied by HMV. Others from Software Warehouse.

Small Soldiers: coming to a PC screen near you

▲ **Square jaws a go-go! Major Chip Hazard, leader of the crack Commando team, surveys the scene. Watch out Gorgonites!**

Hasbro Interactive and DreamWorks Interactive are teaming up to launch two new games based on the action adventure movie, Small Soldiers. The first game, **Small Soldiers**, is a real-time strategy affair where players have to defend their homes, schools and local shops from pint-sized armies. Named after the lab in the movie, **The Globotech Design Lab** gives kids the chance to design, build and battle their very own Gorgonite and Commando action figures. Both titles are out now.

The latest in a long line of game developers to expand its formats to DVD is Blue Byte, which will be porting its successful Settlers series to the new format in early 1999. **Settlers 3** will be out on the PC at the end of this year.

Codemasters keeps coming up with the goods: **TOCA 2 Touring Cars, Prince Naseem Boxing** and **No Fear Downhill Mountain Biking** are all on their way. TOCA 2's content centres on the complete 1998 British Touring Car Championship season. Out in November, it will feature all the real cars, teams, tracks and drivers. The release dates for the other two games aren't known yet — we'll just have to be patient.

There'll be no more games from Europress: its recent venture into the leisure scene with titles such as **Titanic: Adventure Out of Time** and **Championship Rally** had disastrous effects on the company's profit margins. To survive, it had to axe a third of its staff, pull out of the games market and sell off a slice of its equity.

Lose Your Marbles, a new game from SegaSoft, has apparently taken America by storm. Your aim is simply to get rid of all your marbles before your opponent does. Not quite Kerplunk, then. *Screenplay* will have a review soon.

Rumour has it that the British Board of Film Classification (BBFC) could deliberately delay the sequel to the violent car game **Carmageddon**. The BBFC is presently holding the title and has given the game developer SCI no feedback whatsoever about its reasons. Meanies.

Etelka Clark

Games featured in Screenplay*: Colin McRae Rally, The Rocky Horror Show, Creatures 2, MotoCross Madness, Apollo 18 and Emergency.*

Improved snooping hasn't brought Orwell's nightmare any closer, says Michael Hewitt.

Vacancy in Room 101

I see that a Professor at Reading University has recently made history by having a dedicated microchip surgically implanted into his body [see this month's interview, page 120]. Whenever he arrives home from work, sensors will detect his presence, and then, automatically, boil a kettle for him, run a bath, put the cooker on, or whatever. You'd have thought it would have been far less hassle just to hire a live-in au pair (especially as he wouldn't then need a team of anaesthetists for every upgrade). Yet there is, apparently, a serious side to the Professor's silicon implant. He says that he's actually making a statement about the potential downside of such technology; that, not only will his kettle know he's home, but so, conceivably, will anyone else who cares to tune in.

It could be argued, I suppose, that if you're going to have a silicon chip embedded in yourself that broadcasts your personal details, via radio, to the rest of the world, then such lack of privacy goes with the territory. The same as if, say, you strip naked and sit in Woolworth's window. But I think the point that's trying to be made here is that, in the future, everyone is going to have similar technology implanted in themselves as a matter of course, therefore everyone risks being spied upon. To an extent, it's already happening. Mobile-phone companies can apparently track your movements across the globe without you even having to make a call. So long as the phone is switched on, the nearest cell will detect its presence and unique ID, which it then relays to a central computer. So if you're going to murder someone in, say, Glasgow, but are going to claim to have been in London at the time, switch off your mobile before you set off. Yet, disturbing though this scenario no doubt is to cellphone-equipped hitmen, it's still a very long way from being actively "spied" on, 24 hours a day, by some shadowy Big Brother. Not that this is practical, anyway.

Let's consider the logistics of that 1984 scenario, where every house in the land is equipped with a two-way television. There are about 20 million homes in Britain. One member of the Thought Police could, at a push, monitor maybe five simultaneously. Even then, unless there was some particularly exotic scenario going on in the living room or bedroom, he could only do it efficiently for about eight hours, without nodding off. So to monitor five households over 24 hours, you'd need three members of the Thought Police, each working an eight-hour shift. Which, in total, would require a staff of around 12 million. And, of course, Big Brother would have to be watching them too, so you'd have to add a couple more million in order to take that into account.

Now on to maintenance. George Orwell never really considered equipment failure in his novel, but television sets, especially the two-way variety, will inevitably go on the blink occasionally. And Sod's Law says that when it happens Big Time, it's going to happen when all your repair men are away celebrating Hate Week. Obviously, the Thought Police couldn't risk having Big Brother not watching you for upwards of seven days, so they themselves would have to be qualified to repair the sets in times of emergency. It therefore follows that the only way you could train men to be multi-skilled in both Ingsoc totalitarianism and TV repair would be to have the engine of state repression run by either DER or Radio Rentals.

If you're going to have a silicon chip embedded in yourself that BROADCASTS YOUR PERSONAL DETAILS TO THE REST OF THE WORLD, then lack of privacy goes with the territory

The parallel in the microchip world of the near future, where everyone's supposedly got a micro-Big Brother watching him, would be to have the apparatus of state repression set up by the likes of PC World and Dixon's. I've only ever had the briefest of dealings with the aforementioned, but they were enough to convince me that, were their staff ever to unite and try to impose a repressive dictatorship upon me, I wouldn't need to worry unduly.

So, yes, technically, you could spy upon everyone in the land and watch their every movement. But who'd have the time, patience and, more particularly, the qualifications to do so? And what would be the point of such an exercise in tedium and futility, where largely useless information is gathered for information's sake?

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Microsoft has little to fear from Apple's iMac, says Barry Fox. Its bark is worse than its bite.

Close, but no cigar

I have lost count of the number of times I have asked Apple UK and its PR people to keep me up to speed on new developments. I still only get press releases when I phone and nag for them. Apple's statement on Year 2000 issues was downright dangerous in advising PC users to try resetting and see what happens. It can delete date-sensitive data, like wastebin and diary files. And all the time I get a steady stream of emails from self-styled Apple evangelists, whose neo-religious mission in life is to point out all that's wrong with Windows, Microsoft and Bill Gates. I only reply if the writer has the clout to improve Apple's communication.

Meanwhile, criticism continues to run off Microsoft like water off the proverbial duck [*Straight Talking passim*]. When David Weeks, Microsoft's Windows Marketing Manager, responded to my ongoing reminders that Anne Mitchard had failed to give her promised comments on how Microsoft had launched Windows 98 in such an unready state, a lot became clear. Weeks claimed to know nothing of the many articles or faxes I've written since and before Windows 98 was launched in June. Get your PR company to give you a pile and read them so we can talk sensibly, I said. I never heard back. It's not hard to see why Microsoft can behave in such a cavalier fashion. When I showed the Advertising Standards Authority how Microsoft's web site was still saying Windows 98 lets a PC play DVD movies discs, long after Dixons' PC World had withdrawn its misleading Microsoft-approved adverts, the ASA wrote me a letter which showed that they could not distinguish a printout of Microsoft's web site from a PC World store advert.

Initially the iMac launch looked as though it would give Microsoft pause for thought, by providing a low-cost, sexily packaged and easy-to-use PC. Like early Amstrad PCs, the iMac integrates the screen and electronics into a single casing, which connects by cable to a keyboard and mouse, all made of translucent, coloured plastic. This gives the unit a toyish look. But the price is certainly not toyish; at £999, the iMac is on a par with a high-spec Pentium PC. There is no floppy-disk drive, just a very flimsy CD-ROM drive. The mouse and keyboard have a budget feel. There are no serial or parallel ports, only USB (Universal Serial Bus). So most existing printers and other peripherals will not plug in. I phoned Apple to ask about peripherals. After a grand display of ducking and diving I learned that only Epson and Hewlett-Packard will be making USB printers, and a smart cable that connects existing serial/parallel peripherals to a USB port. Imation (formerly 3M) will be making an add-on floppy-disk drive. Nick Graves, Apple's European Marketing Consumables Manager, kept telling me the prices and availability were nothing to do with Apple. But these peripherals are essential only because Apple has failed to provide conventional ports.

The clear message is that anyone seriously wanting to be an iMac customer should insist on a full working package; not have to buy the iMac and then have to hunt for matching peripherals. There are no expansion slots, but the RAM is upgradeable to 128Mb. Nick Graves says he has "not a clue" how much additional RAM will cost. Graves also told me that the iMac is assembled in Cork; but the pre-production unit I saw a day or so before the launch was labelled Korean.

All the time I GET A STREAM OF EMAILS FROM SELF-STYLED APPLE EVANGELISTS, whose mission in life is to point out all that's wrong with Windows, Microsoft and Bill Gates

It was also very slow to start up, taking 90 seconds from switch-on. This, says Graves, may be because pre-release versions had some BIOS software on the hard disk, rather than in ROM.

Apple reckons the floppy disk is dead. So do a lot of the Apple evangelists. I doubt it. Lack of a floppy drive makes it more awkward to transport data: the user must rely on the built-in modem to send files via the internet. The floppy is the VHS of computing: outdated, but still the best method for carrying text files, especially now that virus scares have stopped many of us daring to open email attachments. A final thought: much has been made of the iMac's easy access to the internet. What allows this? iMac comes bundled with Microsoft's Internet Explorer.

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Poor customer service is a software standard. Brian Clegg asks, when will the industry grow up?

Are you being served?

The PC software business is immature. I'm not referring to programmers who look young enough to still be in kindergarten, or even billionaires who are yet to discover the joys of shaving. It's a simple statement of fact about the business. When an industry is young and fresh, it is propelled forward by "gee-whiz" power. The early days of personal computers provide a superb example of this. When the Altair, the grandad of them all, was introduced, it was a nightmare for buyers. Everything was delivered late. Memory boards didn't work. You had to build the thing before you could use it, and then there was no keyboard, screen or storage. But it didn't matter, because it was thrilling (I'm told by those who are old enough to remember).

As a business matures, things ought to change. Funnily, this argument doesn't apply at the level of corporate finance. You might think that the internet was in a similar honeymoon period, as we see companies that lose money hand over fist and haven't a single solid revenue in sight, valued at millions of dollars. Yet corporate finance has always been susceptible to dreamy unreality. You only have to check out the airline business to realise this. If you look back over the history of commercial aviation, adding up airlines' costs and revenues, the business has yet to make a profit. Rarities like BA buck the trend, but you just know that a lot of capital is invested in it for purposes of national pride and the associated prestige. Plus, of course, the sheer exhilaration of driving big metal tubes through the sky. However, things should be different for consumers — consumers of PC software, for instance.

Once a market has a good range of competing products that meet our functional requirements, customer service becomes a major deciding factor. If you're ordering a pizza, you may prefer one firm's dough or another's pepperoni; but how would you feel if your favourite company started delivering late, or forgetting to deliver at all? They wouldn't stay on your shopping list for long. Now look at the customer service in the software business. Once upon a time there were freephone numbers for support. Then they moved to a local call rate. Then, because it was so easy for us (and much less pressure on them) we could email a support query. Now you can search a fair number of vendors' sites and not find the email support — because you have to pay for it. Let's make this absolutely clear: they are charging to tell you how to use their software. And that often means how to get round the bugs and poorly written help files. This is the latest in customer service, as far as software vendors are concerned: state-of-the-art technology coupled with low-rent support.

So what do we do? Do we move to an alternative vendor who is offering great customer service? No. We wait excitedly with sweaty palms for the next thrilling release of the software and rush out and buy it. No matter that the existing version does everything we need. We do it. Now I'm not one of those columnists who moans about software bloat, and is still using a 286 with DOS. I'm a new-version lemming with the best of them. But it really does show how immature the business still is.

Let's make one thing absolutely clear — THEY ARE CHARGING TO TELL YOU HOW TO USE THEIR SOFTWARE and that often means how to get round the numerous bugs and poorly written help files

Here's a challenge to the software vendors — especially those with too much money and a very large share of the market. Why not prove that all your weasel words about listening to the customer and wanting to give us the best are more than just the standard publicity hype. Feel free to keep on piling in the features — but how about some real customer service too? Here's a suggestion: how about free email support and free telephone support? For life. Just like many hardware vendors manage to give us while still making a tidy profit. That way, maybe we'll even grow to love you. After all, bear in mind that no market can remain immature forever, and however big your market share now, there will eventually be serious competition. You'd better start grasping the basics of customer service, before you discover the hard way that it can make a big difference.

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Paul Smith is visited by technical revelations as he shrugs off the shadows of the Jurassic age.

Supernatural sightings

Epiphanies, eh, who needs 'em? I tell you, I've had two this month, and frankly, they both turned out to be just a bit, well... *disappointing*. Certainly, anyone with even a passing acquaintance with this whole technology thing – anyone who's even been in a room with someone who used to know someone who'd seen a computer once – will be aware of the problem. If I was the bloke in charge of making up names for these things, I'd call it the Next Corner Problem, the eternal promise held out by the industry that, if you'll just make do with the current product, all your problems will be solved by the next version "which is just around the corner". Of course, when you get to the corner, it turns out to be a long gentle curve that never ends.

To the first epiphany. For years, I've searched high and, for the sake of thoroughness, low for the ideal HTML editor. How they can write Word and WordPerfect, but can't produce a simple editor for the limited features of HTML is, like most things, I guess, beyond me. Still, you have to use one application for a WYSINWYG (I think you can guess what that stands for) view of the text, another to arrange images, something else to view applets, and then two browsers that will show it all completely differently anyway.

So, like any real man, I use Notepad. Then along came FrontPage 98. I tried it on a whim. Actually, having tried previous versions of FrontPage, it was more of a personal dare. But what an epiphany! It was so easy to use, it did all your internal navigational links automatically, on the fly, and changing or creating themes is a doddle. Of course, use it a couple of times and the limitations soon turn up. I quickly found out that there were many things you can't do, such as create navbars to bookmarks. I know that a good critic doesn't criticise what something isn't, but this is an obvious limitation. "Ah, good idea," the Microsoft FP technical support person told me, faking the voice of someone who'd never considered this idea before. "We should put that in the next version. Which is just around the corner."

Epiphany the Second? Well, this turned up just before our recent holiday in Turkey (and here's a hint to avoid those "Where shall we go this hols?" blues: always go to Turkey. Hot, great food and so hospitable. Easy!). Along comes the Ericsson SH888 mobile phone, with dual-band, infra-red and built-in modem. Up to now, I've been using an old Nokia 5.1 (you won't remember it; it's from before they had phones). Indeed, it was the source of some humiliation when I recently called Nokia for some software that goes with its phones. When I told the PR person I used a 5.1, she laughed. At *me*, techno-king of the known world, gadgeteer to the masses and owner of nothing older than two years, including my marriage certificate (which, that reminds me, expires next Monday). Anyway, the SH888 allowed me to slough off the last vestigial remnants of prehistory and, better still, meant I could go on holiday without a notebook. Just a phone and a Palm III. Place one near the other and you're online. Cool.

So, imagine my disappointment when I get to Turkey to find that, of the two cellular networks there, the one serving our mountain village didn't want to know about GSM data calls at all. Actually, even getting a voice call through was no Turkish delight. There's a myth out there that what people chant from those minarets – one of which, of course, had to be right outside our bedroom window –periodically throughout the day, is some sort of religious incantation. Actually, I suspect that is was the Turkish GSM backbone, and that the muezzin were in fact shouting 1s and 0s at each other in some sort of verbal digital protocol. What I really want to know is: who is it that feels they need to make a phone call every single morning at sunrise?

So, I never did get online in Turkey. I'm taking my phone to Germany tonight to see if it works better there. Meanwhile, unfazed, I await my next epiphanies. I even know what they will be: BT's Home Highway and its ADSL trial. I deserve to be on that trial. After all, I had to marry someone in west London to get in the trial area.

How they can write Word and WordPerfect BUT CAN'T PRODUCE A SIMPLE EDITOR FOR THE LIMITED FEATURES OF HTML is, like most things, I guess, beyond me

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letters

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SPEAK EASY

Your review of Via Voice 98 exec in the October issue was interesting, but newcomers need to know that you will have to lay in a supply of nasal spray and throat pastilles!

Dictating for hours and hours, in a clear voice without fluffing your words, is more difficult than most people realise. Trying this in an open-plan office will make you feel a wally, while driving your colleagues to drink. You must also be prepared to invest enough time and energy in training the beast to understand you.

But the fact that it does work and can be pretty accurate is most astonishing. It passed the acid test of buying it Monday morning, installing and "enrolling" the same day, then dictating a 9,000-word essay (from paper notes) by Wednesday night against a Friday deadline! The only problem is to try to stifle your laughter as the software mangles what you said into words that you never imagined or intended.

SIMON CROFT
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LETTER OF THE MONTH

Games consoles stifle skills

Let's face it, kids enjoy playing games, and as the festive season approaches, no doubt the console manufacturers will again start the hard sell. For many children this will mean a purchase of an inexpensive box that will entertain for hours (and give their parents some well-deserved peace), but the very limitations of these machines may bring about their own downfall.

Still being in close contact with education, the difference between generations — those which had Spectrums and that with consoles — is stark. Many children who had these early computers can program in BASIC and hold at least a small understanding of how the games that they play come into being. With the demise of the BBC Micro in schools, there is nowhere that a child may dabble with the inner workings of a home-made Pong game. So in our everlasting quest to make computers easier to use, we are stifling pretty much all of the creative talent that will be needed in the console industry (and everywhere else) for the next generation of programmers. PCs, with all their bells and whistles, are not much better, as just getting started requires a huge amount of effort and probably a magazine cover disc with a free compiler. Perhaps Mr Gates should start thinking about including "Windows BASIC" with his software, lest his supply of programmers run dry and we all start charging more for our services.

Gordon Laing replies >

I agree 100%. Growing up with and programming relatively cheap home computers proved to be an absolutely invaluable experience, and interestingly enough, plenty of my friends who did the same now hold decent jobs in IT (it must, however, be said that many of them simply don't get out enough). We've just got to hope that PCs become more accessible to inquisitive children, or that development tools become powerful and easy enough to create the next generation of games software packages. We hope you enjoy writing code on your new Taxan monitor.

THOSE IN THE KNOW...

Re: John Skinner's letter (*PCW* October). I work at a college help desk, and we have a number of leaflets listing educational titles. Entec www.entec.co.uk does a great leaflet covering the major educational titles, but do shop around, check the adverts in *PCW*, and ask if suppliers can match the best price you have found.

Of course, you can always pop into the college or university you will be attending and ask their advice, and for your educational licence forms to be stamped for you. Your college shouldn't have a problem doing this before term starts, as long as you show a letter from the college offering you a place on a course.

Also, don't forget that Microsoft will let you buy a student licence while you are still at school or to any household that has a child over five in education, as long as the software is to be used solely for home/educational purposes.

Lastly, check out the internet for tutorials — there are some excellent sites for learning everything from basic computing to complex programming. But go easy right now, as your college will probably allow anything from limited to unlimited access to the internet free to students.

NICOLA MENESES n.s.meneses@canterbury.ac.uk

Paper thin

Brian Clegg's article ("Business Matters", *PCW* October) reminded me of the IBM spokesman who delicately predicted that the paperless toilet was likely to arrive before the paperless office. Over the last 15 years the organisation I work for has been using our intranet to reduce the amount of paper we print. One approach is to set up a filing system on your intranet so everything you record electronically is available for you and your colleagues to find when you need it. File objects once for the whole organisation or workgroup, and then anyone can retrieve them when they are needed — provided they have the appropriate access rights. Yes, you will still need to print things out, but only for temporary use — after which they can go straight to the rubbish sack for recycling.
You may say this is all blindingly obvious; in that case, why are so few organisations working in this way?

Richard Gibson gibson@dircon.co.uk

Dyslexic help

My seven-year-old son has recently been diagnosed as dyslexic. Having seen on TV how the latest voice recognition software is being used to aid dyslexics, I looked into this area and came up with some interesting information. The only system which has proved to be of use for dyslexics is a combination of the now "old" technology Dragon Dictate and a Windows 3.1 word processor called Keystone. It is important that Dragon Dictate is used, as it's a system which works a word at a time, rather than the newer NaturallySpeaking-style products which process whole sentences. Also, the "training" process for Dragon Dictate, during which the software learns the user's voice patterns, is much simpler and therefore easier for a dyslexic to cope with. Keystone is important because it is the only word processor in existence (allegedly) which reads back to you what you type, as you type it. This is very important; in fact, it is this instant feedback which makes the system so useful. This is because, as the dyslexic person says the word, they see it appear on the screen and simultaneously hear it spoken back to them, giving the required feedback which can help enormously.
We desperately need more awareness of this problem, which will hopefully encourage other software companies to enter this market. This should introduce healthy competition and bring the prices closer to what the families of dyslexic children can afford.

Tony Flaherty
tony@brother52.demon.co.uk

Gone with the wind

Your reviews are generally rather good; however, noise pollution is seldom highlighted. Many PCs are just too noisy. Is it true that some computers have a fan which switches on only if the power supply gets too hot?

Derek Johnson capilla@capilla.demon.co.uk

PCW replies > *While not such a problem for large corporates, a noisy PC can be a real headache for small-business or home users. It is, however, worth checking screws and mountings which may have come loose and started rattling. Notebooks often power their fans down, but most desktop PCs keep all cooling systems operating unless in standby mode.*

Chip check

While I much enjoyed reading Simon Collin's recollections of the Acorn Electron ("Retro", November), I would like to point out, at the risk of sounding rather pedantic, that the 6502 was not a Motorola processor. It was originally made by a firm called MOS Technology, designed by William Mensch (formerly of Motorola) and later second sourced by Rockwell. Motorola made the 6800 series of processors, which reached the acme of perfection with the 6809, still judged by many to be the most elegant design for assembly language programming ever produced. There was a 16-bit version of the 6502, the 65816, which was used briefly in the Apple before being crushed beneath the wheels of the Intel/Microsoft juggernaut. Most of the early Atari arcade video games used the 6502, as its synchronous bus cycles allowed efficient interleaved access to video RAM without any wait states.

John Brown johnb@nse.co.uk

Biriani surprise

Here's a little witticism from Microsoft. Dive straight into MS Word 97 and type "chapatti". You'll be very glad, I'm sure, to learn that the actual spelling is "teapot", cleverly suggested by the spell checker. One can only hope that Indian restaurants refrain from using Word 97...

Samuel Hänni
samuel.hanni@mailcity.com

...letters

On and off

When I had a Texas Instruments TI-99/4A, I pressed the "on" switch, and the operating system appeared within seconds. My ZX Spectrum's OS appeared in a flash of clearing ROM. As an Amiga owner, I had moved onwards, and so "powered-up" the system, but it was still ready within seconds.

Now I have a PC — the ultimate multimedia system. Instantly, I can connect to other systems on the other side of the world. I can make my daughter laugh with the Teletubbies online. I can make my wife cry when she discovers yet another Titanic site. I can impress my colleagues with the information I have at my command. Yet I cannot get my laptop to work until over two minutes have passed, while we look at one another, chat about the weather and cough awkwardly. For goodness' sake, help me, and many others. I believe Windows 98 is the best operating system for my laptop, but please, please, *please*, can somebody put the damn thing on a flash-upgradeable ROM chip, so I can have instant accessibility. No waiting for a boot-up. No device conflicts. No file processing. Just wash and go.

John Newbury J.Newbury@tesco.net

PCW replies >

Windows 98 on some kind of ROM which could start up instantly sounds like a great idea, but there are reasons why it is impractical. First, you'd need a 195Mb ROM to match its standard hard-disk requirements, which won't come cheap — 48Mb of compact flash will cost you over £200. And on the subject of hard disks, all versions of Windows (except CE) rely on the presence of a hard disk to implement virtual memory, and that's before we even start considering new device drivers.

Putting things into perspective

Richard Browning wonders if there is a conspiracy to soak up improvements in PC power with the demands of bloated operating systems (*PCW* November). While it may be true that Windows uses more resources than it should, that is not the only place the extra power gets used. In the days before Windows, my PC struggled to push words and numbers around the screen, commands were typed using strange codes, and getting a colour graph out of a spreadsheet was a major achievement, even if I had a printer capable of printing one. Today, my computer makes a reasonable job of running a graphical interface, handling large image files, editing and listening to music, talking to a network and connecting to the internet — and all more or less at the same time. Try any one of those jobs on my old PC, and it would have curled up and died.

Ian Cairns
incamedia@incamedia.co.uk

All fingers and thumbs

I enjoyed Joe Tarrant's long-term review of the Psion Siena (*PCW* October), and his comments about problems using the keyboard and holding the machine at the same time. I have overcome this problem by holding the Siena with both hands while typing with two thumbs. This technique provokes mirth and hilarity wherever I go, but it does work really well.

Dr Robert Sarkany rsarkany@hgmp.mrc.ac.uk

Fast hardware in the frame

Your review of 3D graphics cards in November's *PCW*, although very informative, left me wondering about the need for such fast hardware. The reviews quoted frame rates of over 150fps (frames per second) for Incoming and Forsaken. I was under the impression that the human brain perceives everything over 30 frames per second as fluid motion. Most monitors won't be able to refresh the screen faster than about 70Hz, so are there really any real-life benefits of having a graphics card perform faster than 50fps?

Bart J. Smit bart@nerdland.demon.co.uk

David Fearon replies >

You're quite correct when you say that nobody could perceive the difference between a game running at 100+ frames per second and 60 or so. I would say, however, that you can see the difference between 30 and 60fps. But remember that benchmark scores give frame rates averaged over several minutes. When rendering a complex part of the tests, rates can drop below this as the polygon count increases. A card with more "headroom" that delivers an average of 100 or more frames per second, can cope far better with the tougher parts of a test, so the fluidity of the game is maintained when a lesser card would show perceptible stuttering. And of course, a card with a super-high score now will cope better with the more complex games and apps of the future. With the pace of development on the 3D graphics front, you need as much speed as you can get.

gadgets

compiled by David Fearon

Get tricky with Mickey

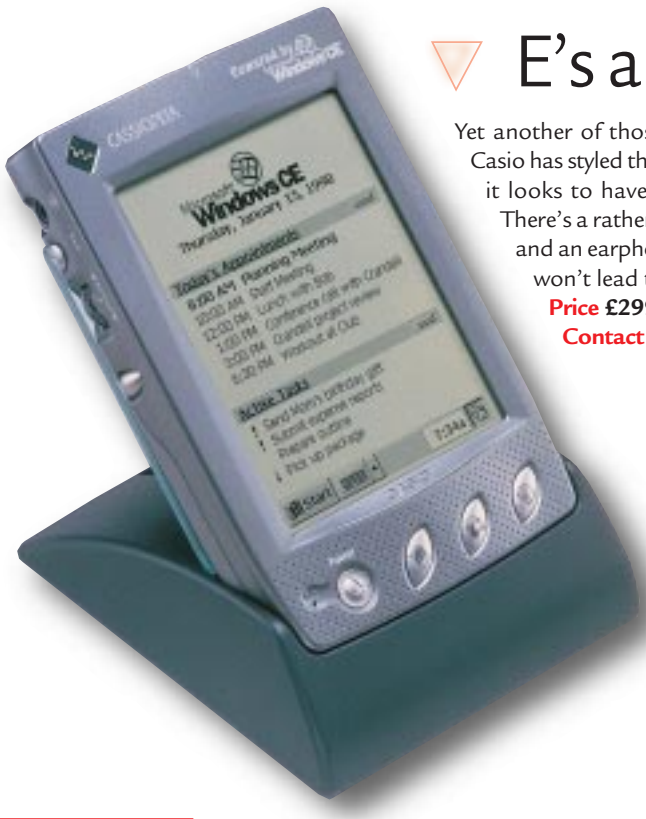
Well, okay, so it's more of a kid's thing than something your average grown-up would want, but there aren't that many grown-ups around at *PCW*. The 3D PC mouse, unlike a lot of novelty rodents, is actually very usable and well-built to boot. The buttons are in the ears, in case you were wondering.

Price £24.99 (£21 ex VAT) **Contact** WWL 0161 633 9800

It's a golfball, Jim...

...but not as we know it. Expanding its range even further, Logitech has released the QuickCam Pro. It's one of the near-torrent of USB devices that are now appearing. You can stick different lenses on it for wide-angle or telephoto views, and it apparently incorporates rather clever technology to eliminate barrel distortion. We'll be verifying these claims with a full review soon.

Price £120 (£102 ex VAT)
Contact Logitech 0181 308 6582 www.logitech.com



E's are good

Yet another of those Windows CE palmtop PDAs; however, Casio has styled the Cassiopeia E10 with an eye to chic. In fact, it looks to have been partially inspired by Sony designs. There's a rather neat wheel on one side to navigate menus, and an earphone socket so that those pesky system beeps won't lead to a lynching from your fellow commuters.

Price £299 (£254 ex VAT)
Contact Casio 0181 450 9131 www.casio.com

Her name is Rio...

This is clearly the future of portable audio. The Rio PMP300 from Diamond is a totally solid-state personal stereo, storing music in flash RAM in highly compressed MPEG3 format. No moving parts means no skipping tracks and longer battery life (12 hours from a single AA cell). Music is downloaded from your PC and the standard 32Mb RAM will let you store an hour of moderate-quality audio.

Price Around £175 (£149 ex VAT)
Contact Diamond 01189 444400 www.diamondmm.com

Communication breakdown

Or not, with this little cutie. A bit more original than the CE machines, this is the latest version of Nokia's Communicator integrated PDA and mobile phone, the 9110. We had a quick fondle of one at a press conference in Finland recently, and it's rather lovely. Unlike the brick-like original, it's not much larger than many current mobile phones. It should be released around the end of the year, but it's bound to be very expensive.

Price TBC

Contact Nokia www.nokia.com

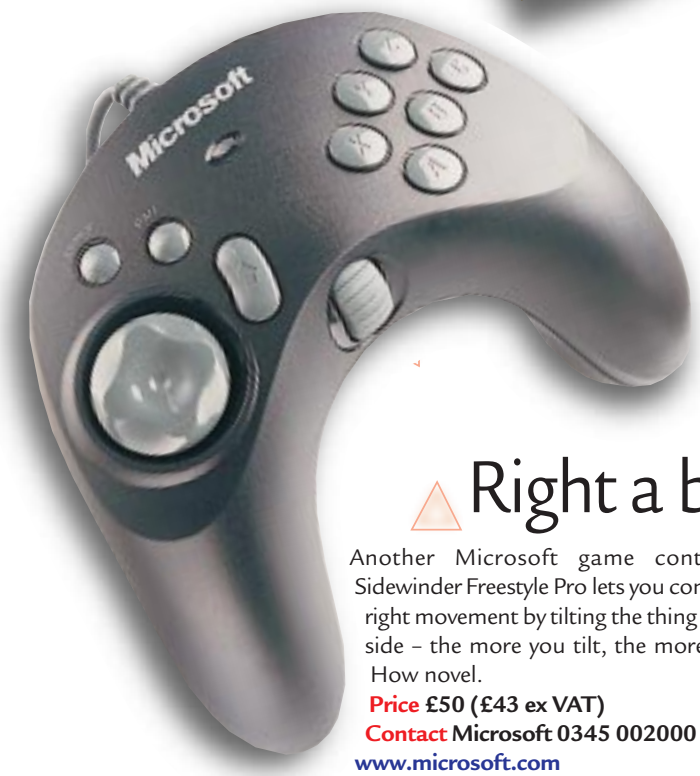
Left a bit...

Those clever chaps at Microsoft have looked up from their boring office applications long enough to produce the Sidewinder Force Feedback Wheel. It is, as the name suggests, a steering wheel with force feedback, so you'll feel every bump and hedgehog. Our editor positively squealed with delight when he saw it, so it must be good.

Price £160 (£136 ex VAT)

Contact Microsoft 0345 002000

www.microsoft.com



Right a bit...

Another Microsoft game controller: the Sidewinder Freestyle Pro lets you control left and right movement by tilting the thing from side to side – the more you tilt, the more you move. How novel.

Price £50 (£43 ex VAT)

Contact Microsoft 0345 002000

www.microsoft.com

Leg it!

Nobody in the *PCW* editorial office could work out what this was without being told. Believe it or not, it's a mouse mat that you put on your knee. No, really. It works too, despite the fact that the resulting surface is, unsurprisingly, curved in the manner of a leg. Probably not the kind of thing you'd want to use all day, but for computing on the move it could be useful.

Price £5.99 (£5 ex VAT)

Contact Nicholas Mark Innovation 01202 513602

reviews

The product of the month has to be Sony's fantastic **NEW SUB-NOTEBOOK**, reviewed opposite. Rarely has a new product produced such universal admiration around the *PCW* office. We've also got one of the **FIRST 350MHz K6-2 MACHINES**, which has been subjected to our usual scrutinisation and testing in the Labs. If you're looking for a **DESKTOP REPLACEMENT NOTEBOOK** rather than the super-mobile Sony offering, both Rock Computers and Gateway have likely candidates.

The big software news is the new version of **ADOBE'S ILLUSTRATOR**, version 8. We tested a late beta, but the final version should be available by the time you read this. It's an **IMPORTANT UPDATE**, so make sure you check out the review on page 105. An interesting piece of hardware is **CALLUNA'S HARDWALL** anti-virus and security card, which does some clever things with partitions. And in the regular PDA software slot, Widget's Software's **ROUTEPLANNER** is an impressive app for finding your way from A to B.

DAVID FEARON, REVIEWS EDITOR
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Contents

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.

Ratings

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

Sony PCG-505G
Slimline style

Sony has excelled itself: a feature-packed notebook with looks to match.

▶ SONY'S NEW NOTEBOOK IS A TRIUMPH OF STYLE AND FUNCTION

This isn't Sony's first notebook PC, but it should have been. While the PCG-737 we reviewed in August's *PCW* was a good product, the 505G beats it hands down for sheer style. Sony really has gone to town with all its miniaturisation expertise to produce an incredibly thin and light device with a footprint considerably less than the copy of *PCW* you're holding, and of approximately equal height when closed.

There's so much to this little beauty that it's difficult to know where to start. Taking it out of the box for the first time produced exclamations of disbelief, both at its size and the fabulous look of the thing. Clad in magnesium alloy top and bottom, it's reminiscent of the more expensive tape, CD and MiniDisc Walkmans for which Sony is so famous. The top of the lid bears the Sony logo, plus a large screen-printed Vaio logo. The lid catch, power and reset buttons are all silver and again bear a resemblance to Walkman controls.

Being so thin, the 505G doesn't have built-in floppy or CD-ROM drives, nor does it have integral serial, parallel, VGA or PS/2 ports. However, they're included via a port replicator and external drives. The port replicator and floppy drive both have their own dedicated connectors on the side of the machine: Sony has taken IBM's lead and attached the connector's covers via a flexible rubber mount, so that if they catch on something they're less likely to break off. The CD-ROM drive doesn't have a dedicated connector, connecting via a PC card adaptor to the single Type I/II slot sported by the unit. The notebook itself isn't totally bereft of standard connectors — there's a USB port which could be used for external mice/keyboards should you not want to take the port replicator around with you. Uniquely, there's also an IEEE1394 connector, which Sony calls an i.LINK port. Sony claims that this can be used with its camcorders to produce a video-editing solution, but bear in mind that most UK Sony camcorders won't record via 1394 without an unofficial modification. With such a slim device, it would be easy for the keyboard's limited travel to render it impossible to use. Yet while it's not as fast as a decent desktop unit, the 505G's keys are remarkably positive and accurate. The unit is fitted with the ubiquitous touchpad for mouse cursor control, but with a unique twist: a flip-out bay inside the lid contains a plastic stylus pen. You can use this instead of your finger for more precise control. It works, too, but be careful if you're a Psion 5 or Windows CE user — it's all too easy to forget what you're doing and prod the screen by mistake, potentially causing damage.

There are no criticisms I can level against this exemplary product

Just about the only feature that the 505G lacks is stereo speakers: there's just the one, on the underside of the case. But that's been taken care of too, via connectors and mounting points on the lid for a special pair of speakers costing around £81 (£69 ex VAT). As far as connectivity is concerned, Sony has that covered as well. There's a ComOne 56K PC Card modem included, which also has Ethernet, GSM and ISDN capabilities if you purchase the right connection kits.

Software pre-installed includes a comprehensive battery-control app that gives masses of information about battery life, and estimates time required for a full charge as well as time remaining. There are no office applications included, though.The out-and-out performance of a unit like this isn't going to be an issue for most people, but it's fitted with a mobile 233MMX processor and 32Mb RAM. This amount of memory is adequate, but Windows 98 does grind the swapfile a little too often, so 64Mb would be preferable. Other than that, there are no criticisms that I can level against this exemplary product.

DAVID FEARON

PCW DETAILS

★★★★★

Price *£2,300 (£1,959 ex VAT)*
Contact *Sony 0870 2402408*
www.sony.com
Good Points *Gorgeous design, stuffed with innovative features. Super-small.*
Bad Points *Could do with more memory, but that's about it.*
Conclusion *The best sub-notebook we've ever seen.*

Carrera PowerMedia 350

Seconds out

This good all-rounder will suit someone looking to enhance their existing PC setup.

▶ No real speed thrills, but the PowerMedia will do the business for the home user

The PowerMedia 350 is a system with a respectable configuration and a price aimed at those perhaps buying their second PC. AMD's latest processor, the 350MHz K6-2, lies at the heart of the system. With 64Kb of Level-1 cache, it has double the allowance found in Intel's processors. It also benefits from the 1Mb of Level-2 cache offered by the Super 7 motherboard that features a 100MHz front-side bus, which pumps up the transaction speed. However, speed of processor alone is not enough to make a decent mid-range system.

The Power Media 350 is housed in an uninspiring standard tower with access to the innards through one side-panel. The case may be pedestrian-looking, but the quality of its internal construction is high. It's a splendid sight to open up a case and actually be able to access all the user-upgradeable components. All the annoying cables are kept at bay with some tight clipping, and if you want to add any devices into the bays, the power cables are dangling conveniently nearby. The supplied components are well thought out, giving you a taste of high-end multimedia without forking out excessive amounts of cash. A VideoLogic Sonic Storm PCI sound card plays through the Altec Lansing speakers and subwoofer, which should shift any loose grouting in your bathroom. A 56K PCI modem from Diamond provides access to the web. Graphics are handled by an 8Mb AGP Matrox Millennium G200 card, which is expandable to 16Mb for around £35. We would have liked to have used the Panasonic DVD-ROM drive to show off the graphics card, but a Matrox-compatible software MPEG decoder was not available in time for this review. Main memory is supplied on one 64Mb DIMM — the minimum you'll need to keep up with the rest of this spec. Storage comes in the shape of Maxtor's 7.5Gb Diamond Max Plus EIDE hard drive, which spins at 7200rpm to maximise data throughput and minimise latency (the average time taken for a particular area of the disk to reach the heads). All of the above should keep most people happy for a while, but it's easy to upgrade. The motherboard is open to various possibilities. Its CPU multiplier is currently set at half-mast, allowing faster processors to be installed later. Two spare SIMM slots allow you to transfer memory from an older system, and there are two more DIMM slots to take advantage of the 100MHz bus speed.

The PowerMedia offers the home user a sound, good-value PC

At first glance there is an array of expansion slots to add components, but you won't be getting the best out of your system if you fill up the three spare ISA slots. The world is going PCI, and they won't be useful for long. The measly two spare PCI slots won't be enough for a dynamic end-user. The spare drive bays paint a brighter picture with two available for 5.25in devices and the same for 3.5in devices, although only one 3.5in device has a front access panel. The 17in Iiyama Vision Master monitor is an excellent choice, providing a quality display controlled by a three-button on-screen menu system. Only Microsoft Home Essentials is pre-installed.

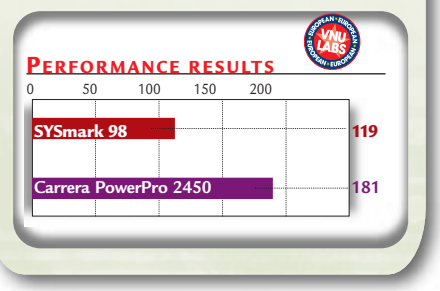
Performance was measured using SYSmark 98 from BAPCo. The result was the expected increase over AMD's 300MHz part. Nothing too surprising, but have no doubt that this is a fast machine. Overall, the Power Media has a lot to offer, with good but not stunning performance in comparison to the top-end Intel processor-based machines. It's not supposed to be an out-and-out speed demon, and it offers the serious home user a sound and good-value system.

IAN ROBSON

PCW DETAILS

★★★

Price *£1,468 (£1,249 ex VAT)*
Contact *Carrera 0171 830 0486*
www.carrera.co.uk
Good Points *Good all-round specification. Excellent monitor. Well built.*
Bad Points *Not the fastest system around. Only two spare PCI slots.*
Conclusion *A high-specification system with everything most people will want.*



Cobalt Qube
Box of delights

Plug-and-go network attachment that sports a most eye-catching design.

In a package not much bigger than Microsoft Office, Cobalt Networks has managed to squeeze in a complete 32-bit server operating system, a web server, a file server that can deliver disk space to Windows and Mac machines, a mail server, a free-text retrieval system, a comprehesive departmental document organiser, and a text-based conferencing system that handles private discussion groups.

The whole thing, including the management of the operating system, the applications and user access, is browser-driven from any client on the network. This means that all the software happily harmonises with whatever other operating systems and hardware you may be running, as long as they understand the basics of the web. Not bad for £849. Oh, and did I mention that the superbly designed translucent blue box the Cobalt software comes in happens to be a ready-to-run piece of hardware? The installation procedure is:
1. Plug in the power cable.
2. Plug in the network cable.
3. Switch on.

Taking the Qube out of the box for the first time is an interesting experience. It just doesn't seem like a computer, and certainly not like a server, given that you can pick it up with one hand. Measuring just 18.4x18.4x 19.7cm and looking like an ornament you might buy in Habitat, the Qube 2700WG works very well as a simple plug-in "appliance solution". And that really is as much as the non-technical user needs to know to get the best out of the Qube. Yet thanks to its use of open software components, the Qube is also eminently configurable by any authenticated Unix administrator. The hardware is modest by current PC standards: a 150MHz Mips processor that the manufacturers claim is equivalent to a 200MHz Pentium, and a 2.1Gb hard drive. Instead of a video subsystem and a keyboard, the console has been boiled down to a two-line LCD and an array of six buttons (and one more for power on/off) at the rear of the machine. This is only used during the initial setup to power up the machine and configure the IP address, unless there's a DHCP server on the network, since the rest of the system configuration is carried out through a web browser.

It doesn't seem like a computer, and certainly not like a server... you can pick it up with one hand

A Linux user telnetting into the Cobalt will find familiar territory, albeit somewhat stripped of features such as man pages. This version of the Qube comes with the Bash shell and the Perl 5.0 interpreter, enough for some fairly extensive tailoring. Using the Qube's own writelcd utility, for example, it was a breeze to customise the startup messages that appear on the LCD screen, and add a few extra diagnostics. A full development environment with a C++ compiler comes with the alternative Qube 2700D model, but this of course can be downloaded for free and added to the WG version of the Qube if you want to use the box to build specialist applications. Along with Linux 2.0.33 is the Apache web server, Sendmail, which empowers the machine as a mail server; Samba, which turns it into a Windows file server; and Glimpse, a useful though not comprehensive free-text retrieval system. There's one proprietary package too: InfoPlace, a document organiser that allows files of any kind to be stored and searched for by title, key field or category. Missing from InfoPlace is an inverted index to allow full text retrieval, and a set of filters to convert files to HTML where appropriate so that proprietary formats can be viewed anywhere on the network without special features in the browsers.

◀ AN APPEALING DESIGN — AND A COOL NETWORK SOLUTION

With no serial port, parallel port or SCSI adapter, the Qube's use as a print or backup server is limited. However, there's a single spare PCI slot to extend the function of the machine in this direction. Alternatively, you could install an ISDN card or modem card to turn the Qube into a fashion-conscious internet router.

CHRIS BIDMEAD

PCW DETAILS

★★★★

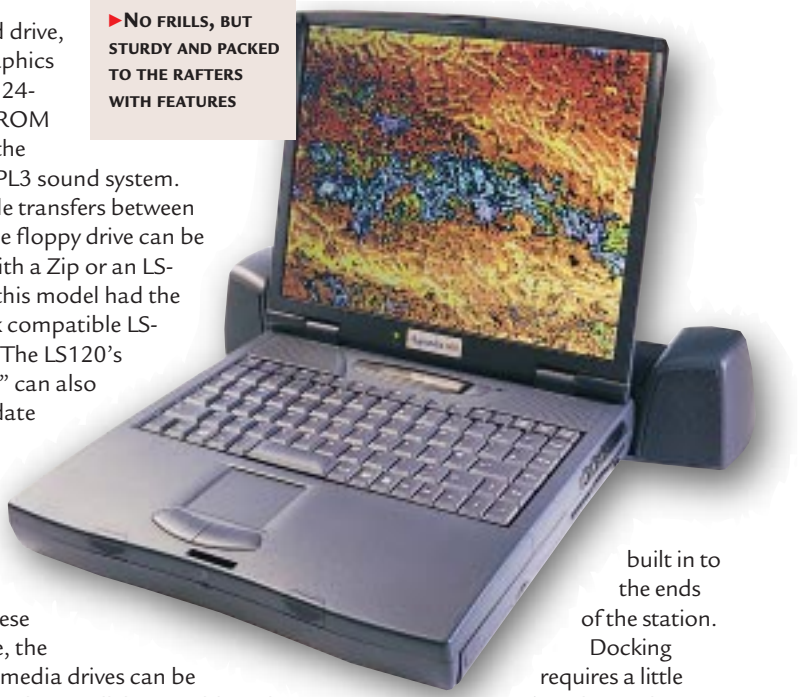
Price *£998 (£849 ex VAT)*
Contact *Mintra 0161 256 4030*
www.cobaltmicro.com
Good Points *Plug-and-go attachment to the network. Software solutions all installed ready to go. Design is almost too appealing.*
Bad Points *Network adaptor card is only 10Mbit/sec. Modest RAM and hard drive for a server device.*
Conclusion *A very neat, low-cost way to build an instant intranet and add collaborative tools to a small network.*

Rock Agenda 960
Power pack

On this Agenda is an amazing specification that makes for a true desktop replacement.

Rock Computers, being one of the largest British-owned notebook computer manufacturers, can make some prestigious claims to its part in the evolution of mobile products. Industry impact is another matter; but with products like the Agenda 960, maybe a little more recognition will come its way.

On the outside you have a bog-standard notebook with no flirtatious curves to its plastic casing. It's not of the wafer-thin variety and a quick call to Weight Watchers wouldn't go amiss, but the build is reassuringly sturdy. However, once you flip open the 14.1in TFT screen and switch on, the numbers that flash past during the boot-up sequence give the first hint to the delights in store. The Agenda is fitted with Intel's mobile Pentium II processor, clocking in at an impressive 300MHz, and this is coupled with 128Mb of main memory. Remember that not so long ago, the average notebook came with 4Mb. The rest of the system spec is equally impressive, with a whopping 5.1Gb hard drive, 4Mb of graphics memory, a 24-speed CD-ROM drive, and the Yamaha OPL3 sound system. For large file transfers between systems, the floppy drive can be replaced with a Zip or an LS-120 drive: this model had the floppy-disk compatible LS-120 fitted. The LS120's "SmartBay" can also accommodate an extra battery or hard drive, and when either of these are in place, the removable media drives can be attached via the parallel port, although a slower data transfer rate will result.



▶ No frills, but sturdy and packed to the rafters with features

The size of the screen, being larger than that of a 15in CRT, makes extended hours away from your usual workspace much more bearable. The display is equally bright across its whole surface, with sharp definition at the recommended 1024x768 native resolution.

The pointing device comes in the form of a touchpad with respectable sensitivity to your demands. No "special function" middle button or scroll option is available, which those used to the new "wheely mice" will no doubt miss. But the most important input device, the keyboard, is a joy to use and is far enough up the notebook to allow the two large spaces either side of the touchpad to be used quite practically as wrist rests.

It's not of the wafer-thin variety but the build is quite sturdy

Included in the attractive asking price is a full docking station, adding all standard ports as well as an extra PS/2 mouse/keyboard connector and USB port, plus a game port. The notebook's own tinny speakers also enjoy an enhancement, with stereo speakers, as good as many bundled system speakers, built in to the ends of the station. Docking requires a little force but with practice can be achieved in seconds. With the docking station there's no need to spend a couple of hours transferring your files to your permanent desktop system via direct cable connection or removable media. A normal setup with 17in CRT, parallel port printer, USB scanner, full-size keyboard and mouse could be plugged into the docking station with a permanent power supply. When docked with your desktop setup there is also the added advantage of the ability to use PC Cards. One Type III or two Type II cards can be plugged in for peripherals in those formats, such as modems or digital camera flash memory cards, and IrDA2 infra-red data transfer is possible to compatible devices like PDAs.

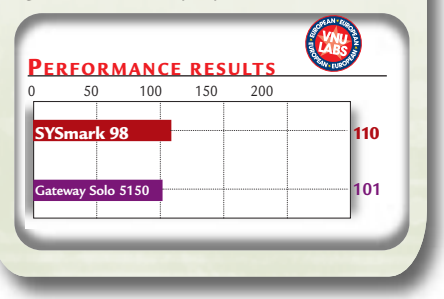
The Agenda came with Windows NT4 installed, and running BAPCo's SYSMark NT benchmark gave a result on equal footing with a desktop PII 300 system. With its amazing spec, the Agenda places no restraints on working at your best while away from your desk. It's not for the road warrior, but it makes a great portable desktop replacement.

IAN ROBSON

PCW DETAILS

★★★★

Price *£2,818.82 (£2,399 ex VAT)*
Contact *Rock Computers 01926 816609*
www.rock-computers.co.uk
Good Points *As powerful as most desktop systems. Docking station included. LS120 drive. Great keyboard.*
Bad Points *Overweight and unattractive.*
Conclusion *A notebook that can truly be regarded as a desktop replacement.*



Gateway Solo 5150 S6-266LS

A pricey, high-spec business notebook — but you really do get what you pay for.

As you may know, Gateway 2000 has recently dropped the millennial reference — perhaps to prevent crashes — and is now simply known as Gateway. This doesn't, of course, change very much; Gateway is still a top-five PC and notebook manufacturer with more sales than a struggling high street and more clout than most PC companies could dream of. This offering, the Solo 5150, is a notebook aimed at the business user. Aesthetically it is fairly standard: slim, and incorporating an ample 14.1in TFT LCD that fits almost the whole width and height of the casing. As is the case with several notebooks, the CD player and floppy drive are interchangeable. Like it or not, this is clearly a handy space-saving device that allows for smaller dimensions. You can also purchase an LS-120 or DVD-ROM drive to slot in, although these are not supplied.The Solo has the now obligatory touchpad (or EZ Pad Plus Touchpad, to use its more regal name). However, the Solo differs from some in that there is also a rocker pad which acts in a fairly similar manner to the little grey wheel on an Intellimouse, and is particularly useful for web-browsing fanatics. It is refreshingly unlikely to randomly double-click itself, opening up applications uninvited, as some touchpads are wont to do. The full-size 88-key keyboard is springy but responsive, so no complaints there.

You can take this unit out on the average train journey and work away

Moving on to its add-on potential, the Solo has the usual suspects along its back — serial, parallel, docking and VGA ports. All are protected by a dust/damage cover, and the docking port has its own bomb-bay doors for easy access. There are two USB ports, one PS/2 port, an infra-red port and two PC Card slots (for two Type I/II or one Type III cards). Add the line-in, microphone, headphone, line-out and volume wheel to this merry band, and you have a capital choice of ways to add peripherals and other devices.

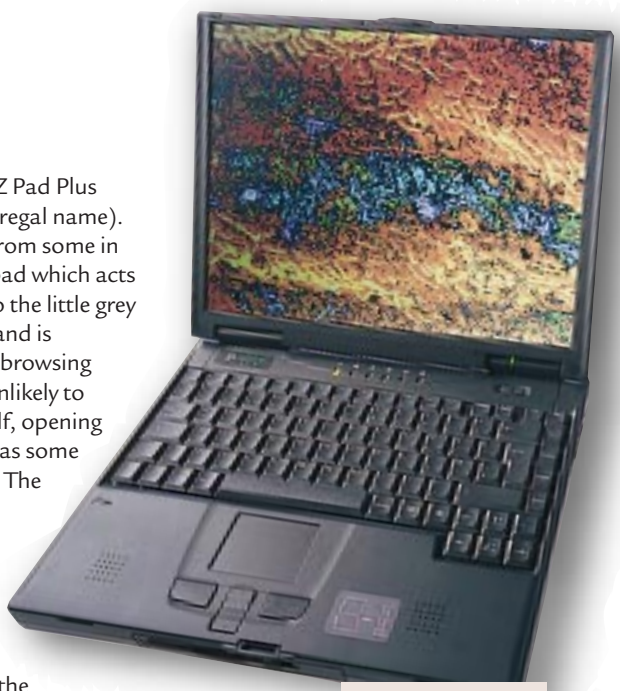
Peeking underneath the exterior, you will find a Pentium II 266MHz processor at the heart of the action on an Intel 440BX chipset, plus 64Mb RAM. We ran several tests on the Solo, on the system and the battery. Solos have always tended to give good battery performance and this model is no exception, managing just over three hours. It's good to know that you can take this unit out on the average train journey and work away without worrying about it dying.

Also worth noting is the ACPI BIOS. This is a new specification designed by Microsoft, Toshiba and Intel; it stands for Advanced Configuration and Power Interface. In brief, it enables the PC to come on instantly when accessed by a user and remain available to perform automated tasks after they are turned off. You can also leave it on, thanks to an advanced sleeping state, and it will turn other peripherals on or off itself. In turn, connected devices can also wake the Solo up without turning it on, thereby allowing for integrated computing, home communications and entertainment. Peripherals and hardware must also be ACPI-aware; unfortunately, many are not.

The Toshiba EIDE 6.4Gb hard drive is extremely generous for a notebook. As for on-board graphics, the Solo uses a 2.5Mb NeoMagic chipset, thereby giving 24-bit colour at 1024x768 resolution. The 16-bit sound is of course also on-board, and relies on two fairly unimpressive speakers located just below the keyboard.

There is a good Microsoft software bundle: Office 97 Small Business Edition, which includes Word, Excel, Outlook, Publisher and AutoRoute Express 98. It doesn't, however, include PowerPoint, which is annoying since one of the major uses for notebooks is giving presentations. Finally, the weight. At 6lbs 12oz it weighs the same as a small newborn baby. By 'eck though, is it less trouble.

JIM HARYOTT

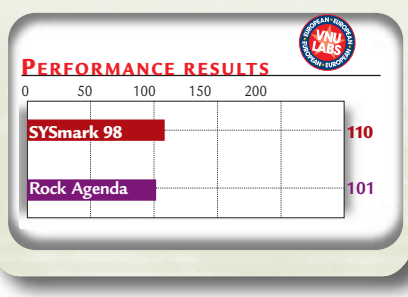


▲ WITH A GOOD SIZE AND SOLID BUILD, THE SOLO IS THE PERFECT BUSINESS PARTNER

PCW DETAILS

★★★★

Price *£2642 (£2249 ex VAT)*
Contact *Gateway 0800 973132*
www.gateway2000.co.uk;
www.gateway.com
Good Points *Screen area. Solid build. High spec.*
Bad Points *Slightly pricey.*
Conclusion *A well-built, well-specified if not particularly inspiring notebook. Fairly expensive, but you get what you pay for.*



Hewlett-Packard 2000C/CN Professional Series

A colour inkjet printer for the office environment.

Does the world really need another colour inkjet printer? Well, Hewlett-Packard obviously thinks that it does, otherwise it wouldn't have come up with the new 2000C/CN Professional Series Color [sic] Printer. We also know that Hewlett-Packard would be the first to jump up and declare that this unit is simply too fast to be classed as Just Another Inkjet Printer. And we'd be inclined to nod sagely, but we'll save that for later.

It has to be said that the 2000C/CN is not a small fellow, and as it weighs in at a scrap under 10kg, we don't have to ask who ate all the pies. And the bulk doesn't help its appearance any: it looks rather like a bulbous bread bin, hewn from beige plastic of course. Aesthetics aside, the 2000C/CN — and if you're wondering about the suffixes, the "CN" model is "network ready" — is a sturdy beast, to be sure. It's designed for fairly heavy use, with Hewlett-Packard stating a duty cycle of up to 5,000 monochrome pages per month; most inkjets would work up a sweat trying to churn out this many sheets, even if they worked 24 hours a day. As we said earlier, the 2000C/CN is faster than most. Print speed is always difficult to gauge because it depends very much on what you intend to do with your printer. On the 2000C/CN it is complicated further by the choice of three print modes: Econofast, Normal and Best. As Normal mode is the default, we ran our Labs tests using this. HP claims that the 2000C/CN will churn out up to eight pages per minute when printing black text, and that's true enough, so long as all you're printing is simple text without significant embellishments. In the real world, however, you're going to be producing a mix of text, graphics and styles, and here the 2000C/CN still copes well, dropping an average of over four pages each minute into the output tray. This tray will hold up to 75 sheets of A4 while the paper feeder will gobble 150. This seems a little short-sighted, particularly for the network unit that boasts a larger paper input capacity of 400 sheets, to which you should be able to send a job and not worry about nursing it through the task.

The 2000C/CN copes well with a mix of text, graphics and styles

▲ THE 2000CN IS THE IDEAL COLOUR NETWORK PRINTER FOR THE OFFICE

Quality was consistent, if not always impressive. Photographic images printed onto glossy paper look fantastic, but nowadays that's hardly likely to set any printer apart from the crowd. Inkjet technology has come on in leaps and bounds in recent times and any model that can't take a good stab at a photo on glossy paper should stay on shop shelves and gather dust. Much the same could be said of the 2000C/CN's text output, though printed black characters were discernible right down to three-point fonts, a rare quality for an inkjet printer. However, on plain paper things are less meritorious. Text still sparkles but the graphics side of things goes a little flat. The same could be said of many colour lasers, though.

As well as the speed, Hewlett-Packard is also singing the praises of the 2000C/CN's printing system, the audaciously named Smart Printing Technology. There's nothing particularly astounding here: individually replaceable ink reservoirs; low-ink indicators; ink-out indicator; end-of-printhead-life indicator; transparency sensor; and a cancel print job "feature", but the combination is unusual, if not unique. For those who are interested — pay attention, you network administrators at the back — the CN model is equipped with Hewlett-Packard's JetDirect 300X print server, allowing automatic switching between 10Base-T and 100Base-T speeds.

Overall, the 2000CN represents an attractive alternative to the considerable expense of a colour laser for medium duty-cycle workloads. It would be particularly suitable as a pre-press machine for colour proofing. It's not going to persuade you to sell your mono laser, though.

SCOTT COLVEY

PCW DETAILS

★★★

Price *£1,057 (£900 ex VAT) for 2000CN; £705 (£600 ex VAT) for 2000C*
Contact *Hewlett-Packard 0990 474747*
www.hp2000c.com
Good Points *Particularly high-quality text. Faster than almost any other inkjet.*
Bad Points *Graphics look flat on plain paper. It's still not as fast as a laser for mono work.*
Conclusion *Would sit nicely in a small-to-medium-sized office, sucking print data from a network server.*

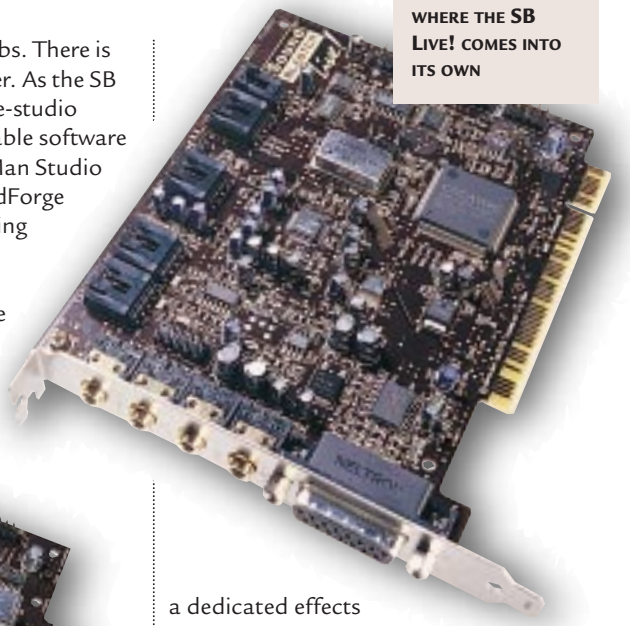
Creative SoundBlaster Live!

Live and kicking

High fidelity and value for money combine in this great consumer sound card.

When Creative Labs introduced its original SoundBlaster ISA card, it soon became the standard in PC audio. However, the market domination of Creative's products has been challenged recently by the entry of Aureal Semiconductors with its Aureal synthesiser. Sound cards using the Aureal chipset — the Diamond Monster Sound and Turtle Beach products — are able to reproduce "true 3D" surround sound using just two speakers. Aureal's 3D sound algorithm makes the sound appear as if it's originating from behind the listener. Creative has never truly been able to match this through its line of AWE64 cards.

The SoundBlaster Live! is Creative's attempt to win back the listeners and developers who have defected to Aureal. Based on the EMU10K1 processor, which is allegedly as powerful as a Pentium 133, the SB Live! PCI card is a major departure from previous designs. It fully supports a new API, called EAX (Environmental Audio Extensions). Creative managed to enlist the support of Microsoft to make EAX a part of its DirectSound API. This means that unlike Aureal's proprietary A3D API, any developer that supports DirectX can use the EAX extensions.The SB Live! ships with a dedicated digital I/O daughtercard and four PC Works speakers from Cambridge Soundworks, a subsidiary of Creative Labs. There is also a dedicated subwoofer. As the SB Live! is also aimed at home-studio enthusiasts, there is a sizeable software bundle that includes MixMan Studio (a MIDI sequencer), SoundForge and Cubase VST. Connecting the four speakers and subwoofer wasn't too laborious a procedure. The two rear speakers come with miniature tripods and there is a separate volume control that can be attached to the side of the monitor or PC. The SB Live! comes with excellent documentation describing each step of the process. Creative claims that the EMU10K1 processor on the SB Live! is consistently able to maintain a noise floor of -120dB. To test this in the real world, we connected the S/PDIF output of the daughtercard to a top-end Marantz AV amplifier and a pair of high-quality Alesis monitors. The noise level remained inaudible except at peak volume settings — impressive for such a low-priced card. The difference in sound quality between the bundled PC Works speakers and the professional ones was significant. Users who can afford to upgrade should do so. We tested the built-in effects processor by hooking up an electric guitar, a bass guitar and a Korg synth. The frequency response of the SB Live! wasn't quite up to reproducing the deep tones of the bass and the high notes produced by the electric guitar — you'll get noticeably better results from a dedicated effects processor. Yet while they're not up to professional standards, they're certainly usable if applied sparingly. Encouragingly, the 256-voice wavetable MIDI playback of the SB Live! is a great improvement over its predecessors. The SB Live! is aimed primarily at gamers and comes with a version of Unreal which uses the EAX extensions. The card comes into its own in the games realm, reproducing gunshots, explosions and screams with profound realism. The unit comes with a number of preset environments for many popular games such as Age of Empires and Wing Commander. There are also generic preset environments like "underwater" and "concert hall", and even some exotic ones such as "bathroom" and "drugged". Gamers can also create their own environments by mixing sounds.



▼ IT'S ALL IN THE GAME — WHICH IS WHERE THE SB LIVE! COMES INTO ITS OWN

The SoundBlaster Live! is aimed primarily at gamers

Creative claims that the full power of the EMU processor is yet to be tapped. Future driver updates should provide support for 512 hardware-accelerated voices and Dolby Digital support for DVDs. But even without these, Sound Blaster Live! is excellent value for money.

AJITH RAM

PCW DETAILS

★★★★

Price *£149 (£127 ex VAT)*
Contact *Creative Labs 0118 934 4744*
www.sblive.com
Good Points *EAX extensions. High fidelity. Good software bundle. Easily upgradeable.*
Bad Points *No support for Dolby Pro Logic or AC-3 playback.*
Conclusion *The most powerful consumer-orientated PC sound card to date, at an enticing price.*

VisionMaker Sketch 14
Point-and-write device

The Sketch is the next step in creating hand-drawn images on your PC.

The Sketch is, as far as we know, a unique product. It combines a 14in TFT LCD flatpanel display with a pressure-sensitive graphics tablet to produce a true "writing surface" display. It has been well designed, and feels very solid when taken out of the box. It's not connected directly to the mains — there's a 12V power supply included. At the back of the display is a metal box containing the power supply and video inputs plus the serial output which goes into one of your free COM ports. The box itself hinges down and forms a stand. It's held up by a metal support in a similar fashion to a normal drawing board, and you can set it at any one of various angles, from flat to virtually upright.

Once you get over the psychological barrier of stabbing at an LCD panel with a pointy thing (something that will ruin a normal LCD), the system works brilliantly well: the barrier over the screen is tough enough to avoid any Newton ring-type distortion effects when pressing hard. The sketch comes with an attractive stylus pen that takes a single AAAA battery, but it's still pretty light — lighter than a decent-quality fountain pen. Because it's an active device, you don't actually need to touch the screen to control the mouse pointer as you would with a notebook-type touchpad.

We tested the Sketch on a system that already had a PS/2 mouse installed. Rather satisfyingly, the Sketch doesn't totally hog the mouse pointer, so you can still use the mouse normally when you want without having to press any buttons or alter any system settings. This is important, because using the Sketch as a total replacement for a mouse isn't really very practical. It's hard to hold the pen still while clicking, and particularly so while double-clicking, so Windows tends to think you're dragging icons rather than trying to activate them. The driver software supplied installs a small app to change preferences such as the pressure sensitivity and the action of the buttons on the pen, and you can set it up to double-click automatically, reducing the accidental dragging problem.

When it comes to using the thing in anger, the Sketch 14 is great

As to the quality of the display, it's good, but not up to the standard of the majority of modern TFT panels. Of course, having the extra protective layer over the screen to prevent the pressure of the pen damaging the display doesn't help, and will inevitably reduce brightness and definition. But the viewing angle is also rather restricted, meaning that the display seems darker at the bottom than the top when viewed from above, and darker at the top than the bottom when viewed from below. There are a few more criticisms of the display too, principally the controls. These are very basic, covering only LCD clock phase and delay, brightness, and horizontal and vertical position. Control is via four front-panel buttons, with no on-screen display. Niceties such as colour temperature adjustment and power management timers are sadly absent. Colour temperature in particular would have been appreciated, since the Sketch's settings are a little on the warm side. An annoying oddity of the controls occurs when you're trying to adjust the display — press the left-hand button to try and move the picture left and it goes right, and vice versa.

▲ POINT AND CLICK? NOW YOU CAN POINT AND WRITE, OR DRAW, WITH THE SKETCH 14

When it comes to using the thing in anger, the Sketch 14 is great. The ability to adjust the angle of the unit means that it's very comfortable, and the sturdy build means that there are no worries about leaning on it in the same manner that you'd lean on a drawing board. The only slight glitch in the operation of the pen was that it would occasionally fail to register pressure at the beginning of a stroke, whereupon the pen needs to be taken away from the surface and reapplied. But this a minor problem that will no doubt be fixed in future versions.

DAVID FEARON

PCW DETAILS

★★★

Price *£5,287 (£4,500 ex VAT)*
Contact *VisionMaker 01483 202051*
Good Points *A unique product for the graphics professional.*
Bad Points *Seriously expensive. Display quality not as good as current flatpanels.*
Conclusion *You'd need to think very carefully before choosing one of these over a normal graphics tablet.*

Yamaha DS2416
Music to your ears

RECOMMENDED
PERSONAL COMPUTER WORLD

Studio quality hard-disk recording at an extraordinarily low price.

◀BUTTON HEAVEN. CUBASE AUDIO VST/24 VERSION 3.6 WILL INCLUDE FULL SUPPORT FOR YAMAHA'S DSP FACTORY

▼THE BASIC DS2416 PROVIDES ANALOGUE AND DIGITAL I/O

The DS2416, part of Yamaha's new DSP Factory system, is an unassuming half-length PCI card that combines all the electronics of the 02R, minus knobs and sliders, with top-notch hard-disk recording features, for an astonishing £599.

Any sound card is capable of making, recording and playing music. However, push things a step further and you'll quickly run into problems. It's all very well having eight or 16 tracks of digital recording in theory. But try applying real-time equalisation or effects on multiple tracks and things rapidly become unbearably sluggish.

With the DS2416 you can apply as much processing as you like since everything's handled by the card's DSP (digital signal processor) chips. The card supports recording of up to eight tracks at a time at 32-bit resolution, with 16-track simultaneous playback. The mixer has 24 channels with 10 buss outputs and six auxiliary sends. Each input and stereo output has dynamics processors as well as four-band parametric EQ and full metering on all channels. Digital cross-patching makes it simple to route channel inputs and outputs. It's important to remember that we are talking about a real hardware mixer here: only the controlling interface is in software. There are two effects processors, equivalent in quality to Yamaha's REV500, that can be applied to any of the channels. They include numerous reverbs, delays, choruses, distortion, ring modulation, flangers, phasers, and combination effects. Having 24 channels is ideal for 16-track mixing. You need this many to accommodate all your inputs, outputs, sends and returns. In a PC-based recording setup you can get away with a single analogue stereo input for recording, and the 2416 provides this on the back of the card, together with a stereo analogue output and digital I/O. Recording one stereo track (or two mono) at a time, you will still be able to build up to 16 tracks of hard-disk audio. Installing and setting up the DS2416 is easy: it's fully plug-and-play and you won't get any conflicts with existing installed devices. A single floppy disk provides the driver, test program and basic patchbay utility. Unfortunately, that's it as far as software is concerned.

Remember that we are talking about a real hardware mixer here...

It's up to third-party developers to provide the means for accessing most of the DS2416's functions. However, all the major names have committed to supporting DSP Factory. Full mixer support is already available for Cakewalk Pro Audio 7 via a free web update. Steinberg's Cubase VST/24 is in beta, and Logic Audio Platinum and Gold are in the pipeline. C-Mexx offers a standalone mixer for DSP Factory, designed to integrate closely with SEKD's Samplitude hard-disk recording software. It's worth mentioning Yamaha's forthcoming SW1000XG sound card. Not just because it promises to be the best ever sound card for the PC, but also because it neatly complements the DSP Factory thanks to a dedicated link between the two cards. The price is likely to be around £500, for which you get the equivalent of Yamaha's flagship EX5R synth module, which combines a huge 20Mb of wavetable samples with five different forms of sound generation including physical modelling and 128-note polyphony. The SW1000XG should be available now.

MICK ANDON

PCW DETAILS

★★★★★

Price *£599 (£509.78 ex VAT)*
Contact *Yamaha Pro Music 01908 369269*
www.yamaha.co.uk
System Specification *(for sequencing/recording software, etc, not the hardware): Pentium II, Windows 95, 64Mb RAM.*
Good Points *Professional performance and features at an incredibly low price. Easy to install and set up. No special PC requirements.*
Bad Points *No software included with the card.*
Conclusion *Brings the cost of entry for serious PC-based recording down to a new level, with no compromises on features or performance.*

Philips PCA645VC
USB video camera

Inexpensive and easy to use, this camera features all the benefits of USB.

The Philips PCA645VC USB PC video camera is one of the first USB cameras to become available, apart from the QuickCam VC from Connectix. It's very easy to use, includes a microphone, and is aimed at the home and small-business user who doesn't require professional-standard video. The Philips camera's output is in standard H.263 or H.261 format, the accepted compression schemes for low-bit-rate video, enabling it to be used in business videoconferencing applications, for internet-based video telephony, or as a webcam. Philips also bundles a "Videogram Creator" application which compresses a minute of video into a megabyte and can be used to email videograms, which can be replayed in Windows or OS/2 Warp. The microphone in the camera transmits its audio digitally along with the video, but can also serve as your system microphone if needs be.

◀SMALL AND LIGHTWEIGHT, THIS USB VIDEO CAMERA OFFERS LOW COST AND CONVENIENCE

To decompress the video from the 645VC at an adequate speed, a Pentium is obligatory, and Philips recommends a 200MHz system as a minimum. However, performance will also depend on how many USB devices are attached to the system. If you need high-quality, fast frame-rates, or only have a slow Pentium or 486, you need a card-based video camera. However, for video calls over the internet to similarly equipped friends and relations, this camera is fine; with internet videoconferencing it's the bandwidth of the internet itself that's the limiting factor. Just don't move around a lot or you'll look like a Klingon.

Price-wise, and in terms of functionality, USB cameras sit between cameras which are parallel port-based and those which require a peripheral card. You don't get the extra features which come with a card-based camera — onboard processing for better performance, external video inputs for camcorders, and so forth. The Philips runs up to 24 frames per second under ideal conditions, meaning fast PC, small picture window. Technically speaking, this is QCIF (quarter common intermediate format), an image 176x144 pixels in size. It supports a maximum of 15fps at full CIF which is about half broadcast speed.

The big advantages of USB are low cost and convenience. With a small, lightweight camera like the Philips, you can videoconference while at the office, and after work you can carry it home in order to send a family videogram to granny. As it's hot pluggable and powered from the USB port there's no AC adaptor to drag around, and no need to hunt for a free power socket. And of course, as there's no peripheral card to install, there's never a need to crack open the PC case. However, there is a catch. USB devices are relatively new and they're only starting to trickle on to the shop shelves. As a result, the only operating system that directly supports them is Windows 98.

But as USB picks up [*see Newsprint, page 27*] support will get a lot better, and not just for Windows 98: Windows 95 and OS/2 Warp can be retrofitted with USB support now, and Windows NT 5.0 will have native USB support. USB will spread to other systems too, starting with the Apple iMac, so it's going to be a great way to share devices at home or in the office, or between home and the office. You will also need a USB port on your PC. They're becoming common, but older machines (1995 or later), although without USB ports, might well have internal USB pin-outs already. You should peruse the motherboard manual or the PC BIOS for a mention of USB and if so, confirm visually by opening the case.

The Philips runs up to 24 frames per second — fast PC, small picture window

TERENCE GREEN

PCW DETAILS

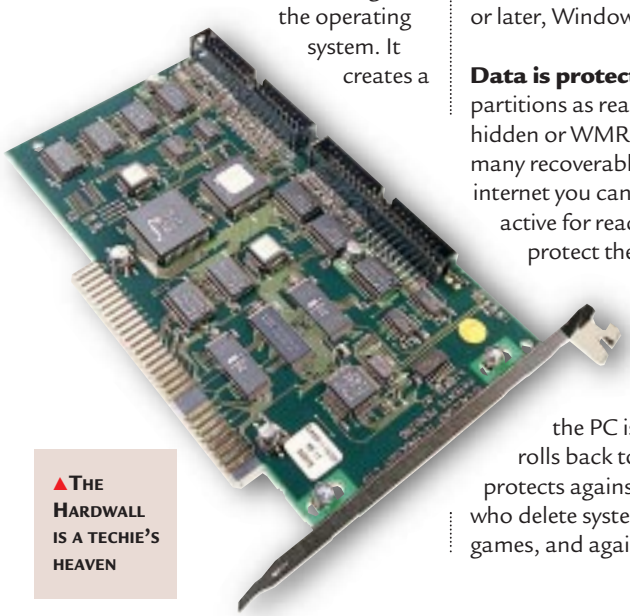
★★★★

Price *£116 (£99 ex VAT)*
Contact *Philips 0181 689 4444*
www.philips.com
Good Points *Inexpensive and easy to use.*
Bad Points *Only fully supported under Windows 98 as of now.*
Conclusion *Ideal for the Windows 98-based home user or small office seeking a low-cost camera without the performance restraints of a parallel-port camera or the cost of a card-based camera.*

Calluna Hardwall

This data-protector is not for the technological novice.

Calluna's Hardwall protects data from threats such as downloaded viruses, hacker attacks, sabotage and accidental or malicious damage to the operating system. It creates a microprocessor-controlled barrier that monitors and controls all data bound for the hard disk. It's a physical barrier, routing the data cable from the hard disk through the Hardwall and onward to the EIDE interface on the motherboard. All you need is a free ISA slot for the card and a Pentium-class PC running DOS 6.2 or later, Windows 3.x, 95 or NT 4.0.



▲THE HARDWALL IS A TECHIE'S HEAVEN

Data is protected by designating partitions as read/write, read only, hidden or WMR (which stands for write many recoverable). When accessing the internet you can designate one partition active for read/write access and protect the others either with no access or with read-only access. WMR is even better as it permits multiple writes, but each time the PC is rebooted everything rolls back to the original state. This protects against viruses, against kids who delete system files to make space for games, and against any kind of malicious or misguided system reconfiguration. It's good stuff. Hardwall has some annoying limitations, though. It only works with IDE/EIDE drives and requires a minimum of five disk partitions with specific names. A copy of PartitionMagic Special Edition is provided for partitioning the drive. Unfortunately, Hardwall's installation process is counterintuitive and the documentation is complicated and unhelpful. Calluna is busy fixing this and a cheaper, simpler version aimed at ordinary people is in the pipeline.

TERENCE GREEN

PCW DETAILS

★★★

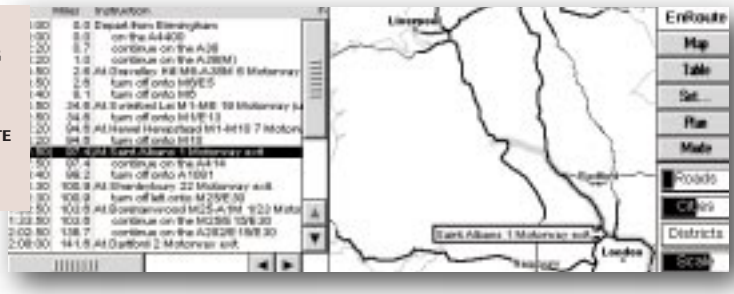
Price *£199 (£169 ex VAT)*
Contact *Calluna 01592 630810*
www.calluna.com
Good Points *Unbreakable data protection.*
Bad Points *Poor documentation.*
Conclusion *Great for techies who can figure it out. Ordinary people should wait for an easier version.*

Palmtop Route Planner

All roads lead to the Psion 5 with this super application.

Once upon a time there was AutoRoute, and it was good. It provided maps of the UK and would plot a course for you from A to B (via C and D if necessary). It flourished on the PC and was then ported to the Psion 3a/c. Bill Gates liked AutoRoute so much that he bought the company; and, of course, killed the non-Windows version.

The good news is that PalmTop has released Route Planner for the Psion 5 that does much the same job, but better. It arrives on a CD-ROM with enough maps to cover the whole of Europe and then some; it has GPS support built-in, so you can play moving map if you so desire. Route Planner makes good use of the touch screen: for example, you can outline areas on the map that you want to avoid and the route will skirt around them. Once calculated, the route can be displayed as a map and/or a set of route directions. The only problem is the bizarre speed of calculation. Going from Birmingham to Dover, 99% of the route is planned in about 23 seconds after analysing 5,500 roads, with just 0.24 miles to go. So why does Route Planner have to examine a further 9,000 roads, taking an additional 35 seconds just to get me that last quarter of a mile?



▶PLOTTING THE RIGHT COURSE WITH ROUTE PLANNER

But I'm not really complaining; I still love the product. If you need to route-plan on the road, this application is justification enough for buying a Psion 5.

MARK WHITEHORN

PCW DETAILS

RECOMMENDED PERSONAL COMPUTER WORLD

★★★★★

Price *£49.95 (£43 ex VAT)*
Contact *Widget 01438 818818*
www.widget.co.uk
Good Points *Covers the whole of Europe. GPS support.*
Bad Points *Calculation times seem a little wayward.*
Conclusion *The kind of application PDAs were invented for.*

Adobe Illustrator 8 BETA

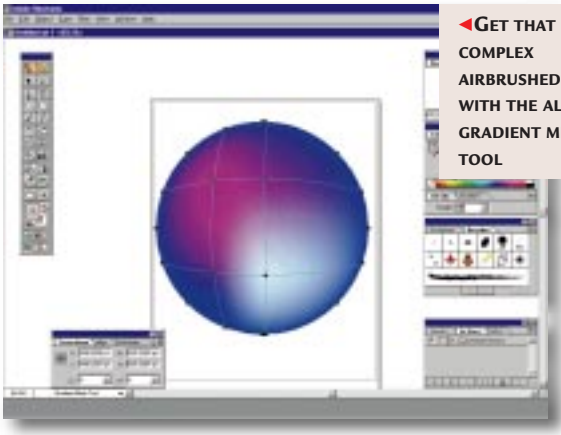
Back in the frame

Ken McMahon highlights the fine new features of this impressive upgrade.

It would be fair to say that the history of Illustrator for Windows has not been glorious. Initial releases lagged two years behind MacOs versions, with version 7 caught up at a lacklustre stage of the program's development. But we got hold of a late beta of version 8, and discovered that it's one hell of an upgrade.

Newcomers to vector drawing find getting to grips with a Bezier pen tool the most difficult hurdle to overcome. The new pencil tool for the first time provides a practical alternative to the pen tool, drawing smooth paths with points at respectable intervals. What's more, if your path isn't quite right, you can redraw sections of it simply by positioning the pencil over an existing section and redrawing: the new section of line replaces the old one.

Illustrator has followed the trend towards introducing paint-like tools to the vector environment with three new brushes: art, scatter and pattern. Any object can be defined as an art brush and then used with the brush tool to stroke any path. You can, for example, define a flower as an art brush and draw multiple copies of it, each bending subtly in different directions to form a bouquet. The scatter brush repeats elements along a path. Image size, spacing, scatter and rotation can be altered at random or according to pressure if you're using a tablet. It's not new: CorelDraw and Painter have had their own variations for some time; but nonetheless it's a welcome addition to Illustrator's repertoire.



◀GET THAT COMPLEX AIRBRUSHED LOOK WITH THE ALL-NEW GRADIENT MESH TOOL

Arguably the best vector drawing package around for any hardware platform

Since the very first release of Illustrator it's been possible to stroke paths with a PostScript pattern. The patterns brush allows you to do this in a much more intuitive manner than previously. There's a small library of pattern brushes including rope, laurel leaves and a fabric print, and you can, of course, create your own.

Another significant addition to Illustrator's toolbox is the Gradient Mesh tool — a complete reworking of the gradient concept. Clicking on a filled object with the mesh tool produces a splash of colour that blends into the background. Select another colour, click elsewhere and a new colour splash appears, blending smoothly with both the background and its neighbouring pigment splash. The multicoloured object is overlaid with a grid, the intersecting nodes each pinpointing a colour splash. Select a node and drag it, and the shape of the blend moves with it; change the fill colour and see the results instantly. The Gradient Mesh Tool takes gradients into a new dimension, providing results you could previously only achieve with a bitmap package. Most of the remaining enhancements are directed towards making Illustrator 8 easier to use and bringing the interface into line with other Adobe products.

Several features of the Photoshop interface have been incorporated wholesale, including the navigator and actions palette, and it's possible to export Illustrator documents to Photoshop with layers intact.

The combination of new features, brand-new drawing tools, enhancements to existing tools and overall interface improvements puts Illustrator back in the frame as arguably the best vector drawing package around for any hardware platform.

KEN MCMAHON

◀ILLUSTRATOR'S NEW PALETTES, CLOCKWISE FROM TOP LEFT: NAVIGATOR, BRUSHES, PATHFINDER, AND COLOUR (NOTE THE NEW NONE, BLACK AND WHITE SWATCHES), AND THE ACTIONS PALETTE

PCW DETAILS

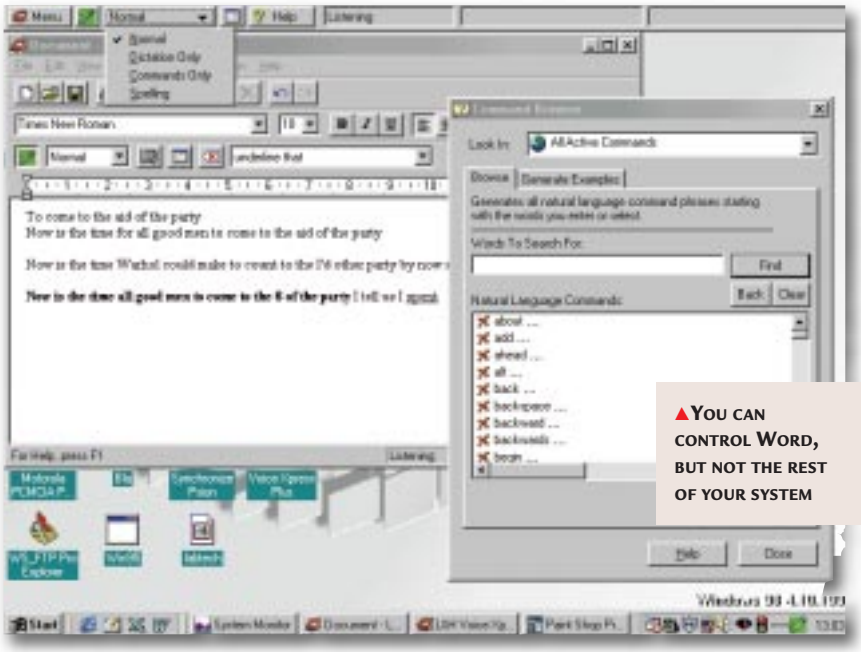
★★★★★

Price *£351 (£299 ex VAT)*
Contact *Adobe 0181 606 4001*
www.adobe.com
System Specification *Pentium processor, Windows 95/98, 32Mb RAM, 50Mb hard-disk space.*
Good Points *Many powerful new tools. Greater ease of use. Improved interface.*
Bad Points *Poor record on speed and stability compared to the competition.*
Conclusion *It looks as though CorelDraw will be under threat when Illustrator 8 is released.*

L&H Voice Xpress Plus
Finding the right words

With Voice Xpress Plus, are you talking loud and clear?

Voice Xpress Plus is the latest of the current generation of continuous speech recognition packages to hit the dealers' shelves. Coming from respected speech technologists Lernout & Hauspie, it offers integration with Microsoft Word 97 and as well as dictation, offers sophisticated command and control facilities within Word. It can additionally read back text.



▲ YOU CAN CONTROL WORD, BUT NOT THE REST OF YOUR SYSTEM

I have to confess that I had some problems installing Voice Xpress Plus. It's best to install voice recognition software on the most powerful PC you've got; in my case this was an IBM IntelliStation M Pro, with a 266MHz Pentium II and 128Mb of RAM. It was running Windows NT 4.0 Workstation, but this is not a worry since Voice Xpress Plus supports it. However, the install crashed at the 85 percent mark, with a cryptic error message. The problem? It didn't like the IntelliStation's integrated Crystal Audio hardware. Not a big deal, but it should have checked for incompatible hardware before proceeding. I switched to a 200MHz Pentium MMX machine, with 64Mb of RAM running Windows 98. This had a SoundBlaster AWE64 Gold installed, which it liked and so installation proceeded smoothly. The first stage of configuring the program involves tweaking your audio hardware and setting microphone and volume levels. Voice Xpress Plus comes with the familiar Andrea NC-80 microphone headset: this has a bendy microphone boom which I had trouble getting to stay in the right position. I much prefer the old NC-50.

Recognition levels were acceptable, but it's hard to correct errors in Voice Xpress

In common with all voice recognition packages, you have to "enrol" your voice if you want decent accuracy. This involves reading some 225 paragraphs. Of all the voice recognition packages I've encountered, enrolling Voice Xpress Plus was the most tedious and frustrating. It had trouble identifying short words like "and", "at" and "I", yet it swallowed hard words like "paraphernalia" without blinking. Part of this was down to my "slow" P200MMX — it was fairly sluggish in general use and so a Pentium II is essential.The enrolment speech data then has to be processed, which takes about an hour. Except that mine bombed out after a minute. I'd run out of hard-disk space — okay, my fault; but the program should have checked before leading me down the garden path.

Once enrolment is complete, Voice Xpress Plus can be launched — a slow process. It's similar in many respects to IBM's ViaVoice 98: it has an auto-hiding toolbar at the top of the desktop and uses either a WordPad lookalike, called XpressPad, or Word 97. It copes well with number formatting — you don't have to say "pounds 45" to get "£45", you just say "forty five pounds". You do have to let it know when you're about to spell out a word, however, by saying "switch to spelling mode". Unlike ViaVoice 98, Voice Xpress Plus doesn't offer system-wide command and control. What it does have that the others don't is "Natural Language Technology", which lets you issue commands in several different ways, making for great flexibility. For example, if you select a word in bold and say "unbold that", it will understand you. Recognition levels were acceptable, but it's hard to correct errors in Voice Xpress: it doesn't, for example, throw up a list of potential matches. And you must spell out your correction into the dialogue box.

ROGER GANN

PCW DETAILS

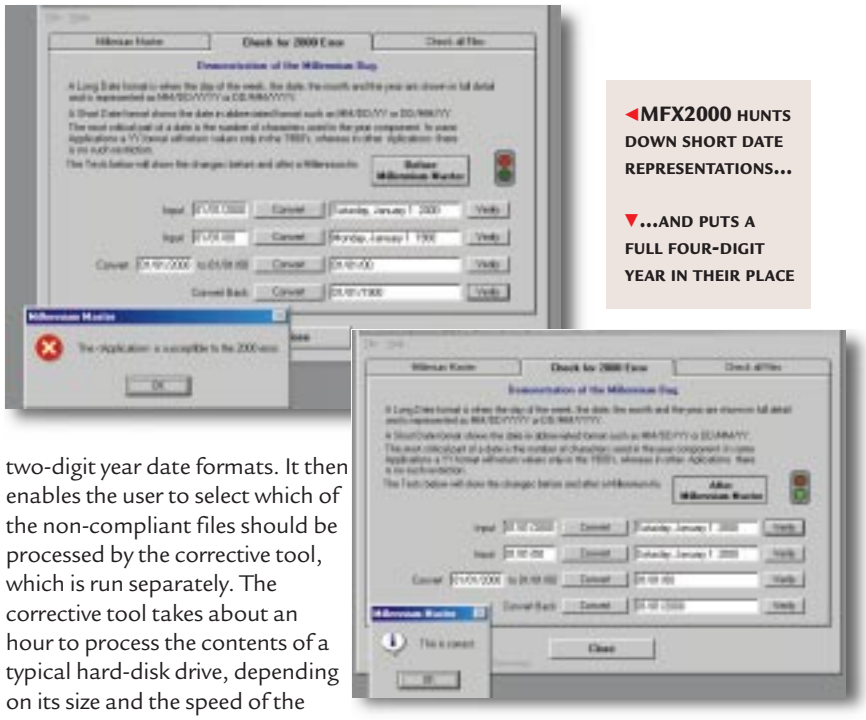
★★★

Price *£79.99 (£68 ex VAT)*
Contact *Lernout & Hauspie 0800 973365*
www.lhs.com
System Specification *Windows 95/98/NT4, P166MMX, 40Mb RAM, 130Mb hard-disk space, 16-bit sound card.*
Good Points *Cheap. Flexible command structure. Good format and control in Word.*
Bad Points *Can't control other Windows apps. Difficult to make corrections. Install program requires attention.*
Conclusion *If most of your work involves creating or editing Word documents, Voice Xpress Plus isn't bad. Otherwise consider ViaVoice98.*

MFX Research MFX2000
Millennium marvel

Year 2000 compliance is based on a four-digit year format, and MFX2000 delivers the goods.

MFX2000 is a Year 2000 solution with a difference. It focuses on where the problem with non-compliant date formats is at its most dangerous: in applications and their data files. The only guaranteed way of ensuring solid Year 2000 compliance is by forcing applications to use a four-digit year format, which is exactly what MFX2000 does.



◀MFX2000 HUNTS DOWN SHORT DATE REPRESENTATIONS...

▼...AND PUTS A FULL FOUR-DIGIT YEAR IN THEIR PLACE

As we all know, PC users are being bombarded with software that fixes a PC's BIOS. What many don't realise is that only a tiny minority of programs directly address the BIOS to extract date information — it's much simpler to do it at a higher level using operating system calls. However, even if your PC has a Year 2000 compliant BIOS plus an operating system which claims to be Year 2000 compliant, applications are still vulnerable because of the way they handle date formats in the first place.

Windows 98 and many applications use a method called "windowing" to avoid year inconsistencies. Windows 98 defaults to a hundred-year window of between 1930 and 2029 and so assumes that any two-digit year date, say "98", falls between 1930 and 2029 — in this case, it's assumed to be 1998. However, not all applications use the same window range and confusing results can occur. MFX2000 actually examines and modifies application object code and data files to convert date representation to four digits. Versions of MFX2000 covering Windows 3.x, 95, 98 and NT are available for standalone systems as well as network servers.

The software comprises two central applications: a diagnostic tool and a corrective tool. The former can scan individual files or the contents of a whole drive and report back which applications or files are using dodgy two-digit year date formats. It then enables the user to select which of the non-compliant files should be processed by the corrective tool, which is run separately. The corrective tool takes about an hour to process the contents of a typical hard-disk drive, depending on its size and the speed of the system, so it's an out-of-hours job.

MFX2000 as it stands is not a solution for the faint-hearted PC novice. It's a tool for reasonably knowledgeable system software maintenance staff. For example, there is an option to manually select dates identified at certain address offsets. Only someone with an in-depth knowledge of that application could make sense of this. However, a sanitised consumer version of MFX2000 is in the pipeline and should appear some time next year. Another point to note is that it's not recommended to selectively correct your system as applications may be interdependent. MFX2000 can't help if you store your dates in strings: unformatted dates in word processing files won't be corrected, for example.

Applications are vulnerable because of the way they handle date formats...

Ensuring that the year is internally represented by four digits is the only cast-iron way of guaranteeing Y2K compliance and so MFX2000 has to be a serious choice. We were worried that tinkering with application object code and modifying data files might be risky, but we had no problems, and MFX Research, the Australian developer, says that the independent NSTL test lab in the US has tested the software thoroughly with no major problems. As this is a professional product aimed at business users and support companies dealing with business-critical systems, the relatively high price is justified.

IAN BURLEY

PCW DETAILS

★★★★

Price *£210 (£179 ex VAT); multiple site licences available*
Contact *POW! Distribution 01202 716726*
www.pow-dist.co.uk
System Specification *386 or later, Windows 3.x or later, 4Mb hard-disk space, 4Mb RAM.*
Good Points *The most convincing Year 2000 fixer so far.*
Bad Points *Not for consumers — yet.*
Conclusion *An innovative solution for a tricky problem.*

ULead Cool 3D Version 2.0
Special effects

For web pages, presentations and the occasional doodling, these text effects will suffice.

THE RANGE OF DIFFERENT CLICK-AND-GO EFFECTS ON OFFER IS IMPRESSIVE

You don't have to be looking at a TV for long these days before being exposed to some kind of clever-looking 3D title winging its way across the screen. It may not convey any more information than plain 2D text, but it's hard to beat for sheer visual impact, and no self-respecting game show would be complete without an expensive computer-animated intro.

The biggest problem with creating any kind of 3D graphics is the sheer complexity of the whole enterprise. Creating 2D documents and images on a PC is relatively easy, as the computer's interface is also two-dimensional. Drag a picture up and to the left on-screen, and that's where it will be when you print it out or put it up on the web. However, manipulating 3D objects and scenes with a mouse and a keyboard is a lot less intuitive, which is why 3D graphics design is still a highly specialised field. You don't necessarily need a piece of general-purpose 3D design software to produce 3D text effects, though, and Cool 3D claims to do just that with the minimum of fuss (and skill). Ulead has achieved this simplicity by providing a library of objects, colour schemes, textures and effects that can be dragged to where they're needed from a preview gallery.

Cool 3D is a fun piece of software ... creating flashy-looking text is simple

Getting started with Cool 3D is about as easy as it could be. An icon on the toolbar brings up a dialogue box where you type in the text you want, specifying the usual properties like font and size, and it appears in the centre of the workspace window but as a 3D object to be manipulated rather than dull old 2D text. You can also import graphics in Windows Metafile format. Applying effects, textures and colours to the text is then simply a matter of browsing those available, and dragging to the workspace. The textures are mostly static, but a few are animated. You can easily import your own if the ones provided aren't to your taste, but the range included with Cool 3D includes all the usual favourites such as marble, wood and blue sky. The bevel selection is a range of styles that define how the characters have been "chiselled out" — how they appear in 3D. Again, there's quite a selection of these, and they can be combined with the textures to create user-defined styles.The text in the workspace itself can be moved around, rotated and resized easily using the mouse. The three axes of rotation are handled fairly sensibly, with the left mouse button combined with mouse movement controlling two of them, and the right button the third. It's not always this easy in some 3D packages, and it only takes a couple of minutes to get used to this system.

The best thing about Cool 3D is the animation, and Ulead has made creating moving text effects as easy as pie. First of all you select the total number of frames that you want for your animation. Next, you move the time-line slider to the next "key frame", which is a point in your animation where you want something to happen, and move, resize or rotate your text. The software then works out the intervening steps of the animation, producing a smooth transition.

Cool 3D is an easy-to-use and fun piece of software, and it makes creating flashy-looking text as simple as possible. While it's not clear how much use most of us have for this sort of thing, they certainly liven up web pages and presentations. In any case, the low price means that even if you only use it occasionally, you won't regret buying it.

DAVE MATHIESON

PCW DETAILS

★★★★

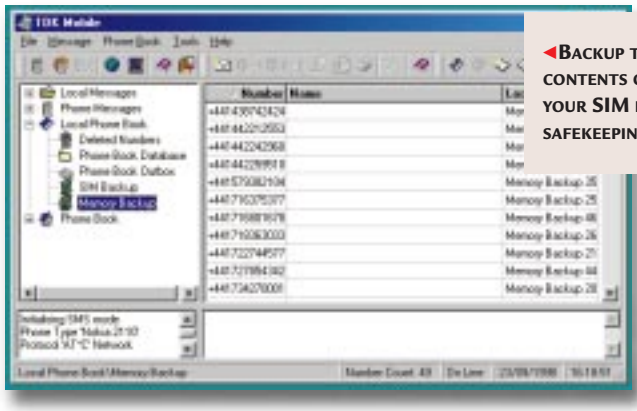
Price *£35 (£29.95 ex VAT)*
Contact *BIT 01420 83811*
www.ulead.com
System Specification *Pentium, Windows 95/98/NT, 16Mb RAM.*
Good Points *Very easy to use. Good range of textures and effects. Cheap*
Bad Points *Can only be used with text and Windows Metafile images.*
Conclusion *If you need text effects, this product is well worth it.*

TDK Global Pulse
Mobile phone software modem

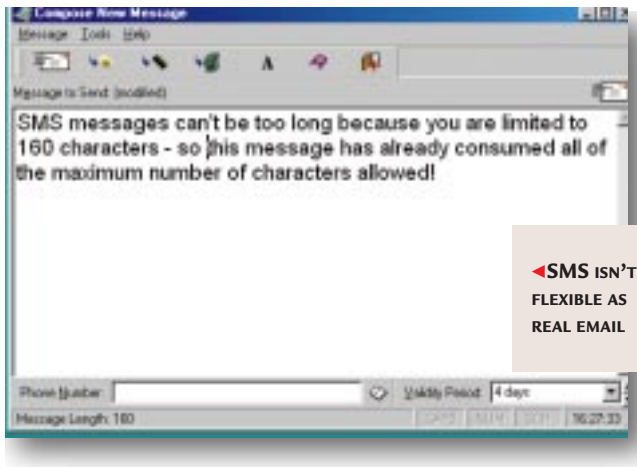
Harnesses the modem built in to the phone for PC comms applications like email and fax.

TDK Grey Cell is one of the first companies to sell a so-called software modem package for GSM mobile phone users. Its product, Global Pulse, connects a GSM phone to its host PC via a standard serial port — there is no need for a discrete "hardware" modem like a PC Card. This means PC Card slots can be reserved for other uses, and notebook users will benefit from a small but useful increase in battery life if no other PC cards are being used.

There has long been talk of replacing modem hardware with software. Originally, Intel's prediction was that 200MHz Pentiums would be able to run software DSPs (digital signal processors) which could emulate the functions of a typical modem and so lower costs. Even with 450MHz Pentium IIs now available, Intel seems to have gone quiet on that idea recently. However, there is one market which sees a lot of potential in a different kind of "software" modem — the mobile phone sector. Modern GSM phones are essentially specialised hardware modems anyway. They convert analogue audio (your voice) into digital signals and back again. Global Pulse effectively provides a way of harnessing the modem built in to the phone for PC communications applications, like internet browsing, fax and email. Hardware is, in fact, a critical part of the Global Pulse package. The only bit of hardware in the box is a serial port to phone lead which, incidentally, is specific to certain phone models. Older phones, like the ubiquitous Nokia 2110 we tested Global Pulse with, require a sophisticated cable which converts signal voltages between the serial port and the proprietary data port of the phone and identifies which phone model it is connected to. More recent phones are practically RS232 compatible and so the cable is quite simple, but all Global Pulse cables act as dongles, so the software is useless without an original cable. Dongles are rarely considered a good idea, but in this instance the plus side is that TDK Grey Cell can publish the latest versions of its software without the worry of piracy. This is just as well, because the original version 1.1 software we tried was pretty appalling. We'd vigorously encourage any existing Global Pulse users to download the latest version 1.4, which is very good.



◀BACKUP THE CONTENTS OF YOUR SIM FOR SAFEKEEPING



◀SMS ISN'T AS FLEXIBLE AS REAL EMAIL

Once installed, Windows modem properties reveals a Global Pulse modem entry. You must quit the main Global Pulse software application, called TDK Mobile, before attempting to go online. TDK Mobile integrates an SMS (short message service) client and a phone book. The latter can make backup copies of the names and numbers you have programmed into your phone, either from the phone's own memory or the SIM card memory which also contains your phone account details. It also serves as a convenient way to edit entries and enter new ones. A problem is that some older phones can't transfer names along with their respective numbers. The SMS client's message editor is easy to use and can also serve as an archive of your old messages.

Moderm GSM phones are essentially specialised hardware modems

If you already have a PC Card modem that's GSM-ready, Global Pulse is probably not for you. But if you've been thinking about getting a GSM-only card, you may find Global Pulse cheaper and its bundled software superior. TDK Grey Cell currently only supports Nokia GSM phones and branded derivatives, but other manufacturers are in the pipeline. A Windows CE version of Global Pulse has just been announced.

IAN BURLEY

PCW DETAILS

★★★★

Price *£116 (£99 ex VAT)*
Contact *TDK Grey Cell 0118 9216230*
www.tdkgreycell.com
System Specification *486DX, Windows 95/98, 8Mb RAM, 6Mb hard disk, 9-pin RS232 port, Nokia GSM phone.*
Good Points *Manages your phone's phone book. Helps preserve your notebook's battery.*
Bad Points *Only for Nokia phones so far.*
Conclusion *Ideal alternative to GSM-only data cards.*

Caere PageKeeper Standard
Document storage

Pan and scan: how Caere simplifies the daunting task of document organisation.

◄PAGEKEEPER SEAMLESSLY HANDLES DIFFERENT DOCUMENT FORMATS

The dream of the paperless office has been around for as long as the desktop computer, but as everyone knows, the amount of paperwork in the average office has actually increased as more people have access to PCs and printers. Scanners and OCR (optical character recognition) software mean that it's relatively easy to turn bits of paper into files that can be stored on your hard disk, but keeping track of the myriad different types of documents can be a daunting task. PageKeeper is designed to help you organise things by allowing you to store different types of documents together, convert scanned pages into word processor documents, and search for them based on categories and keywords that you provide, all within one application.

The basic premise behind PageKeeper is that you scan your pieces of paper, provide them with meaningful descriptions, let the software take care of any conversion, and use PageKeeper to launch the relevant application when you want to edit a document. Obviously, PageKeeper is designed to be used with a scanner, and you're prompted to select your model from an extensive list during installation. The scanner settings are then accessible from within PageKeeper, although the default settings bypass the scanner's default TWAIN pre-scan settings. On our system this proved a problem, as documents were scanned at far too low a resolution. However, the software installs a Control Panel icon that enables you to use the scanner's own front-end, which worked much better.

The main interface is split into two panes, with a standard folder tree on the left and contents on the right. PageKeeper's installation also scans your system for supported applications and provides icon shortcuts to those applications on one of the toolbars.

PageKeeper converts the document into a format that can be used by other apps

Importing a document is achieved by clicking one of three icons on the toolbar — from the scanner, disk and the web. Importing a document isn't simply a matter of copying a file into PageKeeper's workspace, as you could simply use Windows Explorer to do this. Instead, PageKeeper converts the document in the background into a format that can be used by other applications. For example, if you place a sheet of paper containing text in your scanner, it's OCR'd on the fly and a thumbnail is placed in the workspace. If you have Word installed, you can then select the document, click the Word icon in the toolbar, and it's opened as editable text. Similarly, clicking the Netscape icon opens the document as HTML, while Photoshop opens it as the original image file. This automatic conversion means that you don't have to worry about what type of document you're dealing with: you decide what you want to do with it, and PageKeeper worries about the rest. The OCR engine in PageKeeper does a reasonable job, as you'd expect from the makers of OmniPage, although some of the more advanced features, such as support for multi-column documents, are missing.

If you require this extra support, then PageKeeper integrates fully with OmniPage Pro 8.

It's one thing being able to store a whole range of documents, but another to find what you need. PageKeeper Find is a separate utility that enables you to search for text, either in the documents themselves, or in the titles or annotations.

Overall, PageKeeper works well, and the on-the-fly conversion is very powerful. This power comes at a price, though, and certain operations were accompanied by quite a bit of disk thrashing on our 32Mb test machine, which shattered the illusion of transparency between document types somewhat. More RAM would undoubtedly help in this respect, though.

DAVE MATHIESON

PCW DETAILS

★★★★

Price *£39.95 (£34 ex VAT)*
Contact *Caere 0171 233 6677*
www.caere.com
System Specification *486, Windows 95/98/NT, 8Mb RAM (16Mb for NT).*
Good Points *Powerful. Easy to use.*
Bad Points *Needs plenty of RAM for smooth operation.*
Conclusion *A very capable product for the asking price.*

West One Vanguard

Tested over twelve months

Reliable, well built and complemented by good customer support, the West One is a winner here.

Twelve months ago I needed to purchase a second computer. I wanted to buy a machine that I felt would be good value, well made and from a company I could have faith in. After much consideration and consultation, I purchased a West One Vanguard. It was a 200MHz K6 (which was fairly new then) with 32Mb RAM and it immediately outstripped the performance of my Escom DX50. The machine was also ordered with a tape drive, a network card and an AWE64 sound card. A Microsoft mouse, Fujitsu keyboard and 15in Iiyama monitor were supplied. West One builds to order, and the time from order to delivery of four weeks was explained and acceptable. All of the components were good quality and inside everything was neat, with all cables secured and tied back to allow access to all components.

Adding a modem and a second HDD was very easy, but unfortunately I have not been able to maintain the neatness of the cables since my tinkering!
The customer support line was helpful when I wanted to obtain an upgrade driver for the AWE64/K6 combination. I have had no reason to contact the company in the last 11 months, and apart from the occasional failure of the graphics card to start up first time, the machine has worked reliably at everything I have thrown at it.

I am still happy with the choice and the value of the purchase. A good machine, built well, from a company I would happily trust again.

DAVID BRIGHTON

PCW DETAILS

West One Vanguard

★★★★

Price *£1730.78 (12 months ago) (£1448 ex VAT)*
Contact *West One 0171 878 1900*
www.west-one.co.uk
Good Points *Good customer support. Reliable PC.*
Bad Points *The odd problem with the graphics card.*
Conclusion *A good buy.*

IBM 9507 10in colour TFT

Tested over eighteen months

The earth, we are told, is not flat, but the future of monitors may well be.

TFT flatpanel displays have been around for some time. They are most commonly seen on more expensive laptop computers, but as they are now being made in larger sizes and bigger quantities, prices are dropping and they are migrating to the desktop. The IBM 9507 was introduced in 1993 to complement the low-profile, energy-efficient PS/2E, and is comparable in size to a 12in CRT which, at the time, was still fairly common. It comes in three main parts, the first part being the panel, with a solid metal base and tilt/swivel stand. The second is a brick-sized black box, the power supply for the unit. The final part is a small, heavy, metal box which takes the analogue inputs of the VGA outputs from the computer and converts it to digital for the display. This adds to the general clutter of the display, as there are a lot of cables on show, but does mean that the power supply and converter box can be hidden, leaving a very slim and elegant main unit. In addition, the 9507 does not suffer the effects of magnetic fields, or give off any radiation.

At the time, the 9507 cost several thousand pounds, although recently I have seen it advertised on the net for about £400. Even so, the image quality, build quality and sheer appeal and uniqueness make it good value at twice the price. I'll take two!

ANDREW DEACON

Pictured: IBM's 14in Stealth flatpanel

PCW DETAILS

IBM 9507 10in colour TFT

★★★

Price *Currently available for about £400*
Contact *IBM 0870 6010136*
www.ibm.com
Good Points *Good looking. Low profile. Good image quality.*
Bad Points *Purchased new, it was expensive. A rather small screen.*
Conclusion *Fine flatpanel at a fair price.*

Winwriter 150C

Tested over thirty-six months

Easy to use, and with good software, Lexmark's colour inkjet is happily staying the course.

Purchasing a colour inkjet printer can be a tricky task. A plethora of products line shelves and making an educated choice can be complex. I settled on the Winwriter 150C from Lexmark for three main reasons:

- The two similarly priced alternatives (£299 then) failed to print demos and therefore could not be seen working.
- It came with a free copy of CorelDraw.
- Nobody ever got fired for buying IBM, and Lexmark was IBM.

An additional benefit is an excellent software package for controlling the printer. Through Windows 3.x it is easy to select from the range of options on offer (specifying paper type and image quality up to 600x300dpi), allowing the best possible output no matter what the medium used. On upgrading to Windows 95, the latest drivers continued to function faultlessly.

The Winwriter prints successfully on paper, card, envelopes and overhead transparencies. The colour is accurate but now looks slightly lacklustre compared to more recent models. The inclusion of a separate black cartridge alongside the colour cartridge guarantees a true black to all text. Full colour pages have a barely noticeable banding but this has not been evident on the black at all, despite my having printed full-page letters for banners.

The Winwriter is sturdy with an average footprint. Having put it through three years of heavy usage, I have learnt why the adage "nobody ever got fired for buying IBM" is true. I would certainly entertain the notion of another Lexmark inkjet should this one ever die.

PHILIP ROLT

PCW DETAILS

Lexmark Winwriter 150C

★★★★

Price *The 150C is no longer available, but Lexmark's range starts with the 1100 for £99*
Contact *Lexmark 01628 481500*
www.lexmark.com
Good Points *Excellent software.*
Bad Points *Starting to look a little dated.*
Conclusion *A real stayer.*

Agfa e1280 digital camera

Tested over nine months

Versatile and providing superb image quality, this digital camera is the focus of attention.

Buying the Agfa e1280 was a bit of a gamble at the time. I had never seen the camera, but reviews of its lesser cousins were good, the specification was outstanding, and the Agfa allowed me a full range of manual control with very high resolution. I'm a doctor, and I need a camera to take a variety of rather demanding images, ranging from close-ups of skin to X-rays and CT scans. There were one or two minor gripes. After paying out £725, it was annoying to have to go out and find a protective carry case — one should be provided for this sort of money. The control knob doesn't lock and turns too easily, and the plastic flap covering the sockets is badly designed and fragile. I was amazed that such simple design problems had not been sorted out before the product became available. However, the camera itself proved to be a joy to use, and the picture quality is remarkably good. Some adjustment to the image is often necessary, but this can easily be tweaked with the excellent software package to give outstanding results.

The main reason I chose this particular camera is a feature that hugely increases its versatility. It is, simply, a filter thread on the lens mount. This allows supplementary lenses and filters to be attached, and the addition of a macro lens, screwed into the filter thread, allows me to take really close close-ups of very tiny objects. This camera is easily the best available at a reasonable price, and is a truly wonderful piece of kit.

HR BAILLIE-JOHNSON

PCW DETAILS

RECOMMENDED Personal COMPUTER WORLD

Agfa e1280 digital camera

★★★★★

Price *£762 (RRP) inc VAT (£649 ex VAT)*
Contact *Agfa 0181 231 4906*
www.agfa.com
Good Points *Ease of use. Great functionality.*
Bad Points *No case supplied. Poor control dial.*
Conclusion *A winner.*

HP LaserJet 4L

Tested over thirty months

As a reliable, high-quality printer, the 4L excels.

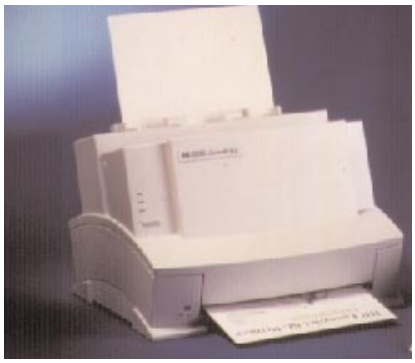
I was still operating a 486 DX2/50 in 1995 when I purchased my Hewlett-Packard LaserJet 4L for nearly £400. As the printer was approaching replacement there was no price drop; it was phased out and the 5L phased in.

The only fault I have ever seen has been an overly thick capital "A" in bold type on some TrueType fonts, rectified by switching to an equivalent hardware font on the printer. Being a writer now, the ability to print and forget is a luxury, and so far only one DTP project has been unable to cope with the 1Mb of memory.

One drawback is the paper tray: it holds 100 sheets of 70gsm paper which no-one uses in the office any more, or 80 sheets of the more typical 80gsm bond. The toner life is rated at 3,000 pages, but apart from slight fading due to a dying drum, the original cartridge had printed over 6,000 pages by the time it was changed. It may not be the most environmentally friendly solution, but the one-piece combined toner and drum cartridge is another unique selling point of HP printers — pull out, push in, one cost, no fuss. The average cost of the 4L's toner is now £50, giving 2p or 3p per page if measured across the six reams of paper. Since I printed double the rated toner life with a single cartridge, that cost barely measures a penny a page (0.0083p) and the printer has now paid for itself.

Not even Hewlett-Packard makes them like this any more, and I will be returning to HP without hesitation for my future colour inkjet printer if I can get anywhere near this level of reliability.

KENNETH HENRY



PCW DETAILS

HP LaserJet 4L

★★★★

Price *Replaced by 6L, £292 inc VAT*
Contact *Hewlett-Packard 0990 474747*
www.hp.com/uk
Good Points *Old-fashioned HP. Quality plus long toner life.*
Bad Points *Small paper tray for mass printing.*
Conclusion *Brilliant value for money.*

Pace 56 Voice (internal)

Tested over twelve months

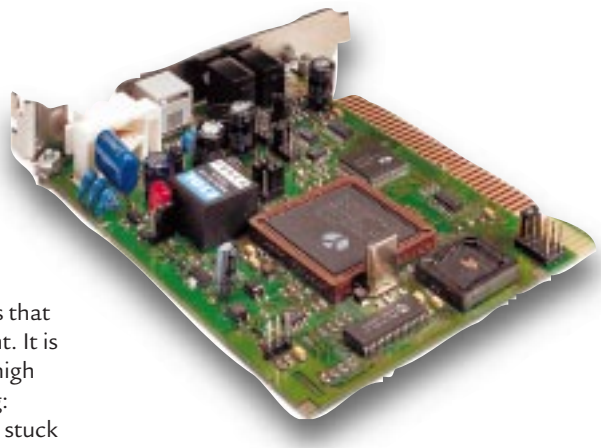
A modem with multiple uses and impressive speed can add to your surfing enjoyment.

Despite being an internal ISA card, the Pace 56 is easy to fit. Turn the computer back on, and Windows detects the modem immediately. Insert the supplied disk, and Windows sets it up. The Voice bit means that it can be used as a phone. The modem comes complete with connection leads so that you can link it to your sound card, or you can plug your mic and speakers directly into it. Using the supplied SuperVoice 2.2 software you can make voice calls using software that looks like a phone. SuperVoice can also turn your computer into an advanced answerphone, allowing you to set up multiple voicemail boxes for your family. It can send faxes by using the supplied driver that sets itself up as another printer. It works, but so does Microsoft Fax. The software occasionally jammed, and I had to reset my computer in order to make the modem hang up. Mainly it's used for accessing the internet. With a suitable provider I get a normal connection speed of 48,000bps. Not quite 56,000bps, but no 56K modem gives that. This is still faster than 33,600 and means that web browsing is more pleasant. It is worth remembering that the high speed is only for downloading: when you upload files you are stuck with 33,600bps. It makes web browsing faster, but still isn't as good as ISDN.

The modem's speed is brilliant, giving high-speed internet access over a conventional phone line. The SuperVoice software lets it down, as it keeps jamming. Using it under Linux, having solved the problems, showed that it has many uses.

ANDY FRASER

● *For details of Pace's latest voice modem, see the Modems & Comms group test, p208.*



PCW DETAILS

Pace Voice 56 (internal)

★★★★

Price *£169 inc VAT (£142 ex VAT)*
Contact *PMC 0990 561001* www.pacecom.co.uk
Good Points *Fast.*
Bad Points *Likes DOS too much. SuperVoice software.*
Conclusion *A good all-round modem.*

Cybernetics evoke visions of a distant future in which human beings have been relegated to a quaint reminder of the natural world. Christopher Rye looks ahead with Professor Kevin Warwick, leading light in the merging of man and machine.

The cyberman cometh

Welcome to the wired world of Kevin Warwick, Reading University's professor of cybernetics, occasional forecaster of the death of mankind — and the Man with the Chip in his Arm. "Cybernetics is all about humans and technology interacting," he explains.

The famous chip in question resembles a glass pill; much the same size and shape as a vitamin capsule, but not as good for you. "I'm an interface man," says Warwick. "The implant in my arm is an identifier. As I pass through different doorways, the building recognises me and lets me in. It's like a more permanent form of smartcard."

The professor's cyberpill contains three silicon chips and an electromagnetic coil to power them, which is activated by radiowaves from intelligent devices dotted about the cybernetics building. (An effect discovered by Michael Farraday many years ago.) The chip transmits a 64-bit signal. In some ways similar to the smartcard technology pioneered by the likes of Bull (now used by the French health service to allow patients to visit any doctor), Warwick's implant contains ID information, allowing him access to appropriate parts of the building. Hidden speakers greet him by name as he enters rooms, and the same technology can be used to activate facilities such as PCs, heaters and talking information points in accordance with his security clearance.

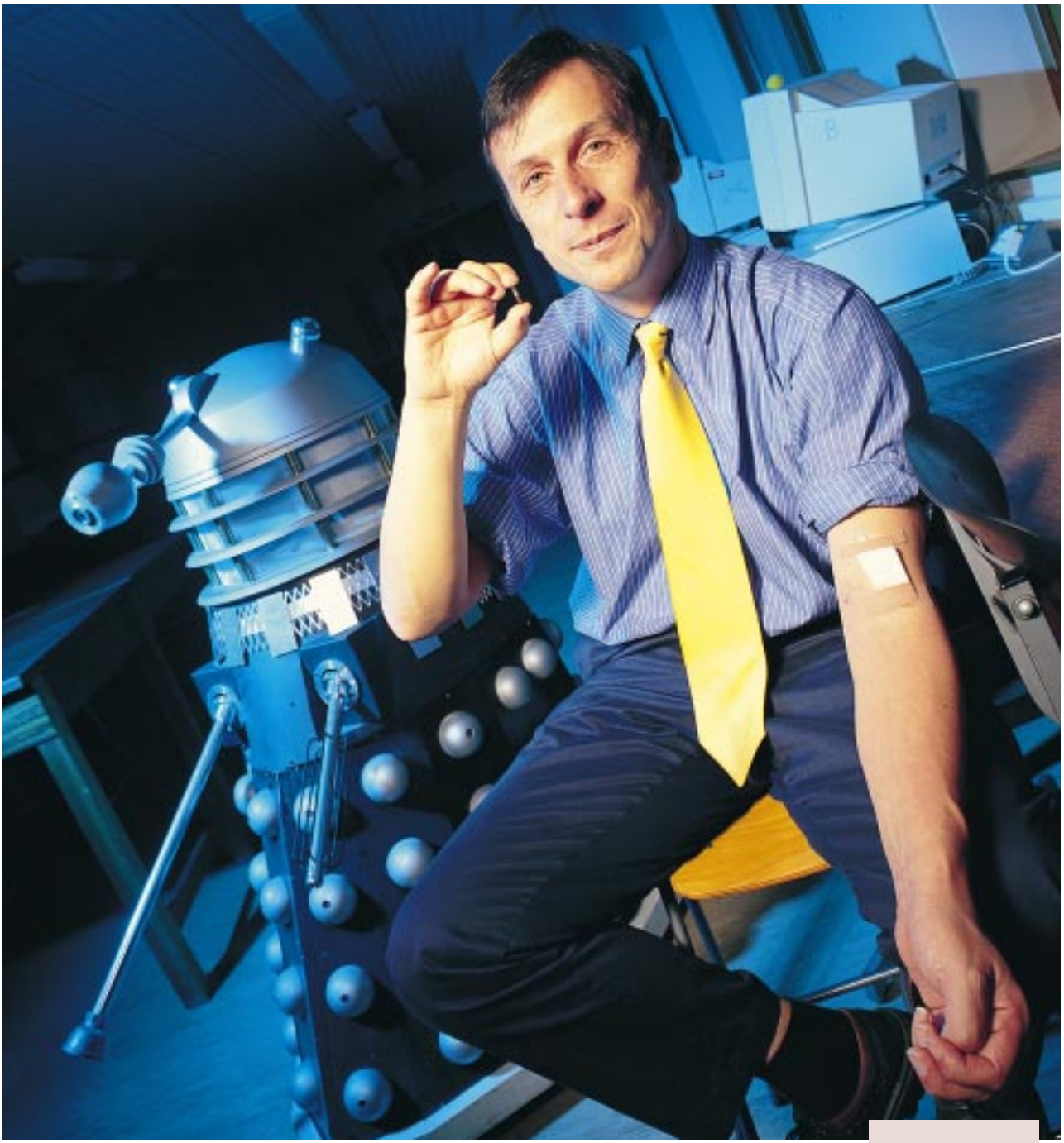
The implant in my arm is an identifier. As I pass through doorways, THE BUILDING RECOGNISES ME and lets me in. It's like a more permanent form of smartcard

In the short term, it's a cost-saving device, a security tag and an ID card, all rolled into one innocuous-looking capsule. It holds information like, Kevin Warwick comes from Coventry, the place people are normally sent to. He was born there in 1954. Appropriately enough, he held positions at Warwick University, as well as Oxford and Newcastle, before joining Reading a decade ago. This followed a spell with BT as a school leaver, then quitting to take a first degree at Aston followed by a PhD and research post at Imperial College, London.

And Professor Warwick is nothing if not a publicist, both for his own research and, to be fair, the work of the university and its students.

In the cybernetics laboratory are a Dalek (a roving fire extinguisher), a crouching robot cat and a cybernetic yo-yo machine. Quaint or not, the machines' young creators are researching the world around them as they play, and their attempts to create anthropomorphic devices may lead them to question whether machines should "ape" mankind at all. Nevertheless, these primeval-looking robots (and primeval is the right word) could be the forerunners of a new master race, if some of Warwick's more apocalyptic pronouncements are correct. None other than Gillian Anderson, of X-Files fame, has named Professor Warwick the leading prophet of the robot age, much to the delight of conspiracy theorists. What is certain is, he has become established as Britain's foremost proponent of artificial lifeforms and computer intelligence, predicting a grim future for mankind in books such as *March of the Machines* and his new title *In the Mind of the Machine*. Both deal with preparing us for a T2-style future in which super-intelligent devices have relegated Man to number two on the evolutionary scale, thanks to his own efforts. Man's, that is. Or perhaps Professor Warwick's?

"People have been talking about computers becoming more intelligent than Man for years. That's all sci-fi authors have been writing about. But no-one had blasted ahead and actually done it. Pushing back the frontiers of machine intelligence: that's what I'm doing today."



Photograph by Phil Curtin

▲**The Man with the Chip in his Arm: Professor Warwick believes that the implant 'is a step in the right direction of merging humans and technology'**

Part of Warwick's work is aimed at researching the implications of a future where intelligent devices, via networks, educate themselves and share information as a collective, but which respond to humans on an individual basis, thanks to what they've learned about us already, and ID devices such as the intelligent implant.

In fact, most of the elements Warwick has been "warning" us about for years are now in place: the internet, intranets and extranets; mobile devices, and technologies such as neural networks (which learn from their mistakes), intelligent agents and chatterbots (web-based software robots you can converse with) already roam the network. All that is missing is for the machines to begin teaching each other, and take over the burden of designing their replacements.

"We've already built an autonomous, roaming robot which updated an identical robot in New York via the internet with what it had learned about its environment. The beginnings of machine conversing independently with machine are here today. The implant is a step in the right direction of merging humans and technology," he says.

The "right direction" Warwick refers to is his research into a more seamless interface between man and machine, such as his experiments with intelligent buildings. These buildings could include your home and/or office , and are part of a Europe-wide programme the University is leading. Intelligent buildings know your name and your location, and share data from one device to the next via an internal network or intranet, allowing them to interact more closely with us (on a first-name basis) by understanding our needs or preferences.

Just imagine for a moment that your office or home is more intelligent than you are.

You stumble in after a night on the town and try to locate the light switch, only to find a message saying, "Your dimmer's in the dog".

"The short-term question is, why have separate networks?" says Warwick. "We have a phone system, TV and radio, the internet offering pseudo real-time pictures... it's no longer feasible. Meanwhile, your PC sits there, inanimate: you have to sit at it and type into it. But if you have an in-built interface with it, like this implant, you could simply write letters in the air, which your PC could interpret and type for you. It's intuitive computing, not typing."

But Warwick's motivation, he says, is to knock down the physical barriers between Man and machine, so when the day comes that computers finally overtake Man in intelligence (some estimates put it at 10 years, others say it's already happened), we will have far greater control over them by having a direct link at biological level – part of us will be machine.

"I believe the human brain is just a physical thing," says the professor. "I'm not someone who believes there's a magic bit of 'oofle dust' that makes us conscious, so there is no reason why machines should not be more intelligent than us very quickly. It's a matter of processing power.

"And ultimately, our thought processes may control our computers. Our DNA, our genes, that's just our initial programming. Our earliest childhood experiences add a little more. There's nothing else to it."

But even if you accept this reductive view of human life (which has the advantage, for scientists, of permitting every type of research), surely implanting technology into the brain is the ultimate intrusion into people's sense of privacy and identity? Could a computer, for example, understand the difference between our everyday thoughts and our fantasies?

"Obviously," says Warwick, "there's the Big Brother problem of the whole process going the other way – of the network reading people's minds. But the mistake people make is in assuming computers have to be implanted into the brain. You could implant them anywhere."

BT's "futurologist", Ian Pearson, has talked about complementing our "limited" human intelligence with microchips. But, do we know enough about the way the human mind works to contemplate this level of interaction?

"We need to know enough medically to make the implant. My chip, for example, had to be put in by a doctor during a surgical operation. People don't necessarily want that. It's also made of glass, and there's a risk it might start moving around in my body, so it has to be taken out.

"But a lot of this research is happening outside cybernetics, such as experiments into 'rewiring' the nervous system for people who have been incapacitated by a serious accident. We can teach these people to use their bodies in new ways, such as how to operate an artificial arm with muscle movements."

Disability is a favourite theme. Here is a market for more creative uses of Warwick's intelligent-implant technology. Intelligent implants, smartcards or even tags could quite literally open doors for people, and at least part of the intelligent-buildings research proposes interactive signs that light up and speak as you pass.

It's encouraging he accepts that using an implant as both ID and tracking device is a far more attractive proposition to the type of corporation (or military concern) that often stumps up the cash for research.

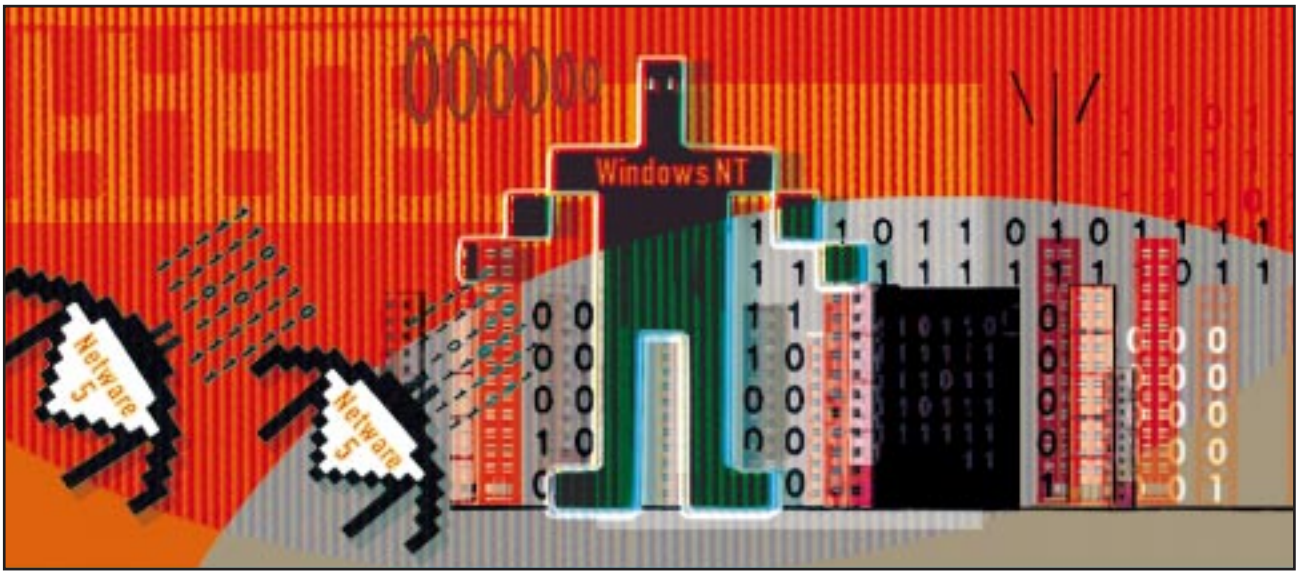
A speaker at the recent TUC conference complained about helpdesk operators being enslaved to the technology, forcing them to take call after call. Companies can already monitor their employees' PC keystrokes. But many advances in computing today are democratic ones – the PC, the internet, even the mobile phone. The Prime Minister has talked about an "online democracy". So isn't the professor concerned his research could lead to less democracy and less equality, by putting greater instruments of social control in the hands of business?

"You're right there could be big positives for business in the beginning. They would be the first adopters and they may use it to control their staff. But I, as an individual, only saw the positive for other individuals. That there had to be some benefit for the rest of us." So is big business or the military funding his experiments? He looks sheepish. "We have our fair share of, er, little windfalls," he laughs. "I have to be careful what I say about these things. But I can put my hand on my heart and say, no, the military hasn't funded this project." Back in the laboratory, he demonstrates Roverr [sic], a robot on wheels that resembles a collision between a bicycle and a dustbin. It was designed by one of his undergraduates to run the Bracknell half-marathon by following in the professor's footsteps as he ran ahead wearing an ultraviolet-emitting belt. Unfortunately, the student hadn't banked on sunshine confusing the robot's UV sensors. "It followed the sun, rather than me, and crashed into the pavement," says Warwick.

Maybe the future is in safe hands after all.

The human brain is just a physical thing ... so there is no reason why machines SHOULD NOT BE MORE INTELLIGENT THAN US very quickly

● Kevin Warwick's *In the Mind of the Machine* is out now in paperback, published by Arrow.



A tale of two servers

TERENCE GREEN COMPARES THE NEWLY RELEASED NETWARE 5 WITH WINDOWS NT 5.0. WHICH ONE WILL BEST SUIT YOUR PURPOSES?

Suddenly we are spoilt for choice. Less than a month after Microsoft released the second beta of Windows NT 5.0, Novell shipped its NetWare 5 and IBM is preparing to ship Warp Server 5 next spring. A little over a year ago, the situation had seemed cut and dried. Novell had been losing money, NetWare was history, and Windows NT was moving on to put Unix in its place. Now, the situation has changed. Unix is not only holding its own, but is also beginning to look interesting, even to long-time Microsoft partner, Intel. But NetWare is a real turnaround tale. Dr. Eric Schmidt, formerly of Sun, moved into the hot seat at Novell, and within a year the company had moved back into profit and released a string of innovative new products. Now it has come up with a new version of the venerable NetWare server that runs Java and native IP. The timing isn't brilliant, though. With IT managers worrying about the introduction of the Euro on 1st January 1999, and the Year 2000, major customers are not going to be in a hurry to deploy new server operating systems. However, given the likelihood that Windows NT will not ship before mid-1999 at the earliest, NetWare 5 has at least a year's grace — and it is Year 2000-ready. During this time it can travel along "shakedown street", clearing those troublesome bugs that appear when a major product hits the market, regardless of the amount of beta testing that has taken place beforehand. Which is where Windows NT 5.0 comes in. The beta 2 (released last August) is, apparently, virtually feature-perfect except that Microsoft's Bill Gates does not reckon we will see it in the shops until mid-1999. Nevertheless, Windows NT 5.0 beta 2 is out at the same time as NetWare 5; so do we wait for NT 5.0 or go with NetWare 5 available now?

Illustration by Rachel Oxley

It is necessary to draw a distinction between Windows NT 5.0 Server and Windows NT 5.0 Workstation. One product, two versions? Not quite. The Workstation version might be built on the same kernel as the server, but you get more server features with Windows NT 5.0 Server. NT 5.0 Workstation will probably be a useful workgroup server in a small office network, but it is already possible to describe it, even in beta, as an excellent desktop operating system. It blows the socks off Windows 98 in terms of stability and reliability.

File server or print server?

Network servers can be divided into file and print servers, and applications servers. In the file and print market, NetWare 5 and Windows NT 5.0 have pretty much the same objective: to be the server of choice for Windows clients, since these

dominate the desktop. Novell pays more attention to Windows 3.x clients than Microsoft, whose gameplan is to focus on the 32-bit Windows desktops — Windows 95, 98 and NT. In the long run, Microsoft hopes to make NT Workstation the premier business desktop, and Windows NT 5.0 begins this process by providing far better management services for NT Workstation than it does for Windows 9X.

NetWare's file and print reputation is built on years of proven performance and reliability, but it was becoming long in the tooth. With NetWare 5, Novell has updated the backup system and produced a new 64-bit indexed file system (NetWare Storage System, or NSS) that, like Windows NT's NTFS file system, supports huge amounts of storage. NSS supports file sizes of up to eight terabytes and breaks the link between RAM and storage capacity that exists in the old NetWare file system, where more RAM had to be added as the amount of storage increased. NSS also mounts and dismounts drives very quickly and, as a journalled file system, it can quickly recover from a system crash by unwinding any uncommitted changes. Support for removable drives and autochangers has been updated, and Novell's backup tools have been replaced with a new utility that is backwards compatible with the NetWare file system. Backup includes agents for Windows 95 and Windows NT clients at the server.

NT 5.0 also has an updated file system with improved performance, and NTFS now supports dynamic volume management, file encryption, disk quotas [Fig 1], a defragmentation utility and a link-tracking facility that can help locate broken Windows shortcuts. A hierarchical storage system enables data to be aged and archived offline. Microsoft's own distributed file system is included which enables multiple drives to be presented as a single, logical sharename. This major new server-orientated feature in NT 5.0, which NetWare 5 lacks, will prove most useful to larger organisations with many users accessing multiple shared drives for which they wish to provide load balancing and resilience. Dynamic volume management enables disk volumes to be re-sized online, and disk quotas enable the use of shared drives to be monitored and restricted. NetWare has always supported disk quotas, and volumes can be enlarged online.

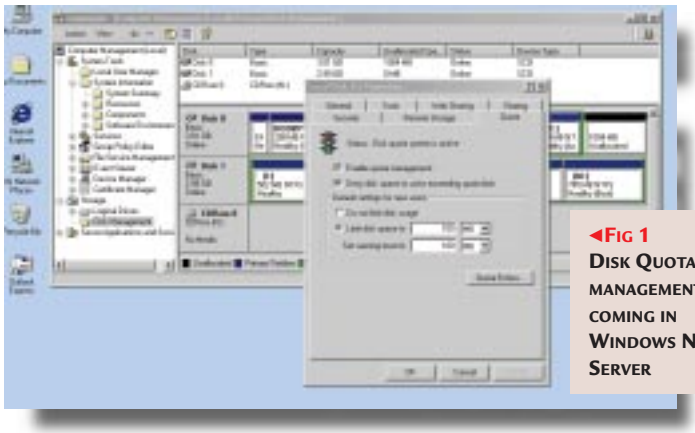
NT 5.0 Workstation

Microsoft is pushing NT Workstation on the business desktop, primarily to implement a bunch of money-saving desktop and software management technologies which cannot be fully implemented in Windows 98. NT forces a user to log on with a password; Windows 98 doesn't. NT has a file system (NTFS) which supports access controls; Windows 98 doesn't. These are the basic reasons, but NT Workstation also has two great advantages over Windows 98: stability and reliability. And it supports symmetric multiprocessor systems. NT 5.0 Workstation will support the same age of hardware as Windows 98 now does, and by means of a device driver model common to both operating systems, will enable peripheral manufacturers to deliver drivers for both, simultaneously. This has been a problem for NT 4.0 users who have often had to wait for drivers, or go without and boot into Windows 95 or 98 to use some peripherals.

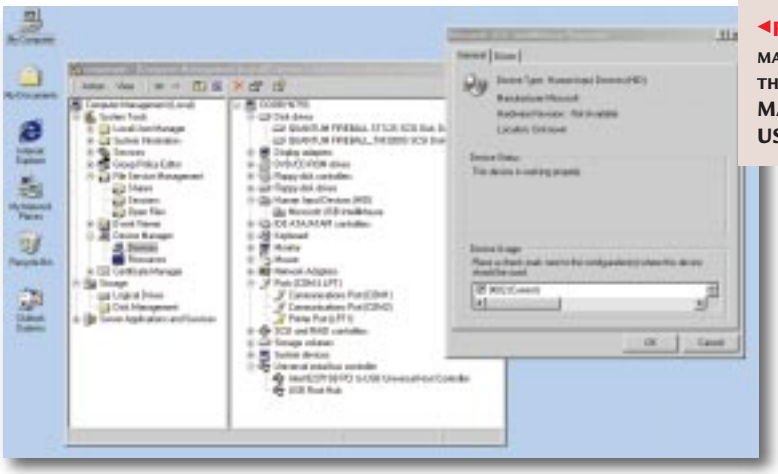
Windows NT 5.0 beta 2.0 is out at the same time as NetWare 5.0 SO DO WE WAIT FOR NT 5.0 or go with NetWare 5.0 available now?

The new peripheral support in NT 5.0 is great. When we installed a Diamond Monster 3DII graphics card and a Diamond Sonic Impact PCI sound card in a PC running NT 5.0, they were automatically detected just as they are in Windows 98. But, DirectX 6 support in NT 5.0 beta 2 is not yet complete and the drivers had to be manually installed. Currently, DirectX is seen as games-orientated, but once it ships in NT 5.0 it will enable business applications to add audio, graphics and video to the mix — for example, in conferencing, training and support applications.

All the new hardware devices such as DVD, IEEE 1394 (Firewire), Device Bay and Universal Serial Bus (USB) will be supported in NT 5.0 [Fig 2, p129], removing at a stroke a major dis-incentive to adopting Windows NT 4.0. USB is particularly important as it allows multiple USB devices to be attached via a single port or hub and they are self-configuring. We found it easy to attach and use a Microsoft USB keyboard and mouse.



◀FIG 1
DISK QUOTA MANAGEMENT, COMING IN WINDOWS NT 5.0 SERVER



◀FIG 2 HARDWARE MANAGEMENT WITH THE COMPUTER MANAGER SHOWING USB SUPPORT

One of the main bugbears with Windows NT 4.0 is its lack of hardware support for mobiles and power management. NT 5.0 supports Advanced Power Management (APM), Plug and Play, PC Card (ex-PCMCIA) and Infra-red, and the Advanced Power and Configuration Interface enables the operating system to manage power and device configuration. It's a better option than leaving it to the BIOS, as happens with APM and Plug and Play. As they are based on the same code, Windows NT 5.0 Server shares all of the hardware support of the Workstation version. The same goes for the updated user interface, the new wizards which step through hardware, printer and network connection setup, and the Computer Manager which collects all the local management tools under one roof. The wizards make life easier for new users at the expense of a few extra mouse clicks [Fig 3]. Those familiar with NT 4.0 will have to spend a little time un-learning the old ways, but the reward is far fewer configuration operations which trigger a system reboot.

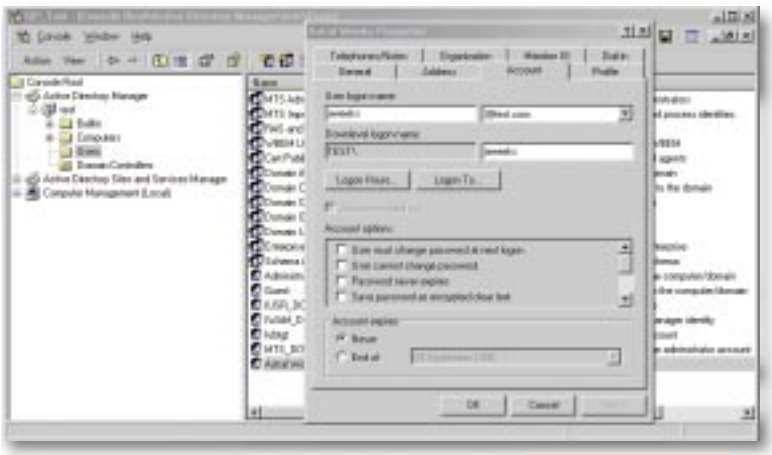
The new user interface includes a bunch of web-based navigation features, special folders for Recent documents and a much-updated search function. The Start menu now remembers your most-used applications and puts them in a quicklist. Document types are automatically associated with applications as you use them, and the Start menu even works out which applications you use most and puts them at the head of the menu.

Mobile users will love the encrypting file system. It's not really a server feature, as servers should be protected from unauthorised access, but there are utilities which allow NTFS disks to be read on any desktop or client that can be booted from a DOS disk. If your laptop is stolen and you had the foresight to encrypt your confidential files, you can sleep easy.

Laptop users will also be able to work offline more easily thanks to client-side cacheing and the Synchronisation Manager, which replaces the largely useless Briefcase. Synchronisation Manager replicates network files to local drives for offline working, and synchronises them when next connected to the network. In short, Windows NT 5.0 Workstation fixes Windows NT for desktops and laptops. It's a shame Microsoft cannot ship it now and let Windows NT 5.0 Server come when it may.

NetWare 5

NetWare 5 is the first version to support native internet protocol (IP) networking. NetWare 5 can run an open-standards IP-only network without a hint of Novell's proprietary IPX network protocol, or it can coexist with IPX. NetWare 5 also includes a Java environment, a Java-based administrative console called ConsoleOne [Fig 4, p130], and a standard set of internet services including



▲FIG 3 ADDING A NEW USER IN THE MICROSOFT MANAGEMENT CONSOLE

Netscape FastTrack web server and Netscape Communicator web browser. For management, NetWare 5 includes a subset of the Z.E.Nworks suite covering software distribution and workstation management. The full suite costs $39 per client and has desktop asset management and administration, and helpdesk tools.

The new kernel of NetWare 5 supports multiprocessor systems [Fig 5, p130] and virtual memory, enables server applications to be prioritised, and allows applications to be loaded into protected memory (Ring 0) where, if they crash, they cannot affect the core server processes. Hardware detection at installation time, and support in general, has been enhanced. Also, the old monolithic storage and network drivers have been shunted aside in favour of the Host Adapter Module (HAM) introduced in NetWare 4.

The major new advance is support for Hot Plug PCI. NetWare 5 implements its core services, including NetWare Directory Services, via IP, but compatibility with NetWare 4.x and 3.x networks running IPX is provided though gateways. Novell's IPX-based Service Address Protocol, which advertises the presence of NetWare services to client workstations, has been replaced by a new Service Location Protocol based on IP standards. This enables NDS to be used to authenticate logins on intranets, extranets and the internet. Secure Authentication Services for NDS provides secure internet communications via the Secure Socket Layer and a framework for extending the cryptographic services when emerging internet standards, such as the public key infrastructure, are settled.

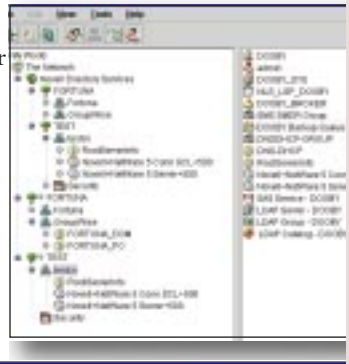
Domain Name Server (DNS) and DHCP (Dynamic Host Configuration Protocol) IP services are integrated with NDS in NetWare 5, along with a Catalog service which maintains a global database of IP names and host addresses. The catalogue can be queried by users or applications and can be used to control access to the network, based on IP addresses.

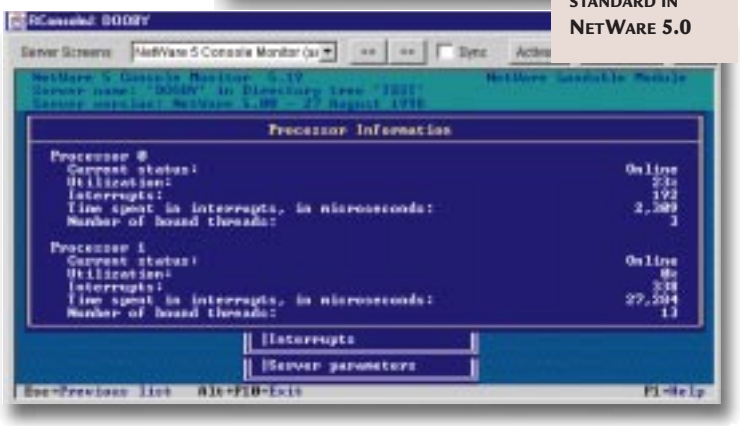
NetWare 5 includes a Java Virtual Machine and a Java development environment. Novell is betting the business on Java and this has two implications. At last, it's providing Novell with a credible applications strategy at the expense of being less mature and less widespread than Microsoft COM. And it also means that you now need a lot more memory on the server because the new storage system can cope with huge amounts of storage. With no more than 32Mb RAM, the Java environment means that you need at least 64Mb in a NetWare server. Novell is weaving Java into the fabric of the NetWare 5 server with NetWare services accessible through Java via published APIs, JavaBeans for NetWare, and a CORBA-compliant ORB (Object Request Broker). Scripting in JavaScript, Perl 5 and Novell NetBasic interpreter will also be supported.

Java is a fine match for NetWare because it provides the missing applications environment. But it also enables network application developers to provide cross-platform components which will run on many platforms, not only on NetWare. Beyond that, NetWare provides an additional benefit which will become increasingly important as extranets become widespread. Because NetWare 5 NDS is accessible through any Information Provider connection and can authenticate access to applications, companies can provide business partners such as suppliers and customers with selective, authenticated access to their internal applications.

Windows or NetWare?

The industry perception is that NetWare is the premier file and print server while Windows NT's forté is as an applications server. Windows NT 5.0 is certainly going to prove that. It would take an entire issue of *PCW* to explain the wealth of applications server features in NT 5.0 and the heavy focus on web-based applications backed up by transaction services. It's all good stuff, and there's an enormous amount of cross-support for the 32-bit Windows desktop [Fig 6, p132]. NT 5.0 also places a heavy emphasis on communications services and security. And, of course, Windows Terminal Server, a centrally-managed applications server for Windows-based terminals, is included.





◀ **FIG 4** NOVELL'S NEW JAVA-BASED CONSOLEONE ADMINISTRATION UTILITY WORKS WITH NETWARE 5 AND EARLIER VERSIONS

▼**FIG 5** MULTIPROCESSOR SUPPORT IS STANDARD IN NETWARE 5.0

The worry is that the more you invest in the Windows platform, the more you need. Take desktop management and applications distribution. NetWare 5 gives you basic facilities for Windows clients in the box with Z.E.Nworks Lite. If you want more, you can add the full Z.E.Nworks or purchase a third-party management application. If you also want to

Microsoft's current NT 4.0 Workstation business push

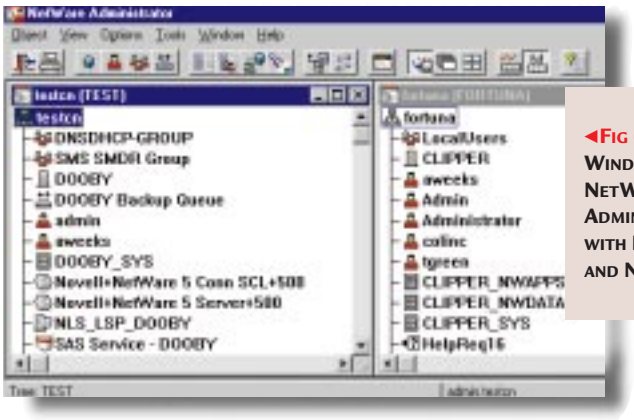
If you haven't used it before, now is a good time to investigate Windows NT because Microsoft is currently promoting NT 4.0 through a number of special pricing and upgrade offers. For the cost of a phone call you can try out Windows NT 4.0 Workstation with the Business Readiness Kit CD. It includes a 120-day free trial version, new device drivers and updates, evaluation tools, and white papers. The Kit explains how Windows NT Workstation outperforms Windows 98 on the same hardware, and how it is the best client for both Windows NT Server and NetWare.

manage your Windows NT Servers through NetWare, you can invest in Novell's NDS for NT. These products are available today and they are all integrated with NDS.

At present, in order to do the same with Microsoft products, you have to follow the Zero Administration for Windows (ZAW) Kit guidelines (which work best if your client desktops run NT Workstation) and purchase Systems Management Server which includes Microsoft SQL Server. And, you may need to purchase another PC server to manage the load. Or you wait until NT 5.0 ships and install IntelliMirror, as the ZAW tools will be called. To provide a complete management solution, you must purchase System Management Server because, according to Microsoft, "machine objects and inventory do not benefit from being stored in a directory" (i.e. Active Directory). This seems to go against all of the claims for Active Directory, which Microsoft says is "the ideal long-term foundation for...common management of network resources".

Microsoft's strategy isn't really a secret — it would prefer you to have an all-Microsoft network from the desktop to the servers. But Novell has twice the installed base, so the company provides coexistence. Microsoft can also provide options for everything you need in the way of additional services to run your network the Microsoft way — groupware and messaging, proxy services, management, connectivity, database, web services, and applications.

Novell, with no desktop operating system or desktop applications, focuses on networking and associated services so they provide good support for the dominant Windows desktop client. NetWare 5 also integrates well with Windows servers, provides basic management services in the box, and communications support for WAN and internet connectivity. Additional management services and network applications



◀FIG 6 THE 32-BIT WINDOWS NETWARE ADMINISTRATOR WITH NETWARE 5 AND NETWARE 4

for messaging and groupware and for firewall/proxy services are available from Novell or third-party suppliers. A Netscape web server is included with NetWare 5 and a five-user version of the Oracle 8 database is free.

Unless you have hundreds or thousands of client workstations, the purchase cost is a minor proportion of the overall cost of setting up and running the network. Novell's pricing is based on the number of clients. You purchase the base product for "x" number of clients and then purchase additive client licences as necessary. Clients can access any NetWare server provided its client count has not been exceeded. Microsoft has a more complicated arrangement where client access licences are required for each Windows NT Server to which it will connect.

Novell provides the basic building blocks for a network which YOU CAN GROW INCREMENTALLY. Microsoft provides a jumbo pack of building blocks...

Conclusion

It is up to the individual to decide which suits them best. Novell provides the basic building blocks for a network which you can grow incrementally. Microsoft provides a jumbo pack of building blocks in a single package. Both platforms provide communications services and offer messaging groupware, firewall/proxy services and network management as extras. Both platforms are supported by a good range of network applications. For the company that needs a network server today, detailed comparisons taking into account what NT 5.0 will do in a year's time are a bit pointless. There is no saying where NetWare 5 will be in terms of comparable features by the time Windows NT 5.0 Server ships. As far as the client desktop is concerned, NT 5.0 Workstation cannot ship too soon: it's the Windows 98 you always wanted.

Novell NetWare 5 and Windows NT 5 recommended system requirements

	NetWare 5	NT 5.0 Server
Processor	Pentium 100	Pentium 166
RAM	64Mb	128Mb
Hard disk	1Gb	1Gb
Available	Now	mid-1999
Supplied by	Novell	Microsoft
Phone	01344 724100	0345 002000
URL	www.novell.co.uk	www.microsoft.co.uk

Prices (street price from Action Online www.action.co.uk):
NetWare 5. (five-user version) £550;
Windows NT 4.0 Server (five-user version)* £570
**Windows NT 4.0 is the currently available version*

Illustration by Cyrus Deboo

Net profit

AN ESSENTIAL BUSINESS TOOL OR A TECHNOLOGICAL INDULGENCE? NIGEL WHITFIELD LOOKS AT MARKETING ON THE INTERNET AND AT HOW THE SMALL BUSINESS CAN GET THE BEST VALUE FROM GOING ONLINE.

SOME ESSENTIAL ADVICE ON INTERNET MARKETING

Marketing on the net is still pretty new, and there's no definitive answer to many questions, but here are some guidelines that will help make sure you fit within many of the accepted conventions. You don't have to follow them, but if you don't, at worst, you'll incur the wrath of many users; and at best, people will find it harder to access you via the net than they need to.

☛ **Always ask permission** before adding an email address to a list. If you request addresses on your web site, don't add them to a list by default. It's better to have a box unchecked, and ask people to check it if they do want to receive email, than to assume the reverse.

☛ **If you collect data** about visitors to your site, make sure you register with the Data Protection Act.

☛ **Keep emails that you send out** telling people about your web site or your services brief, and always include information near the top to explain to people how they can make sure they don't receive any more messages. If you have a lot of information, it may be best to send a brief message with a pointer to a page on your web site.

☛ **No matter how useful** you think it might be, don't send people email with attachments. Some people won't be able to use them, and others will simply delete messages in case of viruses. Use plain text instead.

☛ **Be very careful** about how you promote your web site in newsgroups. If in doubt, simply don't do it. Read the group's charter before posting, and make sure any announcement is relevant to the group, brief, and not too commercial. Flooding discussion forums with adverts is a good way to generate complaints, not business. A short signature on postings is less intrusive.

☛ **Never, ever** use bulk emailing programs. They're offered on the net, with millions of addresses, and most of those won't be suitable.

☛ **Keep it simple.** Multimedia and fancy graphics can spice up a site, but if they take too long to download, people won't bother. Many site visitors will want to know basic info, like phone numbers or prices. Make it easy and quick to find.

PICK UP THE LEAFLETS FROM ANY INTERNET SERVICE PROVIDER that's trying to attract business customers, and you'll read lots of information about how the internet can be an essential part of your business. But what does that really mean? Is it just the usual fatuous waffle that marketing people use when they want to sell you something, or can the internet actually be a good tool for marketing your business? And how do you go about it?

More importantly, how can you do all this without upsetting people ? The internet can certainly be a useful tool, but many of its users are also extremely reluctant to let it become excessively commercialised. Careful planning, therefore, is necessary if you don't want current and potential customers to end up with the wrong impression. Perhaps one of the most important things to remember about internet marketing is that anyone can do it. Although it can cost a lot to have a professionally designed web site — some industry figures put the amount spent by the BBC on its online presence at tens of millions — you can also have a presence for much less, and you don't need to invest in high-speed links to the net. For a small business, in fact, you might not even need a computer and modem in the office, although obviously being able to send and receive email will help tremendously in dealing with your clients.

A web site is the obvious presence to have on the internet; for many people wanting information, it will be a logical first point of call when they want to know about your company. It's also your

online brochure, a first stop for many people, so it pays to make sure that it's easy to use and answers more questions than it raises.

There are other ways of using the internet too. Email is even more widely spread than the internet, with many people having access to it

The time spent creating an impartial and up-to-date guide to a relevant topic COULD WELL PAY DIVIDENDS if it allows you to persuade magazines to feature your pages

that can't see your web pages. A fast response to email enquiries can help keep customers happy or remove pressure from the front desk. And with the right services from an internet provider, you don't need to dial up every hour to check for new mail. Companies like Direct Connection, for instance, provide a range of services, including auto-responders, so that you can have an address such as "brochure@mycompany.com" which will automatically return an electronic brochure in response to enquiries. Email can also be used — carefully — as a means of promoting your company or encouraging people to visit the web site. Many shops that sell online, for instance, allow you to register and receive notification of special offers. Don't confuse this type of marketing with the spam, or unsolicited commercial email. Sending blanket messages to every email address that you can find will quickly alienate potential customers, and may even result in your Internet Service Provider cutting you off.

Using email can be positive. You can keep people up to date with new products, changes to your web site, special offers or important information, and again some ISPs will be able to run a mailing list on their servers for you, saving you from doing much of the work. There are even some packages available for the PC now that will do the equivalent of a personalised letter via email too. If you go down this route, though, it's important to strike the right balance. Sending out a message every time a minor change is made to your web site will annoy people pretty quickly, and they'll simply ask to be removed. It's far better to send out useful information occasionally rather than bombard people with small snippets. Bear in mind, too, the comments in the "Essential Advice" box on page 135. Simply because someone puts an email address on their business card, or sends you a message, doesn't mean that they're happy to have marketing material sent to the same address.

Forward planning

If you want people to access your business via the internet, it needs to be simple to do and easy to find. Planning is essential: from choosing a provider who can offer the facilities you need, to working out a web site and how people will contact other people through that site. For example, what are the main things your company does? Do you want a general email address for all enquiries, like mailto:info@yourcompany, or would it make more sense to have an email address for each product? Key departments, such as sales, support and accounts, may need their own address, to make it simple for everyone to get in touch if they don't know the name of the person that they need to speak to.

Similarly, your web site needs to be thought out, and registering a domain name is vital to creating the right impression. A memorable

THE PROFESSIONAL'S VIEW

Marketing isn't just something you can do in your spare time if you want to make it right. Often, it will be much more effective to hand web-site marketing over to the professionals; but what would they do? *PCW* talked to Jason Finch, a director of port80, an internet consultancy www.port80.com, and asked how they'd go about marketing a web site. One of the most important rules, according to port80, is also one of the most basic — "Get your web address everywhere your phone number appears, and make it big."

Banner advertising may be big business, but it's also far from proven, and Finch believes there are still problems with it, though port80 will

liaise with the main agencies if clients want to promote a site in that way. But auditing remains a problem, according to Finch. "The market is still skewed against the advertiser. The auditing isn't really good enough." It's a point port80 has set out to prove, running simple scripts that will repeatedly select a link on a site, causing havoc with simplistic logging. And it's easy to see the potential problems this could have when you're paying simply for the number of times your ad is delivered to a browser. For some sites, the company recommends trying to attract general publicity by including non-commercial information. "For instance," says Finch, "if you're in the business of selling train sets, you'll probably get more hits if you include general information about model trains and tracks, instead of just having a wholly commercial site."

Ultimately, every client is different. For some, it may be more effective to place an ad in an appropriate magazine, rather than pay for a limited number of impressions on a web site. Good publicity might work better than both, while others really will work best online, whether by banner ads, or by ensuring entry in the most popular search engines.

Marketing your web site

address will help bring people to the site — unlike the www.provider.net/-mycompany type of address you'll find with some free web space. Think how people will want to use the information on your site; is it just a simple page, or an online catalogue? Might it make sense for people to be able to go straight to key areas, like www.yourcompany.com/support/? Look at how other, similar companies have organised their sites, and see what's worth doing, or avoiding.

If you view the web site as an important means of contacting your customers, make sure it works properly; you should consider contacting a few clients you know well and asking them what they'd like to see, or soliciting feedback, before you tell everyone about the new site. There's nothing quite as unimpressive as a page with fancy logos where every link says, "Please visit again; we're working on this site."

Making the most of your site

When everything's ready, it's time to start promoting your web site. The first stage is to make sure it appears in search engines. You can wait for them to find it, or you can register it yourself; systems such as www.submit-it.com will help make sure you're listed in all the popular engines, for a price. Remember to make sure the index page of your site includes keyword and description tags in the HTML to ensure that people can search for it easily. Link exchanges will help create traffic too, and you may find companies you do business with are willing to link to your site in return for a reciprocal link; this is an area where the effort of including general, non-commercial information on your site can really pay off.

When you print new stationery, make sure your electronic contact information is included prominently, too. And if the web site is intended to answer lots of common questions, consider a special, one-off batch of printed material, with more prominence given to web and email addresses, before routinely quoting it next to phone and fax contact details.

Depending on the type of information your site features, you may be able to attract other interest. The time spent creating an impartial and up-to-date guide to a relevant topic could well pay dividends if it allows you to persuade magazines or newspapers to feature your pages.

To really drive up the number of visitors to a web site, advertising may be the way to go. You can pay for your advert to appear when people search for specific keywords in some web indices, or simply to have a banner on selected sites. Online advertising of this type can be effective, but it will take skill to come up with a compelling and informative advert that appears less than an inch high on most computer screens. If it works, you'll see the hit rate of your site clock up, as people can go directly from advert to site in a matter of seconds.

But the key is information, information, information. Money spent encouraging people to visit your web site through adverts, whether they're printed in a magazine or on the front page of AltaVista, is money down the drain if it doesn't help your business. Before you spend time and money on advertising your site, think about just what it is you're really promoting. A web site, or a business? There's a world of difference.

ONLINE ADVERTISING — THE BARE FACTS

Surf the web, and you can't miss them. Banner ads at the top of pages, inviting you to find out about the latest IBM Thinkpad or a new Peugeot car. Click on them, and you'll be taken to the advertiser's site for more information. While some sites sell ads themselves, many are now sold through agencies, so if you want to spread the word about your company, you don't have to contact every site you want to advertise on. Instead, approach an agency, and they'll handle everything for you. You can even upload your ad from a browser when it's changed.

☛ **Payment** for the ads works in a number of different ways. The most common is paying per "page impression": that's a fancy way of saying a whole page delivered to a browser. Visit the front page of a site, and that's one impression. Visit the next page, and that's another. Hit Reload on your browser, and you could well be up to three.

☛ **A typical cost** for a targetted banner ad is around £25 per thousand page impressions, so if you want your ad seen 200,000 times, you'll pay £5,000. With some services, you simply say what type of sites you want the ad to appear on, and when it's been flashed up the appropriate number of times, it disappears. Compared with a single-page advert in a publication, which could cost you under £3,000, this may not seem such a good deal.

☛ **An alternative** is the "click through" charge, where your ad will appear on a page, but you'll only pay — around £1 — for each person that clicks on it to visit your site. A refinement of this, called "pay per action", leaves you paying nothing for casual browsers, but a much heftier fee for those people who visit your site and do something concrete, like buying a product or filling in a form. Fees for that kind of service could be as much as £150. Is it worth it? That's a hard question to answer, and you'll have to do your homework very carefully before taking the plunge. The prices we've quoted are from typical rate cards; with some experts believing that up to 85% of the online advertising capacity in the UK remains unsold, you might be able to strike a better deal.

● *For more information:*
www.tmsni.com
A UK-focused sales agency.
www.doubleclick.net
Global and regional internet advertising.
www.bannerads.org
For a different view of the business.

Generation Xeon

INTEL'S PENTIUM PRO REPLACEMENT IS HERE. BUT WILL IT SOUP-UP YOUR SERVER? TO HELP YOU DECIDE, AJITH RAM REVIEWS FOUR SYSTEMS WHICH USE THE XEON PROCESSOR.

Contents

Ratings

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

INTEL MAY BE FACING increased competition from AMD and Cyrix in the mainstream consumer market, but it rules the mid-range server market with its Pentium Pro processor. The company's new Xeon processor is aimed at both the server and workstation markets and represents the company's attempt to consolidate its hold over these lucrative market segments, while replacing the now quite aged, but still popular, Pentium Pro.

At the same time, Intel hopes that the Xeon will gain market share from Digital's Alpha and Sun Microsystems' Sparc processors which dominate the high-end server and workstation markets. The Xeon also represents a stopgap measure to hold market share before the arrival of Intel's much anticipated Merced processor.

The Xeon is not a radical departure from the standard x86 design. As its full name of Pentium II Xeon suggests, the Xeon core is the same Deschutes core that is present in other Intel processors like the Pentium II and Celeron. It is mainly the L2 cache on the processor that differentiates the Xeon from other Intel products. While the first Celeron had no cache at all, and the Pentium II has its cache running at half its clock speed, the Xeon has either a 512Kb or a 1Mb cache running at the same clock speed as the processor. A version with a 2Mb L2 cache is soon to be released. This larger cache size makes a huge difference while running memory-intensive applications, particularly on busy networks.

The Xeon has also overcome the 512Mb limit on RAM which prevented the Pentium II from being widely accepted in the lucrative server market. The Xeon can be used in multiple-processor configurations like the older Pentium Pro, either in four-way or eight-way arrangements. Used in an eight-way configuration, it can address and cache up to 64Gb of RAM.

Dell PowerEdge 6300

The PowerEdge was physically the smallest system we tested. Fitted with four 400MHz Xeon processors, each with 1Mb of L2 cache, the Dell system has a 64-bit PCI bus but no RAID card. For an extra £1,000, Dell will include it with the system. The PowerEdge comes with 2Gb of RAM but this cannot be easily upgraded as all the DIMM slots are full. The only way to get around this problem is to remove some of the lower-capacity DIMMs and replace them with higher-capacity versions. Adding extra storage will be difficult, too, because all six drive bays are full. However, since each of them contains 9Gb hard drives, it will be some time before upgrading will be necessary. The three power modules that power this server can be easily pulled out and replaced.

The Dell server is well constructed. A side door provides easy access to the expansion slots and is large enough to put in full-length cards. A removable side panel provides easy access to the cooling fans and processors. The inside of the panel has a diagram of important information on component removal and jumper settings. The documentation is comprehensive and is replicated in the Dell Server Assistant CD which also allows you to create necessary driver diskettes. A second CD provides the OpenView NNM server manager for the remote administration of PowerEdge servers.

Performance was only average, with a throughput of 16.3 transactions per second.

PCW DETAILS

★★★

Price *£27,893 (£23,739 ex VAT)*
Contact *Dell 0870 1524625*
www.dell.co.uk
System Specifications *Four Xeon processors, 2Gb RAM, 54Gb SCSI HD.*
Good Points *Easily accessible components. Useful documentation.*
Bad Points *No RAID card.*
Conclusion *A costly server with average performance and not easily upgradeable.*

What Xeon offers in the face of strong competition

Although the Xeon does not represent a radical departure from the venerable x86 design, it includes three significant improvements over the Pentium II (PII) which make it eminently suitable for server and workstation use.

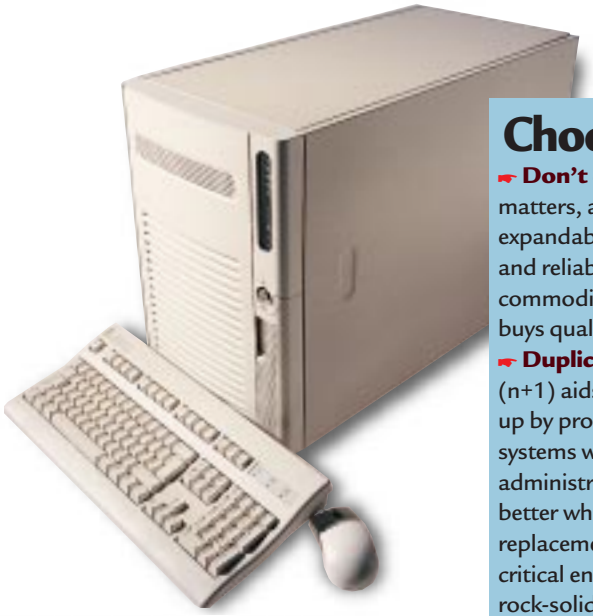
- **Firstly,** there is the addition of either 512Kb or 1Mb of L2 cache, with a 2Mb version likely to follow shortly. The L2 cache runs at 400MHz, the same speed as the processor core, and is a great improvement over the 200MHz speed of L2 cache on the PII 400.
- **Secondly,** there is its ability to address and cache up to 64Gb of RAM in an 8-way configuration; that is, 8Gb per processor. This is quite a jump from the limit of just 512Mb on the PII.
- **Thirdly,** it can be installed in 4-way or 8-way configurations, whereas the PII can only be run in 2-way configurations. These changes may seem minor, but they do represent considerable technical advancement over previous Intel processors.

Although Intel is pitching the new processor as the ideal solution for all servers and workstations, it should not be mistaken as the fastest processor for just any PC. In many systems, the Xeon will represent overkill. Even though its high-speed cache may make it appealing, its integer and floating-point units are identical to PII processors. So, unless you are running applications that take advantage of the larger, faster cache, you are unlikely to see a massive performance increase. And, unless you need more than 512Mb of RAM, you might be just as happy with a PII in your server or workstation. However, systems such as web servers, which require large amounts of memory, are ideal candidates for the Xeon processor. These systems, which place heavy demands on their I/O bridges, are likely to benefit from its power. At the time of going to press, Intel had identified numerous bugs in the new processor and was working on fixing them by making changes to the micro code. The most serious of these bugs occurs while running the Xeon in eight-processor combinations. Intel claims that Xeon systems with less than eight processors are stable enough to be used immediately.

- Despite its strengths, Xeon faces **heavy competition** from the **Alpha** and **Sparc** processors, both running at higher clock speeds. Digital's Alpha also has the distinction of being a true 64-bit processor. But many buyers may prefer to wait for Intel's own **Merced** processor to arrive later next year. This is Intel's first 64-bit processor. Using a new architecture (IA-64) and manufactured using a 0.18 micron process, Merced is expected to provide unprecedented levels of performance.

At around the same time as Merced's release, **Digital** is expected to roll out a **new version of the Alpha processor** with a clock speed of around 1GHz. **Cyrix** is also expected to enter the fray with a new line of CPUs codenamed **Jalapeno**. These are rumoured to have four times better floating-point performance than current PIIs and might be a better option for systems running graphics-intensive applications. These developments are likely to make the dominance of the Xeon short-lived.

Evesham XenQua



The Evesham server had the lov specification we tested. With just t processors, each with 1Mb of L2 ca be the ideal choice for the small to sized business. You get 256Mb of F three hard drives, with a storage ca each. The XenQua has a RAID con but no 64-bit PCI bus. There are 12 DIMM slots and two hard-drive bays available for expansion. This server is extremely well built, but slightly difficult to get into. The dr bays and DIMM slots are easy to ac the two processors are well cooled fans, aided by a mass of adjacent p channel the air flow. One of the side panels carries a diagram showing the proper way to remove the hard drives and change power supply units, and there are manuals dealing with setting up the server.

The XenQua posted test results of over 13.4 transactions per second — impressive for its specification and price point. A good choice for the price-conscious buyer.

PCW DETAILS

★★★★

Price *£12,337 (£10,500 ex VAT)*
Contact *Evesham Micros 0800 4960800*
www.evesham.com
System Specifications *Two Xeon processors, 256Mb RAM, 27Gb SCSI HD.*
Good Points *Easily accessible components. Useful documentation. Excellent construction.*
Bad Points *No 64-bit PCI bus.*
Conclusion *A good choice for small to medium-sized businesses.*

Choosing a server

- **Don't cut corners.** Every component matters, as the overall package must be expandable, upgradeable, manageable and reliable. Intel-based servers may be commodity items, but money always buys quality of construction.
- **Duplication of critical components** (n+1) aids reliability only when backed up by proper procedures. Automatic systems which page the network administrator are good, but they're even better when they call the server vendor if replacement parts are needed. A server critical enough to require n+1 needs a rock-solid warranty with rapid on-site response.
- **Workgroup file servers** can manage with a single processor but dual processors meet the expandability requirement. For Windows NT, two processors are better than one for all but the smallest application server. Four-way and eight-way PII systems are mostly still on the drawing board and will be expensive, so don't discount the Pentium Pro. There are many Pentium Pro systems which will take the PII OverDrive.
- **Servers must support** parity memory and preferably ECC (Error Checking and Correcting) memory: the former flags up memory errors; the latter has a stab at correcting them. Desktop motherboards dumped parity checking to cut costs, but it's a false economy in a server.
- **Forget EIDE hard disks** on all but minor servers: SCSI is *de rigeur* for expansion and performance. An embedded SCSI interface on the motherboard is handy for attaching that essential tape backup drive, and it saves a slot for a RAID disk array controller.

TERENCE GREEN

Olivetti Lexikon Netstrada 7400

As an enterprise-level server, the Olivetti system is almost £8,000 cheaper than Dell's but has no 64-bit PCI bus. It makes do with a 4Mb RAID card. Housing four Xeon processors, the Netstrada provides ample scope for increasing the RAM with its eight free DIMM slots. But its hard-drive expandability is limited as it has only two 5.25in bays free. The hard-drive bays house six 4Gb SCSI drives. This 24Gb storage capacity might become a little constraining for a server aimed at the high end of the market: it would have been better to have had larger-capacity hard drives occupying fewer slots. The absence of the 64-bit PCI bus may affect its performance and upgradeability.

Although adequately built, the Olivetti system is not as well constructed as the Siemens or Evesham servers. The fans cooling the four processors, although serving their purpose, are not as easy to remove as those in the other systems reviewed here. The hard drives are hot-replaceable. One side panel bears instructions on removing and replacing components, while the other side provides access to the CPUs and expansion slots.

The Netstrada's test performance was above that of the Dell and Evesham servers, with a throughput of 18.5 transactions per second.

PCW DETAILS

★★★

Price *£19,407 (£16,517 ex VAT)*
Contact *Olivetti 0800 447799*
www.olivetti.com
System Specifications *Four Xeon processors, 1Gb RAM, 24Gb SCSI HD, 4Mb SCSI RAID controller.*
Good Points *Low cost. Solid construction.*
Bad Points *No 64-bit PCI bus. Not easily upgradeable.*
Conclusion *A well-built system that may attract the price-conscious buyer.*

Siemens Nixdorf Primergy 870

Aimed primarily at the high-end server market and built around four Xeon processors with 1Mb of L2 cache, the Primergy 870 has a 64-bit PCI bus, providing better performance than the more common 32-bit bus. Aiming to fulfil its purpose as an enterprise-level server, the Siemens system comes with no less than 90Gb of hard-drive storage, made up of ten 9Gb hard drives controlled by a RAID card. This ensures fast transfer of data.

The Primergy comes with 1Gb of RAM and has tremendous scope for expansion with its 28 free DIMM slots. This gives it a capacity to hold up to 32Gb of RAM which is the maximum supported by the Xeon processors in a four-way configuration. The system can accommodate up to eight processors and support up to 216Gb of storage directly if larger 18Gb hard drives are used in all 12 hard-drive bays.

The Siemens system is extremely well built. The front of the case is quite stylish and has a door which provides access to the storage bays. One side panel provides access to the expansion slots, while the other allows access to the CPUs. The processors are housed inside easily removable cassettes which slide from their housings. Manuals are supplied which deal with the RAID controller, and further documentation is likely to be available with the shipping versions.

The Primergy 870 was the fastest server in our test, managing over 40 transactions per second.

PCW DETAILS

EDITOR'S CHOICE PERSONAL COMPUTER WORLD

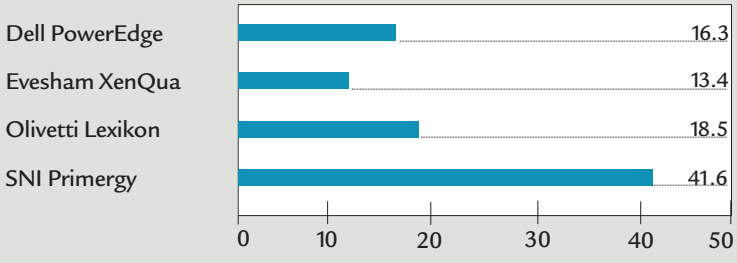
★★★★

Price *£36,985 (£31,477 ex VAT)*
Contact *Siemens Nixdorf 01252 555312*
www.sni-epc.co.uk
System Specifications *Four Xeon processors, 1Gb RAM, 90Gb SCSI HD, 16Mb SCSI RAID controller.*
Good Points *Excellent construction. Easily upgradeable. High performance.*
Bad Points *Expensive.*
Conclusion *An ideal server for the most demanding operations.*

Editor's Choice

The Xeon is a good choice for high-end systems. But the processor is just one of the crucial components within a good server, and this is shown to good effect in the test results achieved by the Dell and Olivetti servers. While the Dell cost about £8,000 more than the Olivetti, it posted a result only slightly higher. It had a 64-bit PCI bus but no RAID card. The Olivetti had a RAID card but only a 4Mb model, and less hard-disk capacity. It is not easy to say which components made the crucial difference, but probably with a better RAID controller, the Olivetti could post better results. As the Xeon is aimed at the mid- to high-end server market, we looked for a model which best catered for this sector. The **Siemens Nixdorf Primergy 870** is our **Editor's Choice** due to its outstanding performance, superior components and excellent build quality. It also offers scope for upgrading with an ability to take eight processors and 64Gb of RAM. Although the Siemens server is the most expensive, its superior performance outweighs price considerations.

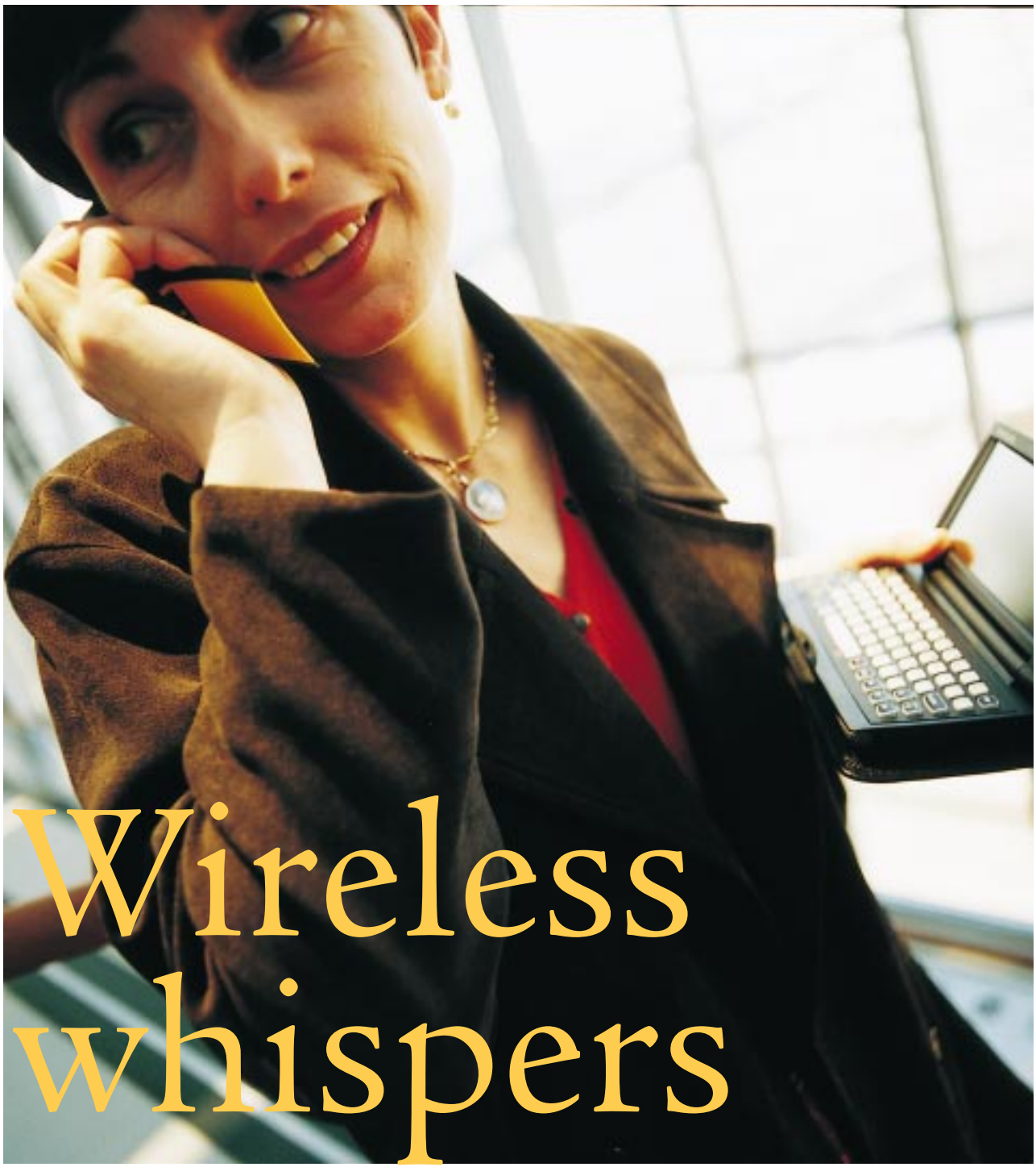
Sysmark DB scores: transactions per second



How we did the tests

VNU LABS

All four servers were tested using Windows NT SQL Server (with all three service packs loaded). On top of the operating system we installed Sysmark DB (database), our benchmarking software, and the server is then connected to numerous client machines. Sysmark then builds a database. The software queries the server to find the maximum number of client systems it can handle without crashing. The database that is built simulates the real-world environment of a travel agency and its clients. The benchmarking software simulates real-time transactions as well as those between the employees of the company.
At the end of the simulated working day, the software publishes the average number of transactions per second that the server is able to handle. This result takes into account the cumulative speed of the hard drives and the processors, the efficiency of the RAID connection and the stability of the software



Wireless whispers

WIRELESS COMMUNICATION HAS, IN THE PAST, EXCLUDED THE TRANSFER OF DATA. TONY DENNIS LOOKS AT DEVELOPMENTS IN WIRELESS DATA TECHNOLOGY AND AT HOW TODAY'S PRODUCTS COULD BE AFFECTED.

Using wireless technology to provide data connectivity has long been a dream in the IT industry. Now, almost 20 years after 3Com shipped the first Ethernet NIC (network interface card), the PC world is at last treating wireless data seriously. Initially, it was infra-red technology which enjoyed a groundswell of support as the wireless technology of choice. More recently, though, it has been radio-based products

(for device-to-device, LAN and WAN links) which have begun to grab the headlines. Crucially, it is the not the IT world but the mobile telecomms industry which is taking the lead here. A new wireless data interface standard called Bluetooth has garnered support not only from IT stalwarts like IBM, Toshiba and Intel but also from handset manufacturers Ericsson, Motorola and Nokia. Infra-red could be in imminent danger of becoming a has-been technology.

The history of wireless data

When it comes to providing publicly accessible data over wireless services, there are two schools of thought: one believes that data is entirely separate from the provision of voice telephony and therefore merits its own standalone wireless network; the other questions the need to build a separate, data-only, wireless network. With the arrival of third-generation mobile phone networks, the distinction between voice and data will have blurred completely.

IMT 2000 (International Mobile Telecommunications 2000) is the ITU's (International Telecommunications Union) standard which should provide such integrated networks by 2002. Or even sooner, as the Japanese are rapidly running out of conventional airspace with their networks and are fast approaching fully commercial services.

The catch is that there are at least three proposed technologies for IMT 2000: W-CDMA; cdgmaOne 2000; and UWC-2000 (*see panel, right*). The differences between today's second generation digital mobile networks and IMT-2000 are similar to the difference between the ISDN and fixed analogue networks. With IMT-2000 there will be improvements in coverage, capacity and voice quality, but the biggest change is that IMT-2000 is designed from the bottom up to support data. In fact, IMT-2000 will offer no fewer than three data rates: 144Kbit/sec (for those travelling in cars and trains), 384Kbit/sec (for those walking around) and 2Mbit/sec (for those who are stationary).

In Europe, the most obvious body to set the pace for IMT-2000 is the ETSI (European Telecommunication Standardisation Institute), the same organisation which gave us GSM (Global System for Mobile communications) in all its current guises. In the UK, Orange and One2One offer GSM 1800MHz, while Cellnet and Vodafone currently offer GSM 900MHz but will soon also offer 1800MHz. The ETSI has its own set of third generation proposals which are defined in the UMTS (Universal Mobile Telecommunications System). And, the ETSI has picked a technology known as Wideband CDMA (W-CDMA) for UMTS which has become its candidate for IMT-2000.

At present, commercial data-only networks still thrive in the UK. For example, there's Cognito, a British firm whose network uses proprietary protocols and its own bespoke wireless terminals rather than portable PCs. Then there's RAM Mobile Data, which is built around the Mobitex protocol from Ericsson. Additionally there is Paknet, which is effectively an X.25 wireless packet network run by Vodafone. Alternatively, a police force or utility company, say, could build its own data network using PMR (Private Mobile Radio) but it would be restricted to a given geographical area.

As the original UK mobile phone networks operated by Cellnet and Vodafone were analogue, it was feasible to use existing modem technology. The drawback is that while travelling you move from one cell into another. The technical term for successfully swapping over from cell to cell is a "hand-off" — something which plays havoc with a traditional modem's carrier signal. The picture improved enormously with the introduction of digital wireless networks in 1994 which conformed to a GSM standard set by ETSI.

The differences were enormous. With GSM mobile, manufacturers were faced with one network which originally encompassed the EC but quickly became a global standard. Not only did this mean you could "roam" with your mobile phone, but it also meant that the number of data-compatible handsets rose sharply. Outside of GSM, only the Japanese have a substantial market for data over digital networks. To date, the USA has stuck with CDPD (Cellular Digital Packet Data) over analogue.

The Japanese are RAPIDLY RUNNING OUT OF CONVENTIONAL AIRSPACE with their networks and are fast approaching fully commercial services

GSM data adapters

The existence of a global market for GSM created a new product; the PC Card GSM data adapter, as launched initially by Nokia. Competition in this area soon heated up with the main manufacturers being modem suppliers such as ComOne (France), Option (Belgium), Psion Dacom (UK) and TDK Grey Cell (UK/Japan) plus new entrants like Smart Modular and Xircom of

IMT 2000

The ITU's standard for mobile networks for the year 2000 and beyond. The current favourites for adoption are W-CDMA (Wideband CDMA) favoured by Europe and the Japanese; cdmaOne 2000 (a variant of CDMA) used mainly in North America and Korea; and UWC-2000 (a variant of TDMA) used mainly in the Americas.

the USA. Then, of course, there's Motorola Communicate, Ericsson and Nokia. Rivalry has resulted in each supplier trying to squeeze more functionality on to a single PC Card, so in addition to GSM data, these PC Cards offer ISDN, modem, fax and ethernet (100 or 10Mbit/sec) interfaces in various combinations.

As soon as a mobile call comes in, THE MUSIC IS CUT AND THE CALLER IS HEARD OVER THE CAR'S SPEAKERS, regardless of the type of mobile network

Currently, each new data-enabled handset requires a different connecting cable. For example, there are four different cables for the Nokia handsets alone. A pain in the proverbial for manufacturer and user alike.

Wireless connections

A solution to the connecting-cable problem is to go wireless. In fact, the longest established wireless data interface was agreed in June 1994 by the Infrared Data Association (IrDA). What IrDA gave the IT world was the serial IR (infra-red) protocol which is a half-duplex protocol running at a maximum of 115.2Kbit/sec. One of its chief backers is Hewlett-Packard so, in effect, serial IR works much like a wireless printer cable! Except, of course, that IrDA now has a very impressive installed base and claims more than 40 million IrDA-enabled devices including LAN adapters, PDAs, cameras and laser printers. Another advantage is that IrDA is implemented in virtually all of the leading operating systems like Windows 95/98, CE, Mac and Geoworks. Consequently, handset manufacturers such as Ericsson and Nokia have begun to build an IrDA-compatible infra-red interface into their handsets. Initially, the infra-red link was used only to access the handset's address book, but Ericsson in particular, with its latest SH888 model, has built a GSM data modem into the handset, which is accessible via infra-red. This was one reason why Ericsson launched its MC12 CE-compatible handheld as a companion to such handsets.

▼POSTCARDS FROM THE CUTTING EDGE CAN BE PRODUCED USING BLUETOOTH-ENABLED TECHNOLOGY

The Bluetooth initiative

There are disadvantages to infra-red, however, one of which being that there are incompatible "flavours" of IrDA caused by the way manufacturers have implemented the standard. Which is why a new (May '98) initiative called Bluetooth, backed by Motorola, Nokia and Ericsson, has been greeted so warmly. It provides for radio-based wireless connections between mobile computers and mobile phones.

Bluetooth will operate in the unlicensed ISM (Industrial Scientific and Medical) 2.45GHz region. Essentially, it is the same kind of radio technology that has given us wireless door chimes and automatic garage door openers. Bluetooth draws heavily on existing wireless LAN technology since it is based around the IEEE's 802.11 (the existing standard for wireless ethernet). The main differences are that in order to consume less power, Bluetooth is restricted to just 10m (40ft) and presently runs at approximately 1Mbit/sec but plans to offer 2Mbit/sec, like 802.11. Its chief advantage over infra-red is that Bluetooth does not require line of sight, so you can have your Bluetooth-enabled handset in your jacket pocket happily communicating with the Bluetooth-enabled PDA in your briefcase.

The technology will work much like cordless home phone handsets where there are transceivers (portable devices) and base stations. You will be able to operate between eight and ten devices within the same cell, with seven offering data services and three offering voice comms. The catch is that an individual Bluetooth device

▶BLUETOOTH ENABLES CORDLESS COMMUNICATION ON THE MOVE, WHEREVER YOU MAY BE

will actually enjoy an asymmetric data connection, totally 721Kbit/sec with the "up" channel running at 56Kbit/sec.

The most unusual aspect to Bluetooth is that immediately two compliant devices recognise each other, they will try to synchronise their databases. But how will Bluetooth manifest itself in product form? The most likely application for it is in a combined car music centre and hands-free kit. Such devices are already available to fit luxury cars such as Porsches and link to popular GSM handsets from the likes of Nokia and Motorola. As soon as a mobile call comes in, the music is cut and the caller is heard over the car's stereo speakers. The massive difference Bluetooth will make is that such products can be sold into all markets (the type of mobile telephone network involved will be irrelevant) and Bluetooth will enable the same car centre to function with all leading handset brands rather than one specific model, as is presently the case.

From an IT perspective, the unit's LCD screen can be employed to display mobile data which can take a number of forms. One benefit is that the LCD will utilise CLI (Calling Line Identity) to show the caller's name. But it can also be used to show short text messages, as with GSM's short message service facility. These messages could take the form of traffic updates, email messages or even advertisements. For example, as you travel along the M4, a little message could pop up with the welcome news that there's a burger restaurant available at the next exit.

This LCD approach has already been taken by Italtel. It makes a GSM handset which looks like a car radio, with a big difference being that you have to take your SIM (subscriber identity module) card out of your existing handset and pop it into the unit, just as if you were inserting a music CD. Bluetooth proponents view the standard's main advantage as being its automatic synchronisation facility. As soon as two Bluetooth devices detect each other's presence, they attempt to swap data. At a basic level this would take the form of a wireless exchange of personal details between two business users. However, Ericsson has shown a product demonstration whereby the synchronisation is used to swap PIM-style information between two intelligent devices.

The most likely application for Bluetooth is in a combined CAR MUSIC CENTRE AND HANDS-FREE KIT. Such devices are already available for luxury cars

In Ericsson's case, the demonstration involved swapping data between its MC12-based CE handheld and a custom watch. Although a fairly chunky device, it closely resembled a Rolodex Rex (the PC Card PDA) but in watch style. The important point here is that manufacturers could take advantage of Bluetooth's

IrMC

Believe it or not, IrDA has a direct equivalent to Bluetooth in the shape of IrMC (Infra-red Mobile Communications standard). This is designed to provide the means to synchronise a number of portable applications such as business cards, calendars, telephone address books, etc. And, IrDA's backers include 150 companies such as Ericsson, Motorola, Nokia, IBM and Toshiba. The drawback is that serial IR is relatively slow for today's requirements — it was designed before the IT world went "internet-for-all-purposes".

Wireless data technology

▶ THE MOTOROLA CELLECT PROVIDES LANDLINE PSTN AND GSM CELLULAR CAPABILITY WHEN USED WITH MOTOROLA CELLULAR HANDSETS

synchronisation capabilities to ensure that the user only has to alter a telephone number once, and that change will be made in both the user's mobile handset and in the PDA or, alternatively, desktop PC.

There have also been suggestions that Bluetooth might be deployed to provide internet access in the home. At present, DECT (Digital European Cordless Telecommunication) is rapidly becoming the established standard for cordless handsets in the home, but its data carrying capability (about 115.2Kbit/sec) is viewed as too slow to provide high-speed net access. By contrast, with a potential of at least 721Kbit/sec, Bluetooth seems to offer greater potential in this area. All it would require is a Bluetooth-enabled base station to be attached to a fixed line (ISDN, cable, or ADSL modem) and the user could surf the net wirelessly.

Bluetooth

Bluetooth will operate in the unlicensed ISM (Industrial Scientific and Medical) 2.45GHz region and is based around the IEEE's 802.11 standard for wireless ethernet. It is limited in range to 10m (40ft) and presently runs at approximately 1Mbit/sec but plans to offer 2Mbit/sec soon.

Symbian

Another intriguing development in this whole wireless data area is Symbian, a joint venture between Psion Software, Nokia, Ericsson and Motorola (expected to buy-in soon). The aim is to push Psion's EPOC32 as the operating system for future data-capable mobile devices. As EPOC32 requires low power and is compatible with RISC chips like the StrongARM, it will mean one processor can handle all the functionality of a GSM handset plus a PDA, in sharp contrast to Nokia's 9000 Communicator which at present uses two separate chips. Symbian anticipates that intelligent mobile devices will be like present-generation handsets with touchscreens, or clamshell handsets like the Samsung SCS200 or the Nokia Communicator. The alternative will be PDAs based on Windows CE or the 3Com Pilot with GSM/IMT 2000 capabilities added.

Conclusion

By mid-1999, Bluetooth should be readily available. Its backers hope the component costs will be so low that Bluetooth will have the capability to replace infra-red. It certainly has clear advantages. One possibility is that just as USB is only gradually replacing serial and parallel ports, infra-red will continue to be supported for purposes of backwards compatibility. Toshiba, for instance, has admitted that there should be sufficient "real-estate" on a portable's motherboard for Bluetooth and IrDA ports to happily co-exist.

The real struggle centres around the user's lifestyle. The market will probably split in two. There will be those whose desire is basically for a swish mobile phone and who will only acquire a product with modest computing power such as a built-in web browser: these people will be perfectly happy with Symbian-style mobile phones. However, those whose main preference is for a portable computer and who want to be in touch while in transit will almost certainly go for a PDA with a mobile phone built in. You can, in fact, almost achieve this objective today. Nokia, Motorola Communicate and Compaq offer a GSM handset in PC Card format which slots inside your PDA. The only trouble is that it drains the battery fast!

PCW CONTACTS

Bluetooth **www.bluetooth.com**
Com One **www.com1.fr**
Compaq **www.compaq.co.uk**
Ericsson **www.ericsson.se**
Geofox **www.geofox.com**
Infra-red Association **www.irda.org**
Motorola Communicate **www.communicate.co.uk**
Motorola **www.motorola.com**
Nokia **www.nokia.com**
Option International **www.option.com**
Psion Dacom **www.psiondacom.com**
Samsung **www.samsungelectronics.com**
Symbian **www.symbian.com**
TDK Grey Cell **www.tdkgreycell.org**
Xircom **www.xircom.com**

Undercover operation

Posing as members of the public, we bought ten £1,000-PCs for this group test. On these pages we reveal the levels of advice and customer service we received as private buyers.

Unless you have an extremely healthy bank balance, buying a PC will take a large slice of your salary. Therefore, you should make sure that you know more about a PC manufacturer than merely whether or not it can build a good machine. What is the company's sales service like? Will it try to sell you a more expensive PC than you wanted? Will it include the components you specified? How long will it take to deliver the PC, and will it be well built or falling apart at the seams when it arrives? And if you have a problem, will technical-support staff be able to talk you through a solution?

To assess these factors, we posed as ordinary members of the public and went out to buy ten PCs. Of course, as the manufacturers had no idea that the machines were destined for the *PCW* test laboratories, they did not have the opportunity to try to impress our review team in any way. Our "cover" was as a small-businessman with £1,000 to spend. We revealed an average level of knowledge, but expected the sales staff to provide recommendations on what to buy.

Our experience of the sales and technical support services of each manufacturer was dependent on just a few calls and on speaking to a few members of staff from each company. Because we were posing as ordinary customers, any PC owner – or prospective PC buyer – could expect the same treatment. Here, we reveal our findings.

We subjected our buys to rigorous testing, and assessed the sales and technical support services. Also, to arm you with all the facts, the *PCW* team provides advice on everything from how to buy a PC, to warranties, financing, and future-proofing your investment.

Contents

Illustration by Amanda Hutt

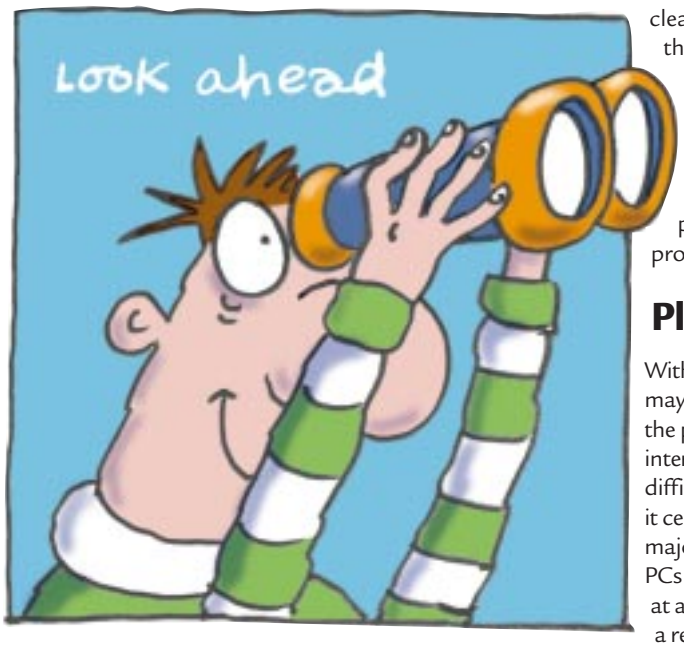
How to buy a PC

It's pretty easy to protect yourself when buying a PC mail order. Just follow our direct buying tips.

You don't need to be nervous when you buy a PC by mail or over the phone. The law is often on your side, and if you follow some simple tips, you can make sure you are protected.

☛ **First, always make** a note of the name of the person to whom you are speaking. If possible, note down any specific claims made during your conversation, such as confirming a particular feature. Record the date and time, too, in case of later queries. When phoning about problems, remember to keep calm; it's unlikely that the person on the other end of the phone is directly responsible for what's wrong and annoying them won't help solve the problem.

☛ **When you're placing** an order, making enquiries about whether or not something is suitable, or if you're not sure about something, don't be afraid to ask. The law requires that items must be fit for the purpose you have specified at the time of purchase. So, if you say you want a PC with enough memory to run Windows NT, then that is what you should be sold.



Illustrations by Trevor Dunton

All-inclusive package?

Don't assume that certain things are included, such as a toner cartridge for a printer, or blank CDs and software for a recorder. Always check, and either ask for written confirmation of price and what's included, or include that on a confirmatory fax or letter of your own. However, if you do confirm an order in writing, make sure it's clearly marked as such; you don't want to accidentally end up ordering everything twice!

☛ **When you're ready** to buy, use a credit card if you can. Under the Consumer Credit Act, you're automatically protected as long as you're spending between £100 and £15,000. What this means is that if the company fails to deliver, or if there's some other problem, then the credit card issuer is jointly liable, and you can take up the issue with them if the seller is reluctant to sort out problems.

☛ **If you're buying** goods or services using someone else's credit card, or perhaps buying for the office with your own card, check whether or not there are any delivery restrictions; for security reasons, many companies will only deliver to the registered cardholder's address. Others will simply ensure that you actually know the address.

Make a date

Never rely on a vague promise of a delivery date, such as "It'll be around two weeks". When it's essential that a system is delivered by a particular time, make sure you make your requirements quite clear to the person who takes your order, and state that "time is of the essence" in any written confirmation. Failure to do this could leave you with no recourse if the company you buy from has a problem meeting the deadline.

☛ **Once you have placed** the order, if all goes well, your new computer will be delivered when you expect it and it will be in perfect working order. Sometimes, though, things do go wrong, so never sign for the delivery until you have checked the outside of the packaging. If there are any obvious dents or tears, note them down on the courier's receipt. Ideally, you should unpack everything immediately and check that it is okay, but the courier is unlikely to want to wait while you do this. In that case, state clearly on the delivery note that the packaging was damaged when you received it, and that you have not yet checked the contents. Do so as soon as possible, and report any problems immediately.

Play it safe

With all these warnings, it may sound like buying over the phone, or via the internet, is prone to difficulties. Be assured that it certainly is not: the vast majority of people buy their PCs without any problems at all. Remember to choose a reputable supplier, and if you want more reassurance, turn to our *Buyers' Guide* at the back of the magazine where you'll find details of *PCW*'s own buyer protection scheme.

☛ **Whether you place** your order by post, telephone or the internet shouldn't make any difference; the law is the same in every case. And the usual precaution about shopping via the internet applies: only give your credit card details to a secure server.

Ultimately it is your choice how you place an order, but picking up the telephone provides the best balance between speed, convenience and being able to ask those essential questions.

NIGEL WHITFIELD

Warranties

When your PC plays up you'll be glad of a good warranty. Make sure you're adequately covered.

What do you do when your PC goes wrong? It depends on the warranty and support you have. If you rely on the PC for your work, then it is worth making sure you understand the warranty before you part with your hard-earned cash.

Which warranty?

There are essentially two types of warranty for a computer system: "on-site", and "return to base". The former involves someone coming to your premises to fix a problem, while the latter means you'll have to get the computer back to where it came from (which is by far the most common). Naturally, it's not as simple as merely deciding whether you want to pack the computer up or to have someone sent around. With either choice there are extra factors involved and the final decision depends on how much you're prepared to spend, and how long you can manage without the computer.

Your business needs

For most people using a computer in business, on-site service is the only option worth considering. Not being able to access your customer database, for instance, could cost a lot of money in lost sales. But don't just take on-site service for granted. Find out the guaranteed response time: will an engineer come the same day, or the next day, or "perhaps during next week, but we can't say when"? The faster the response, the more you'll pay, either explicitly or in the bundled cost of the computer.

☛ **And remember,** there's a big difference between having an engineer come and say, "I've looked, but I can't fix it" in two hours, or someone coming the next morning and saying, "I can't fix it, but there's a spare in the van you can have on loan." Find out exactly what service is being offered on-site. Another popular marketing trick is to offer an on-site warranty for one year, with further years "return-to-base".

☛ **Even a return-to-base** warranty can be far from straightforward. Will someone come to collect a broken computer, or will you have to pay to send it back? And do you even know where it will have to be sent back to? A trip down the road may be one thing, but a courier shipment across the country, or even to a repair centre in another country, could be pretty expensive and you'll often have to pay, at least to get the computer there.

☛ **You'll also need** to find out what's included and whether the warranties are the same on everything. For example, a system including a printer and a monitor from a mail-order manufacturer might have different warranty lengths on different pieces of equipment. You may even find that while a system has a one-year warranty, items such as hard disks have a three-year version. Just don't expect the PC manufacturer to draw your attention to it.

Complete cover?

Check very carefully for exclusions on the warranty. For example, a printer warranty might exclude damage caused by recycled toner cartridges, and some PCs have even had stickers on the back saying that upgrading will invalidate the warranty. Since a PC is, by nature, designed to be upgradeable, it's unlikely that such a clause would hold up in court (provided you've done nothing obviously destructive), but it's worth making sure in the first place that there's no small print to catch you out. If you're concerned, consider finding out before buying how much it will cost to have the manufacturer install upgrades for you in future.

☛ **The biggest exclusion** of all, of course, is software. You will usually be entitled to some technical support for Windows, but not for long. Make sure you're clear what support is available for the software on your computer, and who provides it. For Windows, it's down to the PC maker; for other software, it may not be. And in the grey area where software collides with hardware, the opportunities for avoiding responsibility would make a used-car salesman blush.

☛ **If you're going to rely** on your computer, don't just chance it. Invest in a proper support contract and ensure that it covers everything — computer, peripherals and software. Shop around to see what's on offer, and when you're quoted a price, remember to think how much it would cost *not* to have your computer when you needed it.

NIGEL WHITFIELD

Future-proofing your PC

Sensible buying and prudent upgrading will help you counter the march of technology.

It is a sad fact that no matter when you buy your PC, it will start to look dated after a very short period of time. A new processor will come along, as will new, faster graphics cards, and you will need more RAM to run the increasingly power-hungry applications that are released. However, if you buy sensibly and upgrade gradually, you can get a good lifespan out of your PC and keep it reasonably up to date.

Memory matters

The one component most people add to their PC is RAM. It is, after all, a relatively cheap and easy way of giving the machine more kick. When you buy your PC, make sure that all the RAM is put in to a single slot, leaving you the maximum room to expand in future. When you buy the PC, specify a motherboard with as many DIMM slots as possible. That way, even if you buy your upgrade RAM in smallish doses, you do not have to waste RAM by throwing out smaller-denomination RAM DIMMs to make room for more memory.

☛ **It also worth** making sure that you get 100MHz RAM now, even if your processor will not work with RAM of this speed: 100MHz RAM will simply clock down to 66MHz until it detects a processor that supports the faster speed. There is no price difference, and if you change your processor later, you will be grateful for the speed boost from the faster RAM.

Chips

Of course, if you need more processing power, you will need to upgrade your processor. If you choose an AMD K6-2, be aware that the days of Socket7 are numbered and that although AMD is due to carry on with Socket7 for a year, it is debatable whether or not it will continue to make them thereafter. If you go for an Intel chip, especially one of the Celerons suggested by some of the manufacturers in this test, you have the option to upgrade to a PII at a later date as both these processors fit in to the same Slot1 socket. While Intel is not going to be making Slot1 processors forever, the technology has a longer shelf life than Socket7.

☛ **However, if you are** going to upgrade from a Celeron to a PII, you must make sure your chipset supports this. It is worth investing in a BX motherboard from the start, even if you are saving money by buying a cheaper processor now. It may seem cheaper to get an LX or even an EX board, but this would be a false economy in the long run. The BX chipset supports processors up to 450MHz and 100MHz RAM, thus allowing for a much faster processor to be fitted later.

☛ **In specifying** your motherboard it is also important to make sure you have enough free slots for any components you may choose to add; either parts from your old machine, or new ones you intend to buy later. Many manufacturers are now producing motherboards with very few PCI and ISA slots but with chips on-board (for graphics, sound and even SCSI, for instance). Before you buy a new PC, it may be worth counting the number of cards you have in your old machine and working out just how many slots you will need in the new machine to accommodate any older cards plus the new cards you may be buying, and specifying a minimum number of slots.

Peripherals and cards

While specifying your motherboard, do not forget to consider the number of ports. While USB peripherals are starting to appear on the market, including keyboards, mice, printers and cameras, it may be some time yet before you can throw away all your serial devices. If you have, for example, an external modem and a device such as a Rex card, you will still need two serial ports for these, even if you run your mouse off a USB or a PS/2 port.

☛ **If you are** offered on-board sound or graphics, think very carefully before accepting them. Not only are they typically less good than standalone cards, they can also make upgrading more complicated. Often, on-board graphics cards also have the disadvantage of using a portion of main memory, effectively reducing the amount of RAM you have available to run applications. You will have to disable any on-board chips in the BIOS before adding new cards. For many, this will not be a problem, but it can be more complicated than is strictly necessary.

Storage space

When choosing storage, it pays to get as much as you can when you buy the PC. For example, there is very little difference in price between a 4Gb hard drive and a 6Gb drive for 50 percent more storage space. Similarly, it will probably save you money if you buy an internal removable storage drive at the same time as the PC.

Not only will any savings, made by the manufacturer when bulk buying, be passed on to you, but you will also save yourself the bother of having to fit it and it should be covered by your warranty. It is worth checking, however, that your manufacturer will provide technical support for the drive. If you intend to add more storage drives later, make sure the case has plenty of room to accommodate them.

☛ **The vexed question** of whether to buy DVD now or later is one which has still to be resolved. DVD-ROM drives will currently play all your CDs and CD-Rs, although there are few actual DVD titles available in the UK at present. If you accept that at some point you will want a DVD drive, the question of whether to buy later comes down to how much you will be expected to pay for it. Bear in mind that a DVD drive bought later may turn out to be a better drive, and prices will no doubt drop as take-up of the drives increases.

☛ **Finally, your choice** of monitor should be given careful consideration. If you are spending around £1,000 on a PC, it is easy to decide that you will save a bit by buying a cheap monitor. But the monitor is, after all, what you look at all the time you are using your PC. If you skimp on this, you will not be doing your eyesight any favours. It is worth paying a little extra for a good monitor when you buy the PC, because purchasing a bad one and then having to replace it can be an expensive business. It might even be worth paying a little bit extra and getting a flat-screen monitor, being offered by some manufacturers for as little as £300 over the price of a 19in monitor.

ADELE DYER

Making your **PC** more **affordable**

Strapped for cash? Then consider these alternative schemes to fund your PC purchase.

Pentium PCs, *only* £799! It's still a lot of dosh, and many people will want to avoid forking out a large amount of money in one go. While credit cards are a solution, not everyone has one, or you may not have a high enough credit limit to add the cost to your card. But there are other solutions which can help you afford the computer you need.

Company credit

One of the first things to find out is whether or not credit is available from the computer's supplier. Many of the larger mail-order companies can offer some type of credit, either in the form of a standard agreement or a "buy now, pay later" deal. Before you sign up to credit, however, check to see what the APR (Annual Percentage Rate) is: often it will be much higher than would be available on a credit card. A company is obliged to give you a written quotation for credit if you ask for one, so that you can see how much the deal is really costing you. Do not sign up without first having seen and evaluated the figures, as even an APR can be calculated in different ways.

☛ **An alternative** to credit is hire-purchase, but it's less common now that credit is widely available. It is most useful to those with a poor credit rating, and you can usually hand back a system if you can no longer afford it, or do not need it; but check for minimum contract periods and don't forget to work out how much a system will really have cost you by the time you own it.

☛ **For a business**, leasing may be a good option, as you can set the costs against tax. Alternatively, with an outright purchase, you'll have to write off the cost over a number of years. Depending on the type of business you run, it may even be worth registering for VAT as there's around £200 to claim back on a PC system costing £1,350 after VAT.

■ **Money-off schemes**

It's unlikely you'll be able to get much for an old PC, but in some cases you can claim discounts on software or hardware. Competitive upgrades can knock hundreds off, say, the cost of Caere's OmniPage program.

☛ **The biggest group** to be offered discounts is students. However, many schemes such as the Microsoft Student Discount won't give you the goods until you come up with proof that you are a student. Buy the MS Student Edition of Office, for example, and you receive a box with a form in it. Only when the form has been completed by someone who can vouch that you're enrolled as a student, do you receive the software. You cannot, for example, buy it in the gap between leaving school and starting university.

● *At the time of writing, Gateway launched a new scheme called Your:)ware. Buyers will be able to trade in their old Gateway system for a newer one. To qualify, the system must have been purchased after 18th September 1998 along with one of eight software bundles costing from £50, and the trade-in itself made between two to four years later. The value of your old system is based on estimates of secondhand equipment, made on an independent web site.*

NIGEL WHITFIELD

Armari NBX 350 Workstation

EDITOR'S CHOICE PERSONAL COMPUTER WORLD Technical Support

Armari is a manufacturer based in Brentford. In five years it has established a reputation at the high end of the market, catering largely for graphics users, but also supplying individuals.

Sales

In direct contrast to Evesham's representative [*p179*], the sales assistant at Armari told us that the Celeron 333 is slightly slower than an equivalent Pentium II running at the same speed. The validity of either of these statements depends on the type of applications being used. In tests, we have found the Celeron 333 to be slightly slower at running business applications, whereas in games environments it can actually be more suitable than the PII. We were told that the Celeron would save us money, and so, keeping our business sense about us, we followed this recommendation.

The assistant recommended that for £20 we opt for Lotus SmartSuite rather than the more expensive Microsoft Office, but when our faxed spec arrived this had been changed to the inadequate Microsoft Works due to incompatibility problems with Windows 98. This was in spite of the fact that we were told on the phone that we would have no major problems with Windows 98.

Two graphics cards were offered: the Diamond Viper 330 with 4Mb SGRAM, which was recommended and accepted, and the Millennium G200 with 8Mb. Without having to check, the assistant was able to tell us that the monitor had a 1024x768 refresh rate of 85Hz. When we called back, a different, exceptionally knowledgeable sales assistant dealt with our purchase. He recommended upgrading to 100MHz RAM (the quote had been for 66MHz) and to a PCI sound card from the recommended ISA at no extra cost. Delivery was promised in ten days. Following this second assistant's performance, we felt reassured.

The company dropped its prices just a couple of days after we had placed our order. Manufacturers with less scruples may have let our order stand as it was but Armari called back and offered a free upgrade on both the hard drive and the graphics card. When the PC arrived, even the processor had been upgraded to a PII 350.

The system

All the drivers and manuals you could need were contained within the Asus motherboard box. However, there was little consideration given to the virgin user; it is assumed that you know what you're doing when setting up the PC. The NBX 350 was one of the larger PCs in the group test, and a dream for anyone who already has existing top-notch kit such as storage devices which they want to fit in their new PC. There were two spare forward-facing 5.25in drive bays, complementing two 3.5in units, one of which was internal, the other forward-facing.

Armari had opted for quality, branded components. For our money, we got a PII 350 processor, with the (seemingly now standard) 64Mb SDRAM. We also had the excellent Millennium G200 graphics card from Matrox, the Creative Labs SoundBlaster PCI 128, as well as the Diamond Supra 56K modem. The machine was equipped with a 6.5Gb Medallist Pro hard drive from Seagate.

Armari scored bonus points for its choice of monitor, the 15in Vision Master 350 from Iiyama. Offering 75Hz vertical refresh rate at 1024x768 resolution, this was an impressive performance from a monitor with an excellent OSD (on-screen display).

Technical support

Of all the technical support calls we made, the Armari help desk was the fastest to answer our call and the man at the other end identified himself as the technical support manager in charge of the help desk. This was not surprising, as Armari is a far smaller firm than multinationals like Dell and Gateway. Speaking in a polite voice, at times even enthusiastic, he correctly identified the problem. Of all the technicians to whom we talked, the Armari manager was the only one who gave two possible reasons for our (supposedly) blank monitor. He correctly informed us that it was either a loose graphics card or memory module, and offered to send an engineer over the next morning to repair the system.

Our second call, about a "defective" printer was, again, answered promptly. On being told that we had installed the latest drivers for the printer, he correctly assumed that the printer was not the default one in Windows and instructed us on how to make it so. For transferring large files from one PC to another, he suggested the Iomega Zip drive as being cheap and easily available.

PCW DETAILS

Price *£1,398 (inc VAT & delivery), £1,167 (ex VAT)*
Contact *Armari 0181 810 7441*
www.armari.co.uk
Good Points *Quality components. 56K modem. Excellent graphics card.*
Bad Points *Not user-friendly for novices.*
Conclusion *A quality piece of kit for someone who knows what they're doing.*

Sales Rating	
Details of spec given	★★★★★
Sales overall	★★★
PC Rating	
Build quality	★★★★★
Value for money	★★★★
Technical Support Rating	
Technical knowledge	★★★★★
Technical explanation	★★★★★

Dabs Direct Atlantis Home Office

Set up in 1987, this public limited company has bases in Bolton and Bracknell, and last year's annual turnover was in excess of £50m.

Sales

Dabs' freephone number was answered on the first ring by an automated service that put us into a queue of two. The company recommended an Atlantis Value bottom-end PC when we had outlined only the basics of our requirements. The representative said he would send out a catalogue, but didn't want to talk to us any more until we had received and read it, which made us wonder if the reps didn't know their product line as well as they should.
We later tried phoning Dabs' custom-build lines and were put into a queue. At 5pm our call was terminated even though we were still queueing.
We phoned back on a different occasion to check whether this occurred because their lines closed. We were informed that the line's closing time depended on whether the firm can get staff to work the line late in the day. On this second occasion, it was to remain open until 7pm.

So, back to General Sales, where we were 23rd in a queue. A recorded message assured us that our call would be answered in five minutes; it took 12. As we pretended to have read their catalogue, the company advised us that the 300MHz Pentium II is now obsolete, and because the Celeron is too slow, it is best avoided.

The next day we placed an order. Talking to a different salesperson, because no name had been given, this new assistant was helpful and knowledgeable, and advised us on a number of sensible upgrades such as a BX rather than LX chipset to take full advantage of the 100MHz frontside bus. This efficiency unfortunately came a little too late. Our Dabs buying experience failed to impress.

The system

The PC Dabs sent was the cheapest in this group test, although obviously this was partly due to the Dabs salespeople. We were impressed by the setup of the PC: for less than a grand it included a fair amount of impressive kit. Dabs had included a PII 333MHz processor along with the 64Mb of SDRAM, and a 32-speed Creative Labs CD-ROM drive as well as a 56K modem based on the Rockwell chip. We were not too impressed by the S3 Virge GX2 graphics card which, while useful enough for running 2D office applications, is not so suitable for playing relatively up-to-date 3D games. There was a respectable amount of expansion room inside the PC, with a stonking three 5.25in bays and one 3.5in bay all free and forward facing, as well as four DIMM slots, with the 64Mb filling just one of them.

On a user-unfriendly note, we were surprised by a missing plate at the rear of the PC that should have been covering up the motherboard. Instead, the USB, parallel and serial ports jutted out.
The Belnea 10 30 35 15in monitor was a disappointment, with substantial blurring at 1024x768 and unable to produce a healthy refresh rate at that resolution.

Technical support

Our first call to the Dabs Direct help desk was held in a queue for ten minutes. Unlike most other help lines, there was no music playing and so it was slightly irritating to listen to the ringing tone of a telephone for that length of time. The technician who came on the line was quite polite and immediately identified a loose graphics card as the problem behind our (supposedly) blank monitor. However, he could not identify any other possible reason, including a loose memory module. Having failed to teach us about reseating the graphics card, he offered to arrange for a courier to pick up the computer.

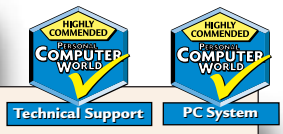
Our second problem, regarding the "reluctant" printer, was answered in the same polite manner by another technician. He suggested reinstalling the drivers and trying to print a test page. He also gave the printer manufacturer's technical support number. For transferring large files across PCs, the technician suggested an Iomega Jaz drive as it had a capacity of 1Gb and was good value for money.

PCW DETAILS

Price *£945 (inc VAT & delivery), £795 (ex VAT)*
Contact *Dabs 0800 558866*
www.dabs.com
Good Points *Very reasonable price.*
Bad Points *Unwanted access to the motherboard at rear. Graphics card.*
Conclusion *Affordable, impressive office machine.*

Sales Rating	
Details of spec given	★★★★★
Sales overall	★★
PC Rating	
Build quality	★★★
Value for money	★★★★
Technical Support Rating	
Technical knowledge	★★★
Technical explanation	★★★★

Dell Dimension XPS R350



Dell has a long-established reputation for selling direct to customers, whether individual home users or large corporate clients. Other companies, like NEC, have copied its successful direct-selling approach.

Sales

The call was answered after just one ring and we were asked our name, contact details and the use we would make of our new machine. We were then put on hold for an operator in the appropriate department who already had our details to hand — impressive.

Dell was quick to recommend a 350MHz-based system from its Dimension range, with a 10Gb hard drive and a 17in monitor. Throughout the call the telesales representative was efficient and courteous and seemed to have great faith in the products he was selling. We were a little disappointed that when enquiring about the monitor's refresh rate we were told that it was 800x600 (a resolution specification). This is a fairly fundamental mistake that we did not expect from the likes of Dell. An upgrade to a 3D graphics card with 8Mb onboard for better 3D game playing was recommended, but we were disappointed that should we opt to downsize to a 15in monitor from the standard 17in model supplied, we would save no more than £17. Windows 98 and Microsoft Office 97 Small Business Edition were bundled.

The assistant gave us his direct phone number so that we could call him back to place an order. We did this, and after having given our postcode, our details were called up and we were asked to confirm our spec and opt for either a mini-tower or desktop case. We turned down the offer of an upgrade to a three-year "collect and return" warranty, but there was no attempt at a hard sell to change our mind.

The system

The first thing to greet you on opening up the Dell box is the reassuring "Getting Started" poster that details in the simplest terms how to treat the equipment out-of-the-box and, more importantly, how to connect it all up. Underneath the poster was a box filled with every conceivable manual and driver diskette, including a copy of Windows 98 (not all manufacturers supply a copy — essential if you need to format your hard drive and start over).

For our wedge, Dell had supplied us with a Dimension XPS R350 with a fairly hefty specification. Along with the PII processor running at 350MHz and the 64Mb of SDRAM, there was a 9.3Gb hard drive from Maxtor, as well as the Xpert98 graphics card from ATi, fitted with 8Mb of SGRAM (the maximum amount available with that card). Internet access is provided by the US Robotics Sportster Winmodem, capable of connecting at 33.6Kbps. Everything was relatively neat and tidy inside, and there was plenty of room to upgrade, should you wish. Three free PCI slots, with one free ISA slot next to the modem, and all 64Mb of SDRAM was on one DIMM, leaving two DIMM slots free.

The 15in monitor was Dell's D828L, with 13.7in viewable. Those 13.7 inches were best viewable at 800x600 where the refresh rate was a healthy 85Hz; it dropped to 60Hz at 1024x768.

Technical support

Our first call to Dell was answered within a minute by the switchboard operator who routed us to the technical support desk. This wait was slightly longer and was answered by a polite technician. On hearing the "problem" of the blank monitor, he asked us to reconnect the cables and switch the system back on.

When we informed him of the two long beeps, he correctly identified the problem as a loose graphics card. He even took the effort to explain to us the role of a graphics card in a computer system. He then offered to send a courier to collect the PC.

Trying to stretch his patience, we insisted that Dell should repair our PC on-site, that afternoon. Still retaining his composure, he politely pointed out that our warranty did not cover on-site maintenance. When we continued to insist on it, he offered to expand our warranty to on-site maintenance for an extra £80. He also assured us that a technician would be able to come in that afternoon or the next morning.

Our second call was answered in the same prompt, polite manner. When asked about the best method for transferring data from one PC to another, the technician suggested an external Zip drive which connects to the parallel port.

PCW DETAILS

Price *£1,261 (incl VAT & delivery), £1,044 (ex VAT)*
Contact *Dell 0870 1524625*
www.euro.dell.com
Good Points *Expansive hard drive. Plenty of headroom.*
Bad Points *No speakers, despite having on-board sound.*
Conclusion *A quality performer.*

Sales Rating	
Details of spec given	★★★★★
Sales overall	★★★★
PC Rating	
Build quality	★★★★★
Value for money	★★★★
Technical Support Rating	
Technical knowledge	★★★★
Technical explanation	★★★★

Evesham Micros Prestige Scorcher

Evesham is based in Worcestershire. The company has five branches and is one of the UK's largest PC companies.

Sales

After having spent12 minutes on hold, we were recommended to choose the highest processor possible to run the latest games, but also warned to buy the cheapest possible processor the company offers to cover our needs, because whatever we bought would be obsolete within three years. A compromise was reached and we opted for a 333MHz Celeron, billed as being faster than a Pentium II of the same speed (see what Armari had to say about this, in its review on p170).

The machine was bundled with a Lexmark 1000 Colour JetPrinter, although the sales assistant advised against choosing this printer and suggested that we upgrade to a more suitable Hewlett-Packard DeskJet 690. The assistant informed us that the 15in CTX monitor had a refresh rate of 85Hz at 1024x768 which was, she assured us, the correct resolution to run a monitor of this size.

When we called back, our original contact was already busy on the phone but there was no offer to put us through to anyone else on the sales team. We called back once more and, because our contact was again busy, we were put on hold. After six minutes of waiting we asked to speak to anyone in sales, wondering why this had not been offered anyway, and had to wait a further four minutes.

The bundled Lexmark printer once again came in for criticism and we were warned that we would have to change cartridges on it. We turned down the offer of an upgrade. While frankness is admirable, the playing down of products in this way gave us a feeling of general unease about the remainder of our order.

The system

For a company that is proud of its sales to individual home users, we were surprised that Evesham had not opted for the immediacy of the "idiot's guide" poster that had greeted us on opening the Dell (p174) and the Mesh (p183) boxes. The rear of the Evesham PC was clearly and comprehensively labelled, though, so that even the novice would really have to put some effort into hooking it up incorrectly. Besides this, Evesham had included a wealth of information with the PC, as well as a folder which included manuals for the CD-ROM and graphics card.

Evesham had used a small tower case to house the Prestige PC, and the engineers had utilised the EX chipset in the Chaintech motherboard. The EX is principally designed for the Celeron and as such Evesham is cutting off a significant processor upgrade as the EX cannot handle a 350 or 450MHz processor. This minute motherboard nonetheless contained an AGP slot along with two ISA and two PCI slots. Filling the AGP slot was ATi's Xpert 98, a popular graphics-card choice of the companies here, and one of the PCI slots contained the SupraExpress 56Kbps modem using the Rockwell chip. At the price, this was a reasonably-configured PC and even after adding VAT and delivery charges, the Prestige was still one of the cheaper PCs in this group test. At our price point, the standard for monitors seemed to be 15in, and Evesham's offering was no different. Taxan's impressive Ergovision 550 offers 13.7in of viewable screen, and its manual image controls worked well.

Technical support

Answering our first call within two minutes, the technician at the Evesham help desk asked us to try and plug the monitor in to another PC in order to solve our (fictitious) blank monitor problem. When we reported it working, he identified a loose VGA card as the problem. When we pretended to be total novices, he proceeded to explain the purpose of a graphics card. He also tried giving us clear instructions for reseating the graphics card. When we asked for on-site technical support, he promised to send a technician over the next day.

Our second call to the Evesham help desk was held in a queue for about ten minutes and was answered by a technician who seemed to be suffering from a severe cold. To add to his misery, we again proved ourselves thoroughly inept when he tried to figure out our (concocted) problem with the printer. However, he was quite patient, and suggested reinstalling the drivers and securing the cable.

Intriguingly, he asked whether we had upgraded our operating system from Windows 95 to Windows 98. When we confirmed this, he said that the new operating system has wrought havoc with many other PCs' printer settings and that we should download the latest printer drivers from the manufacturer's web site. This is quite sound advice, as Windows 98 uses a different driver model from Windows 95. Indeed, it has caused problems with many PC peripherals like printers and CD-Rs.

PCW DETAILS

Price *£1,156.40 (incl VAT & delivery), £965.17 (ex VAT)*
Contact *Evesham 0800 496 0800*
www.evesham.co.uk
Good Points *User-friendly setup.*
Bad Points *The smaller motherboard may frustrate future expansion.*
Conclusion *A modestly-configured machine.*

Sales Rating	
Details of spec given	★★★★
Sales overall	★★★
PC Rating	
Build quality	★★★★
Value for money	★★★
Technical Support Rating	
Technical knowledge	★★★★
Technical explanation	★★★★

Gateway GP6 333

Gateway is one of the larger companies in this group test, a PC giant whose European manufacturing base is centred in Ireland.

Sales

We explained to a receptionist that we were looking for a business PC, before being put into a queue to speak to a sales representative who quickly recommended a 333MHz Celeron-based system. This business system included Word, Excel, Outlook and Microsoft Money, while Encarta and a pair of "standard" speakers should keep the kids happy. A fax modem was also included as standard and would meet our requirements to fax direct from applications such as Word.

Although no specific figures were given, we were assured that there was plenty of room for memory expansion, although unless we were using memory-hungry applications we should need no more than the standard 64Mb for quite some time. We were advised against downgrading from the package's 17in monitor, as 15in would apparently make us squint and is considered "very small" these days. It was eventually the low system price quoted that convinced us to stick with this recommendation.

The sales assistant's extension number should have helped when phoning back to order, but as her number was diverting to voicemail we were passed to general sales. The order number came to the rescue and without further delay delivery was promised within the next ten working days.

At the time we phoned, President Clinton was in the building, and we could hear him in the background giving a speech to the Gateway staff. We suggested that the assistant should dump our call and join in because it sounded like much more fun, but she assured us that we were their "number one priority". A nice touch.

The system

We may only have paid £945 (ex VAT), but then, Gateway wasn't exactly pushing the boat out. It had sold us a stripped-down, no-frills PC. We had purchased a PC housing the much-criticised Celeron, albeit one running at 333MHz. Of course, the GP6 was kitted out with the 64Mb of SDRAM that only six months ago seemed extravagant, but there wasn't much else for this reviewer to get his teeth into.

On-board graphics were provided by the Mpact graphics chip from Chromatic, a 4Mb chip that we hadn't come across before. The single ISA slot was filled with the Sportster 33.6Kbps modem from US Robotics. That left four free PCI slots and no AGP, should you have wished to try and upgrade your graphics capabilities. We have criticised other, similarly spartan specifications in this group test for their lack of expansion potential, but the Gateway PC did not suffer from these problems. There were spare bays for two forward-facing 5.25in drives, one forward-facing 3.5in and room for another two internal 3.5in drives, slung vertically.

Gateway had included its own branded 17in monitor, the excellent EV700 capable of a healthy 85Hz at 1024x768. User-friendly and comprehensive, with a great OSD, the monitor was a joy to use. Seeing as we had a 17in monitor rather than a 15in, Gateway's price was still competitive.

Technical support

Gateway has a most unusual system for answering technical support calls. After an initial five-minute wait, we were connected to a technician who put us on hold for another 15 minutes. This was followed by a connection to a four-way conference call being handled by a single technician. Predictably, this tactic produced some moments of mirth, particularly when all four callers tried to talk to the technician at the same time. he became confused as to which problems belonged to whom, and went off for a few minutes to refresh his memory or to ask a colleague. During these breaks, frustrated callers could be heard trying to sort out *each other's* problems. One of the callers even surprised us by suggesting a loose graphics card as the gremlin behind our blank monitor "problem". It was an excruciating 72 minutes before the technician was able to answer our question. Even then, he was constantly interrupted by new callers and we had to hold for an additional 25 minutes before he could complete the answers to our questions. The technician was polite and had good technical knowledge, but he sounded exhausted at times.

PCW DETAILS

Price *£1,068 (incl VAT & delivery), £909 (ex VAT)*
Contact *Gateway 0800 172000*
www.gateway.co.uk
Good Points *17in monitor.*
Bad Points *Limitations of the EX chipset.*
Conclusion *A no-frills performer.*

Sales Rating	
Details of spec given	★★★★★
Sales overall	★★★★★
PC Rating	
Build quality	★★★★★
Value for money	★★★★
Technical Support Rating	
Technical knowledge	★★★★
Technical explanation	★★★

Hi-Grade Winputer PV2 333

Hi-Grade has won its fair share of awards in *PCW* group tests, and was recently listed as one of Britain's 100 fastest-growing companies.

Sales

We were offered the choice of an EX or BX chipset. Hi-Grade explained that although the EX allowed us a maximum of a 333MHz processor and a 66MHz frontside bus, we would be wiser to opt for the BX, giving us the option of a 450MHz processor and a 100MHz bus. The assistant recommended that we opt for a 333MHz processor, citing the 450MHz as too expensive. His advice was to wait for a year until the price of the 450MHz PII had dropped to around £100 and then consider upgrading. He also recommended upgrading the 4Gb hard drive we had requested, to 6Gb which would cost us only £10 more. Warning us that Windows 98 was not yet particularly stable, he proposed sticking with Windows 95 at this time. He also suggested that we do away with the need for an extra high-capacity removable storage device by swapping our floppy drive for an LS120.

This assistant was very knowledgeable and able to talk competently and with interest about the Hi-Grade product line. He was not afraid to lead the conversation but always went at a speed we could follow, putting us at ease and never once making us feel we were being cajoled into buying more than we would need. At the end of the call he gave us his name and direct telephone number to use should we choose to place an order. This considerably speeded up the ordering process, and although there was a three percent surcharge on our American Express card, delivery was promised within five to ten working days.

The system

Rather than suffer the constraints of the EX chipset and motherboard which some of the other companies in this test had offered, Hi-Grade had used the BX chipset in tandem with Intel's PII 333 processor. Upon opening up the PC, we found the innards of the machine to be as neat and orderly as any can be, bearing in mind the number of wires floating around.

There was nothing in this machine that really stood out in terms of generous amounts of hardware. We had the standard 64Mb of SDRAM, a PII 333, the seemingly ubiquitous ATi Xpert 98 AGP card, as well as a generic 56K modem using the Rockwell chip. Hi-Grade is a large enough company to have its own branding on equipment, and this stretched to the ergonomically impressive Logitech mouse. With the roomy Asus P2B motherboard there was plenty of room for upgrading hardware, with four spare PCI slots, both ISA slots filled with the modem, and the Yamaha OPL3-SA sound card. There were two forward-facing 5.25in bays free, and an internal 3.5in unit free for a drive. Hi-Grade's own branding also extended to the 15in monitor it supplied with the system, the AlphaScan 511. It was a disappointing monitor, though, providing a blurred view of icons at the corners of the screen at an 800x600 resolution, and was almost unwatchable at 1024 x 768, despite its refresh rate of 85Hz.

Technical support

Our first technical support call to the Hi-Grade help desk was answered within a minute by a pleasant female voice. On hearing that the monitor was blank and Windows not booting up, the technician immediately identified the problem as a loose graphics card. When we asked whether that could be the only problem, she told us that was usually the case.

She then proceeded to give step-by-step instructions for opening up the PC and reinserting the graphics card. When we proved ourselves totally inept at even this simple task, she seemed slightly annoyed and condescending. When we insisted on on-site maintenance, she reminded us that our warranty did not cover it and that we would have to return the PC for repair.

Our second call was answered in the same prompt manner, this time by a male voice. To get the printer working again, he suggested updating the drivers, securing the cable to the parallel port and also making sure that Windows had identified the printer as the default unit.

For transferring large files across computers, he suggested using an external Zip drive and offered to sell us one. He also suggested a CD-R for archiving data.

PCW DETAILS

Price *£1,304 (inc VAt & delivery), £1,110 (ex VAT)*
Contact *Hi-Grade 0181 532 6133*
www.hi-grade.com
Good Points *Room for expansion.*
Bad Points *The monitor.*
Conclusion *A well-built machine.*

Sales Rating	
Details of spec given	★★★★★
Sales overall	★★★★
PC Rating	
Build quality	★★★★
Value for money	★★★
Technical Support Rating	
Technical knowledge	★★★★
Technical explanation	★★★

Mesh Elite Connect PII300

Compared to giants such as Compaq and HP, Mesh is a relative newcomer to the scene. It regularly makes an impression in our group tests, and has scooped armfuls of *PCW* awards in the past, so we were intrigued to see what it would offer in this undercover test.

Sales

Mesh recommended its "lowest spec" machine, a 300MHz Celeron, but we were told that we could opt to upgrade to a PII 300MHz if we felt the need. The details of both systems were given and we chose the Celeron at around £200 cheaper than the upgraded option.

The assistant put us on hold while he checked on the monitor's refresh rate, and at the end of the call we were told that we could speak to anybody when we called back to order. As it turned out, this was not helpful advice. We called back later that same afternoon and were asked for the name of our contact — we didn't know it. We were asked for the system name — he hadn't given it. We were asked for the system reference — it had not been given. In general, we felt that this second assistant was quite unhelpful.

Using our address details, she located our machine, told us it was the Connect 300 and named our original sales assistant. We asked to purchase the spec quoted but were told that Mesh was no longer dealing with 300MHz Celeron processors so we could not have the system detailed in our first call. We asked to upgrade to the 300MHz Pentium II, but neither was this available. In the end we had to upgrade to a 333MHz processor, thereby effectively changing the whole basis of our order. We were not impressed.

The system

Mesh is another company, along the lines of Dell, that never makes the mistake of overestimating its customers. "*Please Read This First!*" shouts the headline on the poster, the first thing you see when opening up the box. This clearly shows you how to set up your PC, even if you don't know your PCI from your PIM. There is also the reassuring sight of the Mesh pack, full of drivers on floppy and CD, complete with manuals.

The Mesh PC was kitted out with 64Mb and a PII 333MHz processor. Sound was provided by Creative Labs' SoundBlaster Vibra 16, graphics by ATi's Xpert 98 card. There is a fair amount of room for expansion, given the two free 5.25in bays with the two free 3.5in bays. The rear of the PC was not quite as user-friendly as the novice would hope: although labels such as "USB" and "Parallel" were stamped in the casing, this was not as impressive as the fully-integrated colour coding on some PCs.

Mesh scored points for its inclusion of the Taxan Ergovision 550, a 15in monitor that afforded an excellent 85Hz resolution at 1024x768 with an impressive OSD.

Technical support

Mesh has garnered a reputation for building excellent systems and we were hoping that this expertise would carry through to its help desk. Our first call was answered by a recorded message telling us that we would be attended to shortly — but "shortly" turned out to be 20 minutes. Right from the start, the support person who answered the call appeared very annoyed and gave only curt answers to our questions. When told about the (supposedly) problematic monitor, he immediately assumed it was a problem with the PC and did not bother to ask if the cables had been plugged in properly or whether it worked when connected to another system. He informed us that our warranty did not cover on-site maintenance and that the PC would have to be returned to Mesh for repair. He assured us that the system would be returned within five working days.

Our second technical support call was put on hold for 15 minutes. When posed with the (imaginary) problem of the non-working printer, the technical support person said that we should try downloading the latest drivers from the manufacturer's web site. He mentioned no other possible solutions.

PCW DETAILS

Price *£1,149 (inc VAt & delivery), £978 (ex VAT)*
Contact *Mesh 0181 208 4706*
www.meshplc.co.uk
Good Points *56K modem. An easy PC to set up.*
Bad Points *Hard drive not very big.*
Conclusion *A solid machine.*

Sales Rating	
Details of spec given	★★★
Sales overall	★★
PC Rating	
Build quality	★★★
Value for money	★★★★
Technical Support Rating	
Technical knowledge	★★
Technical explanation	★★

NEC Direct SM-333CL

We have featured a fair representation of PC manufacturers in Britain in this group test, and NEC Direct is a good example of one of the global brand giants with a base in the UK. Recently converted to the direct "model", it set up its direct-selling arm only this year.

Sales

Our call was answered by a receptionist within four rings. She then put us on hold for sales. Four minutes later, we were answered and then put through to yet another line. Throughout our call, a problem with the voicemail system meant that an automated system was continuously interrupting our conversations with the sales assistant. This was distracting and offputting.

The PC recommended, based around a 333MHz Celeron processor, had only 32Mb RAM. Although we pointed out that we already had this on our existing machine and were a bit worried because in our experience this seemed a little stingy, we were assured that it would be plenty for our needs.

A modem did not come as standard in the recommended machine but the telesales assistant was able to add a 56K model for around £40, allowing us to fulfil our wishes to fax from the desktop. At the end of the call NEC faxed a quote and promised to post a catalogue to us.

When we called back, our call was answered before the first ring and we were put in a queue. After five minutes we reached an operator who immediately accessed our specification through the use of the order number on the fax. NEC Direct was the only manufacturer to ask us to sign the quotation and send it back, but the company did not think to ask for our payment details, meaning we had to call back a few days later after NEC had left a message to this effect.

The system

The PC was set up for a first-time user. A large introductory poster was present when we opened the box. Oddly, bearing in mind this consumer-friendly touch, the ports on the rear of the PC were neither clearly labelled nor colour-coded.

This machine was one of the cheapest in the group test, and looking at the specification, the reason for this was immediately obvious. Kitted out with Intel's Mendocino Celeron processor, running at 333MHz with 128Kb of L2 cache, this was the only PC we saw with 32Mb SDRAM. That said, NEC had opted for the LX motherboard, rather than the EX, which meant that users could always upgrade to a PII, albeit cut off at 333MHz by the limitations of the LX. There was plenty of room to upgrade the PC inside. Even though the sound card and modem filled the PCI slots, there were still two free, and both ISA slots were empty. There was a spare 5.25in drive bay as well as two free 3.5in bays. There was a full set of manuals and drivers for the relevant components, all clearly labelled and bundled together.

Despite having ordered a 15in monitor, we ended up with a 17in NEC-branded C700 for only £40 more than the original price quoted for a 15in. We liked this monitor nonetheless, with its useful OSD and sharp focus.

Technical support

NEC has separate help desks for its various PC models. Although slightly confusing if the user does not know the exact model of his system, this does mean that the technicians are well equipped to handle the questions.

The NEC technician identified the (supposed) lack of image on the monitor as the result of a "hardware call on the motherboard". When asked to explain this in more palatable English, he said that a piece of hardware was sending the "wrong" signals to the motherboard. With more probing, he identified our (supposedly) malfunctioning hardware as the graphics card which, he said, was faulty and would have to be replaced. He did not consider the possibility that the graphics card or memory module might just be loose. As our call was made on a Friday morning, the technician said that an engineer would only be able to come over "early next week". Furthermore, he was not willing to promise that the engineer would arrive during the first days of the week.

Our second call, this time about our "faulty" printer, received the same indifferent response. The technician sounded disinterested and seemed eager to get us off the line. After much hassling on our part, he said the problem might be related to the printer driver installation and hence was not NEC's problem. He suggested contacting the printer manufacturer to sort this out.

PCW DETAILS

Price *£896 (inc VAT & delivery), £734 (ex VAT)*
Contact *NEC Direct 0870 333 6320*
www.necdirect-europe.co.uk
Good Points *Easy to set up. Plenty of potential to upgrade.*
Bad Points *Will 32Mb prove future-proof?*
Conclusion *Affordable, attractive PC.*

Sales Rating	
Details of spec given	★★★★
Sales overall	★★★
PC Rating	
Build quality	★★★★
Value for money	★★★
Technical Support Rating	
Technical knowledge	★★
Technical explanation	★★

Panrix Lightning 266

Panrix has developed a reputation at *PCW* for delivering top-notch machines to our group tests, and we were keen to see what would be delivered when we posed as an ordinary customer.

Sales

Panrix recommended one of its entry-level Lightning systems running Windows 98. A 266MHz Pentium II processor would take care of the business end of things and Lotus SmartSuite is bundled, which would replace the ageing applications we told the sales assistant we were currently using. The representative's knowledge of the system was demonstrated when he informed us that the 64Mb RAM would be supplied on a single module, leaving us with a further two slots free to increase this at a later date. He was also able to confirm that at 75Hz, the 1024x768 resolution refresh rate of the 15in monitor was above the recommended safe minimum. Although a modem was not included as standard, we added a 56K model to our spec for just £55. The assistant had this information to hand and did not need to keep us on hold while checking the facts.

A 3D accelerator card was recommended, ranging from £85 to £150 in price depending on the model we chose. We were assured that this was a necessary addition to any standard graphics card and that it would improve our game playing. It was then that a technical fault cut all the Panrix phone lines dead. When we later rang back to order, we were connected to our previous operator who remembered the system we had been discussing. There was a two percent surcharge on our American Express card and delivery was scheduled for the following week.

The system

Panrix is another company that presents the user with a welcoming poster as the first thing they see when they open up their new PC. For the unwary, the "Quick Start Connection Guide" details what goes where.

Our first reaction was one of surprise; believing that we had ordered a PC worth nearly £1,200 with 64Mb of SDRAM, we discovered that we had, in fact, ordered a PC worth £1,200 with 128Mb of SDRAM. Despite the PII 266 being considerably slower than the PII 350s in some of the other machines, we were even more impressed by the Lightning when we saw that all 128Mb was on one DIMM, leaving the other two DIMMS free in case we came up with some reason (or application) to need more RAM. Despite the Panrix PC being one of the more expensive in this test, we could at least see where our money had gone. Rather than the on-board graphics and sound we saw in other machines, the Lightning was fitted with the stormingly impressive Millennium G200 2D/3D card from Matrox. Diamond supplied the cards for both the 56K Supra modem and the Sonic Impact 64 PCI card. Additionally, Panrix had also kitted out the PC with a massive 10.1Gb IBM Deskstar hard disk. Bundled with the machine was a 15in Vision Master 350 monitor from Iiyama. At 1024x768 resolution, it provided a healthy 75Hz vertical refresh rate across its 13.8in of viewable screen.

Technical support

Our first call to the Panrix help desk would not connect due to a "temporarily unavailable" phone line (the telephone operator, rather than Panrix, is the more likely culprit). Our second call was answered after ten minutes by a technician who was laughing hysterically. However, after he had calmed down, he gave us the proper answers to the problem of our (supposedly) blank monitor. He then informed us that we would have to send in the PC for repair and that it would be returned within five working days.

We had to wait 20 minutes for our second call to be answered. The technician sounded distracted, as if he were searching for something. On hearing about the (imaginary) problematic printer, he suggested reconnecting the cable and downloading the latest drivers. He didn't pause to consider that the printer might not be the default one used by Windows.

During both calls, we could hear a lot of distracting noise in the background. At times we had to almost shout into the handset to make ourselves heard. The technician apologised for this and was polite at all times.

PCW DETAILS

Price *£1,197 (inc VAT & delivery), £999 (ex VAT)*
Contact *Panrix 0113 244 4958*
www.panrix.co.uk
Good Points *A generous amount of top-notch kit.*
Bad Points *One of the more expensive packages in this group test.*
Conclusion *A stunning configuration.*

Sales Rating	
Details of spec given	★★★★★
Sales overall	★★★★
PC Rating	
Build quality	★★★★★
Value for money	★★★★
Technical Support Rating	
Technical knowledge	★★★
Technical explanation	★★★

Tiny Computers Home Plus

Tiny Computers should be a familiar name to readers of *PCW*, as the company is one of Britain's largest PC manufacturers.

Sales

When we called Tiny, the phone rang 29 times and then we were cut off. On our second attempt we got through to a salesperson on the fourth ring. She said she would send us a brochure, but was happy to talk about the company's systems, recommending a Pentium II 333MHz-based machine, currently on offer at just under £1,000.

We were told that there was plenty of room to expand the system's memory to 256Mb, although it was not made clear whether this would involve replacing the memory already installed. We asked about an office package and were assured that the system came with Microsoft Money, a word processor, Encarta and a few games, as well as an Epson Stylus 300 printer.

The sales assistant had a reasonable level of knowledge and seemed to know the product line well. The only time it was necessary for her to leave the phone was to check on the refresh rate of the monitor. She explained that it was 85Hz unless you switched to the "top" resolution when it would drop to 65Hz. The resolutions involved were not explained, and we were not warned that at 65Hz the flickering screen would be unpleasant on the eye.

At the end of the call, the assistant gave her name and extension so that we could deal with her again. Upon calling back to order, our quotation was recalled via reference to our postcode. Without further ado, our order was placed and delivery within a week was promised. There was no attempt to sell us more.

The system

For £1,200, we had been expecting something more impressive than the PC we actually got. Onboard sound, onboard graphics, a single ISA slot and two PCI slots, plus 64Mb of SDRAM filling both the slots, leaving none free for expansion (despite what we had been told over the phone).

A small motherboard is fair enough, if the manufacturers make the most of it and use a small box to fit it in, thereby potentially saving desk space. Tiny, however, employed a standard-size box. The motherboard didn't even reach the bottom of the case, rendering the bottom three blanking plates useless as the motherboard doesn't reach them. This would not be a good buy if you wanted to upgrade your PC in the future. Apart from the tricky task of upgrading from onboard graphics to a graphics card (inadvisable) there was no AGP slot on the motherboard, even if you had wanted to buy a tip-top card. Having seen the system itself, although we got the Epson Stylus 300 colour printer, we would rather our money had been spent on the former.

Tiny was one of the few manufacturers to supply an unbranded 15in monitor with its system, and this could only produce 60Hz refresh rate at a 1024x768 resolution. There was no OSD, although the monitor had a set of decent manual controls instead.

Technical support

On calling up Tiny Computers' help line a voice informed us that no technical support was available by fax and that w would have to continue holding the phone line. After we'd spent five minute listening to Wagner's *Ride of the Valkyries*, a technical support person came on the line. On being posed with our "problem" of a monitor with no image, he asked whether all the cables were plugged in properly. When we told him they were, he jumped to the conclusion that the problem was a defective monitor. We even tried providing hints by mentioning the two long beeps when the computer boots up, but he assured us that this meant nothing and offered to send over a courier to pick up the monitor (which would be replaced within 48 hours).

He did not even ask if we could hear the sound of Windows booting up or whether we had tried connecting the monitor to a different computer.

Our second call, regarding a "non-working" printer, elicited better, more accurate, answers. The waiting period was a tedious 15 minutes, though. Overall we found Tiny's help desk to be polite, but inadequately trained.

PCW DETAILS

Price *£1,205 (inc VAT & delivery), £999 (ex VAT)*
Contact *Tiny 0800 731 3476*
www.tiny.com
Good Points *A printer is included.*
Bad Points *Everything else.*
Conclusion *A poor specification with almost no room for manoeuvre.*

Sales Rating	
Details of spec given	★★★★★
Sales overall	★★★★
PC Rating	
Build quality	★★★★
Value for money	★★
Technical Support Rating	
Technical knowledge	★★
Technical explanation	★★★

How we did the tests

Sales

When buying these PCs, we had to assume an identity other than that of IT journalist. We assumed the guise of a small businessman; a sole trader who would mainly use the machine for word processing, spreadsheets and accounts. We had a couple of children who were keen to play games, so we wanted the manufacturers to recommend a graphics card that would cope with the demanding requirements of modern entertainment.

We told the manufacturers that we were currently using a P90 with a 1Gb hard drive ready to burst its seams. Our theoretical machine had originally been supplied with a rather feeble amount of memory that we had increased over time to 32Mb. This meant that all of our memory slots were full, so we wanted to make sure that our new machine could grow as our needs evolved.

We expected suppliers not only to know their product line, but also to have some general technical knowledge. They would be expected to explain simple concepts like refresh rates, and delving into the realms of chipsets and upgrade opportunities would score them extra marks. Although we had some idea of the system we wanted to buy, we were open to suggestions, to see whether the suppliers would try to sell us upmarket or downgrade our requirements to match a standard product line.

Rather than buying our PC there and then, we set one final test: we asked for a period of reflection and phoned back later that day to see whether the suppliers had accurately recorded our specifications. Although we did not want to repeat them, we did want to make sure that should we be put through to a different sales assistant on our second call, he or she would be able to pick up from where the first assistant left off.

The systems

Once we had the machines in the labs, we ran two sets of tests on them: Final Reality to test their graphics capabilities, and SYSmark 98 on Windows 95 and Windows 98 PCs to test the speed of the machines when running 2D office applications.

The SYSmark test measures the speed of the PC running eight common office applications and the time taken by the PC to perform a variety of tasks in each application. Each test is run three times to ensure consistent results. 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, SYSmark scores accurately reflect how the machine will perform in a real-world situation. The better the score, the longer the bar in the graph. We have also marked our Editor's Choice and Highly Commended machines, so it is easier to spot the winners.

Final Reality is a suite of tests designed to examine the processing power of the 3D accelerator on your graphics card, 2D image processing, and AGP. It runs under Windows 95/98 and DirectX 5, and uses a 3D engine developed by Remedy. It supports Direct3D, a 3D standard developed 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. The visual appearance factors are weighted in importance and combined with the overall processing speed to produce an overall mark. So, the higher the score and the longer the bar, the better the result.

Technical support

Technical support is one of the critical areas that customers need to consider while buying a computer. This is particularly relevant to first-time buyers who may not be very computer literate. Unfortunately, this is also one of the areas about which buyers often forget to enquire and which companies tend to neglect.

We tested the technical support lines of all the companies in our group test by calling at different times and on two different days. This way, we could ask more questions and have the chance to speak to more than one technical support engineer. Most of our questions dealt with problems that are likely to be faced by buyers and were fairly non-specific. We did not, for example, claim to have any major problems with the PC.

During our first set of calls, we pretended that there was no picture on the monitor that came with the PC. There could have been three possible causes for this: a loose signal cable, a loose graphics card, or a loose memory module. In the last two cases, most computers give two warning beeps. Any qualified technical support person should be able to identify the problem as one of the above three, and one of the last two when we dropped the hint about the beeps.

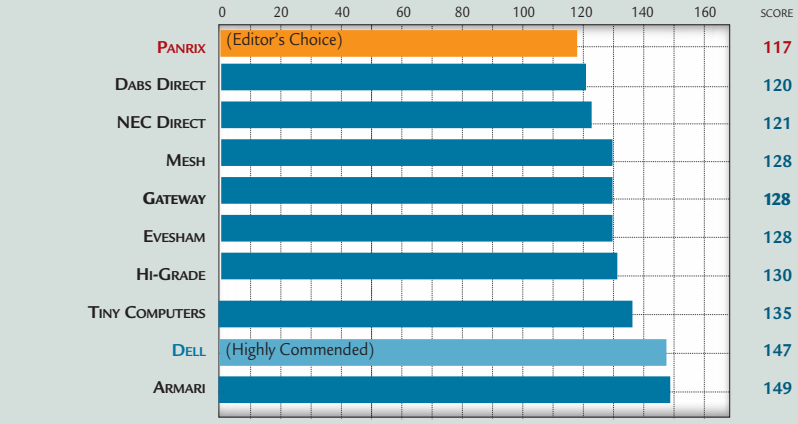
On this first call we also asked for advice on the best way to transfer our data from our old PC on to the new one. As many of the systems had little more than standard floppy drives for transferring data between PCs, this gave us the chance to ask about bulk transfer of files. The most common answer to this problem would be to buy an Iomega Zip drive.

On our second call, we stuck to mundane questions, seeing how quickly the technical support engineers would tire of our call. We asked how to get around the problem of a non-working printer (a component which had not been supplied by the PC manufacturer) to see whether or not they were willing to offer support on this. We also asked about the best way to fax a document from Windows 98, and the best method to get the £ instead of the $ symbol on-screen — questions intended to test their patience with us, as well as how well they could talk through a solution. Finally, we asked whether we could get the Euro symbol on the screen using the keyboard. We knew that this would be baffling to many technicians, as Microsoft has so far refused to incorporate the Euro symbol into its products.

On the second round of questions, all the technicians were able to give competent answers. However, to see if we could provoke a response, we pretended not to understand them. This often annoyed them and some did show their frustration. The truly professional technicians, however, repeated their answer in detail.

PCW Labs Report

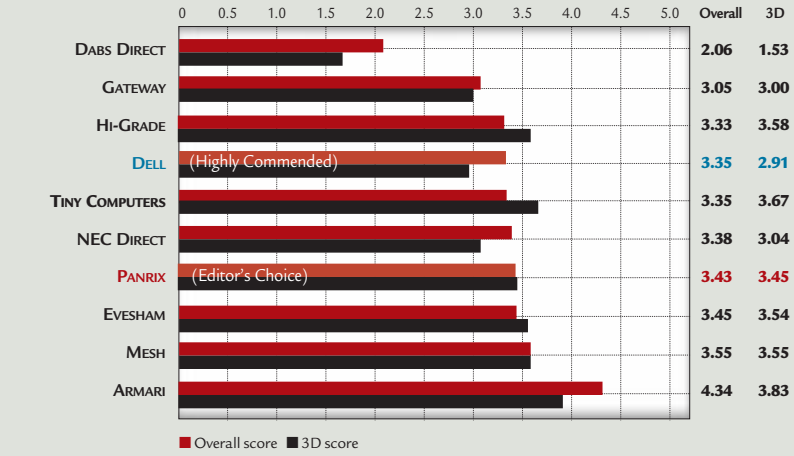
Sysmark 98 scores



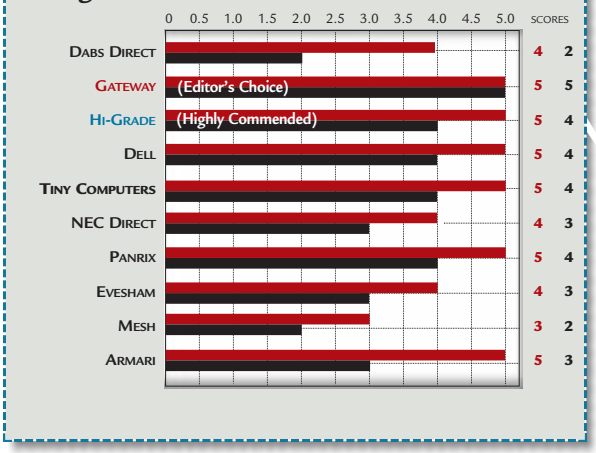
It might seem a little odd that our Editor's Choice is the Panrix, when it scored the lowest of the group in the Sysmark tests. The reason for its score was its PII 266 processor, outgunned by those PCs with a PII 333 and PII 350. However, Panrix will be supplying the machine with a PII 333 for the same price, and otherwise it was one of the best specified PCs, and the best built, in the test. It is no coincidence that the Armari and the Dell machines were the only two with the next-generation 350MHz processor and the 100MHz front-side bus. While the 350MHz processor is only marginally faster than the PII 333 when running with 66MHz bus RAM, it gets its kick from the 100MHz bus.

The Armari PC again triumphed in our Final Reality tests, kitted out with the excellent Millennium G200 card from Matrox with 8Mb of SGRAM. The slower graphics chips on the Dabs and the Gateway, combined with a measly 4Mb of SGRAM, also slowed down each of these machines. The 32Mb of SDRAM with which the Dabs was fitted undoubtedly contributed to its last-place position, as all the other machines had a more robust 64Mb. The Millennium G200 card won a Highly Commended award in our last graphics card group test and is one of the best all-round cards available.

Final Reality scores



Ratings for sales service



Ratings for technical support

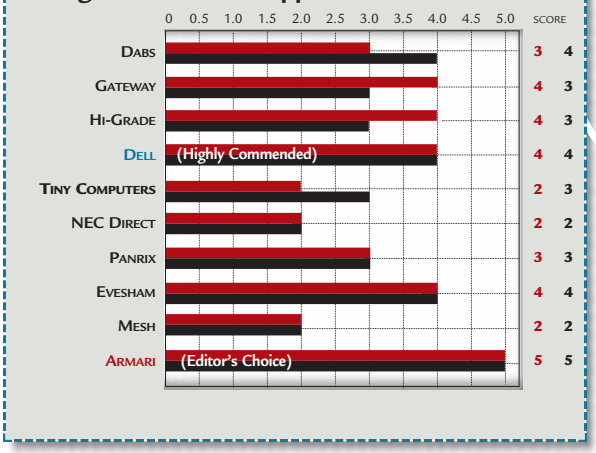


Table of features





Manufacturer	Armari	Dabs Direct	Dell	Evesham Micros	Gateway
Model Name	**NBX-350**	**Atlantis Home Office**	**Dimension XPS R350**	**Prestige Scorcher**	**GP6-333C**
Price (ex VAT)	£1,167	£795	£1,044	£965	£909
Price (inc VAT + delivery)	£1,398	£945	£1,261	£1,156	£1,068
Telephone	0181 810 7441	0800 558866	0870 152 4625	0800 496 0800	0800 172000
Fax	0181 810 8846	0870 129 7000	01344 723695	01386 769795	00353 1848 2022
Web address	www.armari.co.uk	www.dabs.com	www.euro.dell.com	www.evesham.co.uk	www.gateway.co.uk
Hardware Specs					
Processor	PII 350MHz	PII 333MHz	PII 350MHz	Celeron 333MHz	Celeron 333MHz
SDRAM	64Mb	64Mb	64Mb	64Mb	64Mb
L2 cache	512Kb	512Kb	512Kb	128Kb	128Kb
Hard disk	Seagate Medalist	Seagate Medalist	Maxtor	Samsung	Quantum Eclipse
Size/Interface	6.5Gb UDMA	3.2Gb UDMA	10Gb UDMA	6.4Gb UDMA	6.4Gb UATA
Motherboard Components					
Motherboard manufacturer	Asustek	Abit	Dell	Chaintech	Intel
Model	P2B	440BX	XPSR	ESA	Andover
Chipset	440BX	440BX	440BX	440EX	440LX
Expansion and I/O					
No. of free 3.5in bays	2	3	3	1	3
No. of free 5.25in bays	2	1	1	2	2
AGP slot	Yes	Yes	Yes	Yes	No
No. of free PCI/ISA/shared slots	2/2/1	4/1/1	2/2/1	0/1/1	3/0/1
No. of USB ports	2	2	2	2	2
No. of Serial ports	2	2	1	2	1
No. of Parallel ports	1	1	1	1	1
No. of PS2 ports	2	2	2	2	2
Multimedia					
CD-ROM manufacturer	Asustek	Creative Labs	Teac	Panasonic	Mitsumi
CD-ROM speed/interface	40X/EIDE	32X/EIDE	32X/EIDE	32X/EIDE	32X/EIDE
Sound card manufacturer	Creative Labs	Pine	Crystal	ESS (onboard)	Creative Labs
Sound card model	SoundBlaster 128	Schubert 64	Sound Fusion	Solo 1	AudioPCI 64
Speakers	Yamaha YST	Logic3 Maxim 60W	None	Zyfi	GCS 100
Graphics card	Matrox Millennium G200	S3 Virge GX-2	ATi Xpert98	ATi Xpert 98	Chromatic Mpact
RAM/Max RAM/type	8Mb/16Mb/SGRAM	4Mb/4Mb/SGRAM	8Mb/8Mb SGRAM	8Mb/8Mb SGRAM	4Mb/4Mb SGRAM
Graphics card interface	AGP	AGP	AGP	AGP	PCI
Monitor	Ilyama VisionMaster 350	Belinea 10-50-35	Dell	Taxan Ergovision 350	EV700
Monitor size	15in	15in	15in	15in	17in
Refresh rate at 1024x768	85Hz	60Hz	85Hz	85MHz	85Hz
Other Information					
Modem	Diamond SupraExpress	Dabs 56 Internal	USR Winmodem	Rockwell	USR Winmodem
Modem speed	56K	56K	56K	56K	56K
Misc hardware	-	-	-	-	-
Bundled software	MS Works v4.5	Lotus SmartSuite 97	Office SBE 97	MS Office SBE	Win98, Office SBE II
		13-title software pack	BT Internet, one month		Cypress Megaphone
					McAffee Antivirus
Standard warranty	1yr on site	1yr on site + 4 yrs labour	1yr collect-and-return	2yr on site	1yr on site
Options	3yrs on site	Extensions to on-site	1yr on site (2nd/3rd c & r)	3rd yr upgrade	Upgrade 3yr on-site
			3yrs on-site		
Tech support no.	0181 810 6491	0870 1293350	0870 9080800	Non-disclosable	0800 552000

Table of features





Manufacturer	Hi-Grade	Mesh Computers	NEC Direct	Panrix	Tiny Computers
Model Name	**Winputer PV2 333**	**Elite Connect PII 300**	**SM-333CL**	**Panrix Lightning**	**Home Plus**
Price (ex VAT)	£1,110	£978	£734	£999	£999
Price (inc VAT + delivery)	£1,304	£1,149	£896	£1,197	£1,205
Telephone	0181 532 6133	0181 208 4706	0870 333 6320	0113 244 4958	0800 731 3476
Fax	0181 532 6101	0181 208 4493	01506 402520	0113 2444962	01293 822514
Web address	www.hi-grade.com	www.meshplc.co.uk	www.necdirect-europe.co.uk	www.panrix.co.uk	www.tiny.com
Hardware Specs					
Processor	PII 333MHz	PII 333MHz	Celeron 333MHz	PII 266MHz	PII 333MHz
SDRAM	64Mb	64Mb	32Mb	128Mb	64Mb
L2 cache	512Kb	512Kb	128Kb	512Kb	512Kb
Hard disk	Quantum	Seagate	Maxtor	IBM Deskstar	Fujitsu
Size/Interface	6.8Gb UDMA	6.4Gb UDMA	6.4Gb UDMA	10.1Gb UDMA	6.4Gb UDMA
Motherboard Components					
Motherboard manufacturer	Asustek	Asustech	Micronics	Asustek	Microstar
Model	PB2	P2B	440LX	P2B	MS6312
Chipset	440BX	440BX	440LX	440BX	440EX
Expansion and I/O					
No. of free 3.5in bays	2	1	2	1	1
No. of free 5.25in bays	1	2	1	1	1
AGP slot	Yes	Yes	Yes	Yes	No
No. of free PCI/ISA/shared slots	4/3/1	3/2/2	2/1/1	2/3/1	2/0/0
No. of USB ports	2	2	2	2	2
No. of Serial ports	2	2	2	2	1
No. of Parallel ports	2	1	1	1	1
No. of PS2 ports	2	2	2	2	2
Multimedia					
CD-ROM	Teac	Teac	Toshiba	Asustek S-400	Panasonic
CD-ROM speed/interface	32X/EIDE	32X/EIDE	32X/EIDE	40X/EIDE	32x/EIDE
Sound card manufacturer	Yamaha	Creative Labs	Creative Labs	Diamond	Yamaha
Sound card model	OPL3-SA	SoundBlaster 16	AudioPCI 64	Sonic Impact	XG 32 integrated
Speakers	Jazz 7W	Contec	Labtec LS1025	Yamaha M20	Tiny CPR50
Graphics card	ATi Xpert 98	ATi Xpert98	ATi Xpert 98	Matrox Millennium G200	ATi Rage Turbo (onboard)
RAM/Max RAM / type	8Mb/8Mb/SGRAM	8Mb/8Mb SDRAM	8Mb/8Mb/SDRAM	8Mb/16Mb/SGRAM	4Mb/4Mb/SGRAM
Graphics card interface	AGP	AGP	AGP	AGP	AGP
Monitor	Hi-Grade AlphaScan511	Taxan Ergovision 550	NEC C700	Ilyama VisionMaster 350	Tiny Computers
Monitor size	15in	15in	17in	15in	15in
Refresh rate at 1024x768	85Hz	85Hz	85Hz	85Hz	60Hz
Other Information					
Modem	Modular Tec	Internal PCI	Diamond SupraExpress	Diamond SupraExpress	Etech
Modem speed	56K	56K	56K	56K	56K
Misc hardware	-	Lexmark 1100 printer	-	-	Epson Stylus Color 300
	-	-	-	-	Joystick
Bundled software	MS Office 97 SBE	Lotus SmartSuite97	MS Word 97	Lotus SmartSuite 97	MS Family pack
		Windows98	MS Works 4.5		Dorling Kindersley
			CorelDraw7		pack
Standard warranty	1yr on site (parts+lab)	1yr collect-and-return	1yr on site	1yr pts+lab, return to base	1yr collect-and-return
Options	Extra yrs on-site	Upgrade to on-site	Upgrade to 3yrs	Upgrade to 1/2yr on-site	1yr on-site
Tech support no.	0181 532 6199	0181 208 4791	0870 901 8000	01132 444948	01293 821222

Editor's Choice

Our awards reflect the service that you, the buying public, can expect from PC manufacturers.

For this test decided to hand out a range of awards, covering sales service, the PC system and technical support. In each category we have awarded one Editor's Choice and one Highly Commended.

Best sales service

In actually purchasing our kit, the level of service we received varied greatly between the ten manufacturers we approached. In making our enquiries we were keen to ensure that the companies approached could sell an ordinary purchaser, who had a competent, although by no means exceptional, knowledge of computers, a product that would meet their needs. On the whole, we were largely pleased with our experiences.

It should be remembered that this test provides a "snapshot" image of the service received from just one or two representatives from any particular company on a particular day. But when you're spending a large sum of money on a computer, it is only reasonable to expect courteous, competent service. Of the companies featured here, it was Gateway which most ably fulfilled this requirement. The representative's comment that we were her "number one priority" was demonstrated by the way the company handled our call, its staff taking their time to consider our requirements and ensuring that the enquiry and ordering process was as swift and as painless as possible.

▶GATEWAY — BEST SALES SERVICE

We also salute Hi-Grade. The company's sales assistant demonstrated an excellent knowledge of the firm's product line and of computer hardware concepts in general. We were lead by the hand from start to finish but never felt that we were being patronised or encouraged to spend money on components we did not need. A range of sensible upgrade options that would considerably extend the useful life of our purchase was proposed.

Gateway and **Hi-Grade** receive our **Editor's Choice** and **Highly Commended** awards respectively.

Best PC systems

This was by no means a usual group test; we had after all made our buying decision based on the advice of the salespeople. In so doing, we had been persuaded in some instances to spend slightly more or slightly less than our original budget of £1,000 (ex VAT). So, despite not having the usual set price limit, we were still swayed by price when deciding which machines should be given awards.

Commiserating pats on the back should go to the well-built, impressive machine we received from Gateway and the very affordable Dabs Direct PC. After much deliberation, the Armari NBX-350 PC narrowly missed out on an award. Instead, the **Dell Dimension XPS R350** is **Highly Commended**. Both machines had similar specifications (PII350 processors, 64Mb) and although the Armari had the edge over the Dell in a few departments, the XPS R350 had a massive hard drive and was £100 cheaper. As stated, although price was not a major factor, because we were buying these PCs ourselves, when we were faced with two similar machines, their costs were taken into account in our final decision.

Editor's Choice in this section is the excellent **Panrix Lightning 266**. Kitted out with 128Mb of SDRAM, the Matrox Millennium G200, and even a PII 266 processor, we were very impressed.

● At the time of going to press, we learnt that Panrix was about to replace the soon-to-be-defunct PII 266 processor with a PII 333, for the same cost.

▼PANRIX LIGHTNING 266 — BEST PC SYSTEM

Best technical support

No matter how experienced a PC user you are, there are always going to be occasions when you need to call technical support. Before buying a system, you would be well advised to make detailed enquiries about the level of technical support available, and for how long. Some companies offer lifetime phone support, while others may limit the free telephone support to a few years. Others are even planning on charging for calls made to the technical support help desk. From the calls we made, it is obvious that there is tremendous disparity between the level of support offered by various manufacturers.

Armari is our **Editor's Choice** for the best level of technical knowledge displayed by any help desk and the courteous manner in which they answered our queries. The technicians also exhibited a willingness to respond quickly by offering to send a courier to pick up the system.

▲ARMARI — BEST TECHNICAL SUPPORT

The **Dell** help desk is deservedly **Highly Commended** for the ease with which we got through, and the professionalism evident in the way the technicians handled our queries. Their offer to upgrade our warranty to on-site service even after the problem had occurred, is very rare in this industry.

Comms and get it

Internet bandwidth may be stretched to the limit, but at least the new V.90 modem standard for dialup comms speeds up connectivity. Roger Gann reviews a range of desktop and PC Card modems and assesses comms technologies, present and future.

Dial-up comms entered the nineties (the V.90s, that is) last February when the International Telecommunications Union (ITU) formally "determined" a single 56K modem standard. The new V.90 standard, which offers 56Kbps throughput downstream from your ISP and 33.6Kbps upstream, will last far longer than the V.34 standard it supersedes and is likely to be the final analogue modem standard. For the majority of web users, using a V.90 modem will be the most popular method of accessing the internet for some years to come. But if we are to fulfil the promise of the internet, the V.90's 56Kbps is not going to be fast enough. So from where will this bandwidth come? It's unlikely to come from the phone system: we've run out of steam when it comes to pumping data down the analogue PSTN (Public Switched Telephone Network). With 64Kbps digital links connecting BT's exchanges, there's an absolute ceiling on the data throughput we can expect from a normal dialup connection. In a couple of years we'll see ADSL and cable modems delivering data throughput in excess of 1Mbps, but that is jam the day after tomorrow. They will carry a premium and not everybody will have access to them.

What are the immediate prospects for faster dialup connectivity? Not good, this side of the millennium. Cheap, high-speed links to the internet threaten BT's lucrative leased-line and ISDN business, and BT is in no hurry to introduce them. ADSL and cable, which primarily offer internet connectivity, cannot replace point-to-point solutions like ISDN and leased lines, but the promise of bandwidth in excess of even a T1/E1 1Mbps leased line, at a fraction of the cost, will make many companies rethink their connectivity strategies. But isn't cable poised to swoop in and take advantage of this hiatus? It's true, the cable companies have a head start over BT; but cable modems seem bogged down at the trailing stage and commercial availability remains distant. Some of this reluctance on the part of the telcos can be placed at the door of free US local phone calls. US telcos cannot wait to introduce ADSL, a new, chargeable service which will bring in revenue and relieve pressure on the PSTN. In the UK, no such pressure exists. Until cable modems get going, why should BT cut its own throat? It may be that we will see no significant progress on the ADSL front from BT until 2001.

In the pages which follow, we review all the options: modems, ISDN, and the up-and-coming technologies. We look at which is likely to give you the best connection at the best price, and at which technologies are going to stick around and those that are already past their sell-by date.

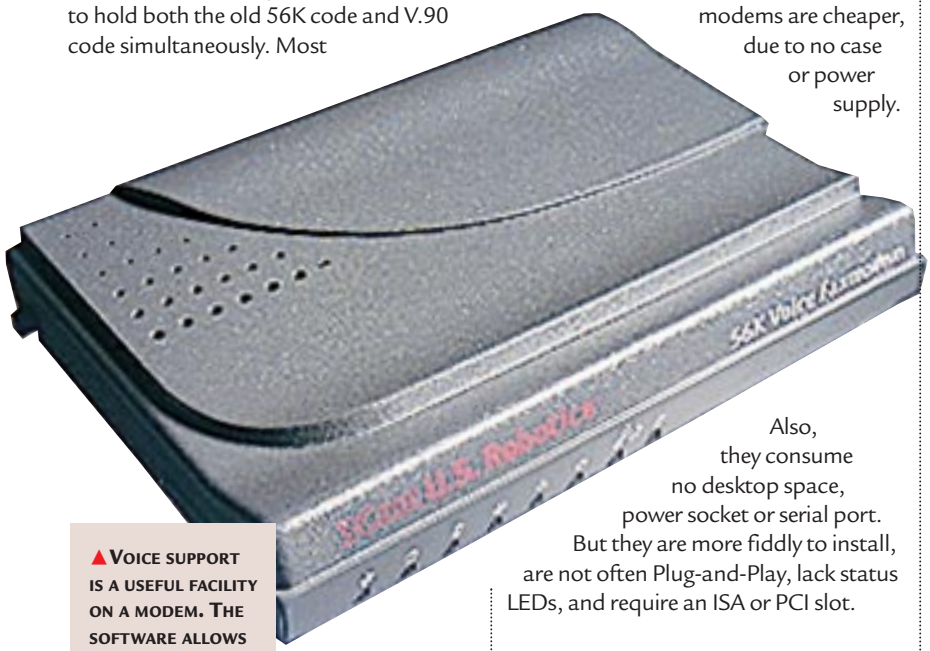
Contents

What to look for in a modem

Here we explain the ins and outs of a modem, to prepare you for that all-important purchase.

Most V.90 modems use either the Rockwell chipset or the US Robotics (now 3Com) chipset and so will have near identical basic functionality. They will all offer a complete range of connect speeds, from 300bps right up to 56Kbps. They will also offer V.42bis data compression, which can compress data by as much as a factor of four, thus accelerating downloads, plus V.42 error correction. Another common feature will be fax support: as well as being able to send and receive faxes at 9.6Kbps, the speed supported by most fax machines, most will also support faxing at 14.4Kbps.

Flash upgradeability is an important feature. All current 56Kbps modems are upgradeable to V.90, provided the firmware is available, but there are some pitfalls here. The better modems have 2Mb of flash memory which allows them to hold both the old 56K code and V.90 code simultaneously. Most dual-mode modems let you dial different ISPs and still get the best throughputs, irrespective of whether or not they have upgraded to V.90. Modems with 1Mb of flash memory can hold only one set of firmware, which means that if you upgrade to V.90 and your ISP hasn't, you'll connect at speeds no faster than 33.6Kbps. The transition to V.90 could be a lengthy business, perhaps as long as a year, so a dual-mode capability is important. At present, none of the major ISPs is offering V.90.



▲ VOICE SUPPORT IS A USEFUL FACILITY ON A MODEM. THE SOFTWARE ALLOWS YOUR PC TO ACT AS A VOICEMAIL SYSTEM

Internal/external modems An external modem is easy to install, is Plug-and-Play, and can be reset. It has good status LEDs, is portable, and often has a volume control. But it takes up desk space, requires a mains socket, and eats a serial port. You will also have to ensure that the UART (Universal Asynchronous Receiver-transmitter), the chip controlling the serial port, is 16550 UART with FIFO (First In First Out) buffers. If you have a 16450 UART, it might be an idea to upgrade or use a serial card. Internal modems are cheaper, due to no case or power supply. Also, they consume no desktop space, power socket or serial port. But they are more fiddly to install, are not often Plug-and-Play, lack status LEDs, and require an ISA or PCI slot.

Modems can be inscrutable devices and it's nice to have some sort of clue as to what they're doing

LED Modems can be inscrutable devices and it's nice to have some sort of clue as to what they're doing at any point in time. The best modems come with a proper display that tells you things like connect speeds and data compression. Most others make do with a set of up to twelve LEDs to indicate status. Check that these are easily visible in daylight (many aren't) and that they have meaningful labels, too. Internal modems, of course, lack this luxury.

Soft modems are cheaper because they dispense with some hardware and rely on the host PC's CPU to do the work via software emulation instead. They're not a great solution.

Leads and cables The better external modems should come with separate (as opposed to captive) leads. Also, check that there is a pass-through connector for a telephone handset. Ideally this will have a BT-style socket, but many modems come with RJ-11 adapter leads.

Voice support Increasingly, more modems offer voicemail support as standard. This allows your PC to act as a small-scale but still relatively sophisticated voicemail system, similar to those you come across when you dial large companies. Or, you can use the modem as a simple answering machine. Often, these facilities are poorly explained. Typically, the voice software supplied is either SuperVoice or Trio Comms Suite. Some modems can be used as a speakerphone: while some have the requisite sound hardware and so have sockets for speakers and a microphone, others require a sound card. Some can even function as a standalone message centre with the PC switched off. If you are a gamer and like playing across the internet, some modems offer simultaneous voice and data, allowing you to "talk" to your opponents as you play.

V.80 support Not an essential standard, but it's a Good Thing to have if you're intent on using voiceover IP (internet protocol).

Documentation A small point, perhaps, but increasingly modems are shipping with ever-skimpier documentation. Complete listings of the AT command set are very useful, as are instructions detailing use of the sound hardware. Some modems come with good online help files, though.

3Com 56K Voice Faxmodem

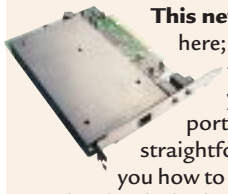
This is the first "USR" x2 modem to wear the 3Com badge. As with other voice modems, it offers the usual features like fax on demand, multiple voicemail boxes and remote message retrieval. It's a dual-mode modem and conveniently supports x2 and V.90 out of the box. Installation under Windows 9x is straightforward. The thickish User's Guide and Reference Manual is surprisingly bad, with some crucial setup diagrams marred by illegible labels, poorly arranged, and with no real explanation of how to use the voice aspects of the modem. Given its price, this is inexcusable.

PCW DETAILS

Price *£119 (£101.28 ex VAT)*
Contact *3Com UK 0118 922 8200*
www.3com/mobile

Usability	★★★
Overall	★★★

Aztech 56K PCI Modem



This new modem stands out from the others here; it is an internal modem and PCI (rather than ISA). It is truly Plug-and-Play, so you don't need to configure the serial port settings. Installation is therefore straightforward. The user manual shows you how to install the modem but little else, and there are no upgrade instructions. This Aztech modem has some nice features like support for "wake-up on ring" power management. It's a K56flex voice modem based on the Rockwell chipset but this wasn't apparent when running V.90 firmware. Worse, the Aztech web site didn't mention the modem.

PCW DETAILS

Price *£79.95 (£68.04 ex VAT)*
Contact *Micro Peripherals 01256 707070*
www.aztech.com.sg

Usability	★★
Overall	★★★

BT Prologue K56EV Plus

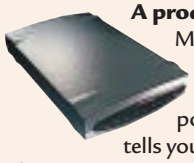
The Prologue is a K56flex modem but a V.90 firmware upgrade is not available at present. Unlike the others in this group, the Prologue is not supplied with a modem INF file so has to be set up as a standard modem. And, it comes with only skimpy installation instructions. The Prologue's status LEDs are bright but the labels are difficult to read. It has convenient front-mounted jacks for the included mic headset, which lends itself to AudioSpan/ASVD gaming. Voice software is the venerable but dependable SuperVoice v2.2. Overall, this is an unremarkable modem.

PCW DETAILS

Price *£99.99 (£85.10 ex VAT)*
Contact *BT Sales 0800 800800*
www.shop-atworl.bt.com/business/data.htm

Usability	★★★
Overall	★★★

Compaq 56K External Fax Modem with Voice



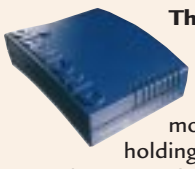
A product of Compaq's acquisition of Microcom, this is the first modem to bear the Compaq badge. It has a suitably businesslike appearance, except for dim, poorly labelled LEDs. Paper documentation tells you how to install, and the remainder of the documentation is provided in high-quality Acrobat format on CD. The disc also contains Trio Communications Suite 5.3. As expected, installation under Windows 9x proceeded smoothly. The Compaq is a single-mode K56flex modem but despite hunting high and low for a V.90 upgrade, I could find no trace of it at Compaq's rather confusing web site.

PCW DETAILS

Price *£88.13 (£75 ex VAT)*
Contact *Compaq Computer 0845 270 4000*
www.compaq.co.uk

Usability	★★★
Overall	★★★

Diamond SupraExpress 56ePRO



The new 56ePRO sports a number of subtle improvements, including status LEDs which are now easier to read and a non-captive serial lead. This is a 2Mb dual-mode modem, holding K56flex and V.90 firmware. The modem is also Shotgun-ready [see p223] and supports AudioSpan/ASVD gaming. There is no other voice support. The cursory installation instructions were wrong, but using the CD installation was easy. The default DTE speed was set low, at 57.6Kbps rather than 115.2Kbps, but from then on it speedily delivered the goods.

PCW DETAILS

Price *£75 (£63.83 ex VAT)*
Contact *Diamond Multimedia 0118 9444401*
www.diamondmm.com/56k/

Usability	★★★★
Overall	★★★★

LASAT Safire 560 Voice

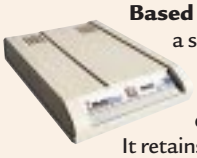
The Safire 560's bevelled black strip on the front contains membrane switches for power and volume, plus eight easily-visible LED status lights. The rear panel is taken up by the various sockets. Disappointingly, the Safire 560 is not V.90 enabled: LASAT is waiting until the technology stabilises before releasing the firmware upgrade. The 560 does come with a reassuringly thick (but dull) user manual, though, and a CD full of goodies including the Trio Communication Suite voice software. Installing the modem was the usual Windows 95 no-brainer and in a few minutes I was up and surfing at 46Kbps.

PCW DETAILS

Price *£105.75 (£90 ex VAT)*
Contact *Ingram UK 0190 826 0160*
www.lasat.com

Usability	★★★★
Overall	★★★

MultiTech MultiModem MT5600ZDXV



Based on the Rockwell chipset, the 5600ZDXV is a single-mode modem with the usual range of data speeds, fax, and full-duplex speakerphone capabilities. It is not V.90 enabled and there's no upgrade at present. It retains MultiTech's traditional form factor with ten bright LEDs on the front panel, but the labelling is poor. Installation was par for the course under Windows 9x. There is a thorough model-specific owner's manual and a few update sheets. There's no paper documentation for the voicemail software, though, nor is there mention of Windows 95 and Plug-and-Play, which might stump some users.

PCW DETAILS

Price £99 (£84.25 ex VAT)
Contact Multitech Computers
0118 959 7774
www.multitech.com

Usability	★★★★
Overall	★★★

Olitech Self Memory II 56000

The Olitech is a small desktop modem that crams two quarts into a pint pot. It's a fully-featured K56flex voice modem which can also act "standalone" to receive messages and faxes without a PC. It has small, clear status LEDs and, due to its size, requires a remote control for its "answerphone" facilities. An external mic is also supplied. It was easy to install, as Windows 98 has the right drivers in stock. As for V.90 code, the web site is ambiguous. The Olitech comes with proprietary (but not TAPI) OliFax/Voice software and a better-than-average user manual.

PCW DETAILS

Price £149.95 (£127.61 ex VAT)
Contact Direct Source
0118 981 0011
www.olitech.com

Usability	★★★★
Overall	★★★★

Pace 56 Voice

This is a well-designed K56flex modem that can be placed vertically. It has nice, bright status LEDs which include fax, video and voice indicators, but the labels are too small. There's a volume control plus speakerphone button, and you can use the modem as a "handset". It holds K56flex firmware but it was easy to upgrade to V.90. Installing under Windows 9x was a snap; the user manual is basic but more than adequate. The HTML online manual gives more depth. A CD-ROM with almost 500Mb of comms goodies accompanies the modem. The Pace is a good choice, but expensive.

PCW DETAILS

Price £139 (£118.30 ex VAT)
Contact PMC Consumer Electronics
0990 561001
www.pacecom.co.uk

Usability	★★★★
Overall	★★★

Premier MT56KSVe

Like most of the modems in this group test, the Premier is a K56flex voice unit based on the Rockwell chipset. This budget model shows evidence of cut corners, though: there's no on/off switch and the status LEDs are tiny and dim. The installation instructions, a triple-folded A4 page, and the user guide, a Word document on the CD, border on the pathetic. Windows 9x installation was uneventful. The V.90 upgrade is provided on disc but as this is a single-mode device, upgrading is an either/or decision and anyway, it's a two-stage process requiring the upgrade of both sets of firmware.

PCW DETAILS

Price £79.95 (£68.04 ex VAT)
Contact Direct Source
0118 981 0011 (no URL)

Usability	★★
Overall	★★★

Tashika 56000BPS

A budget K56flex modem based on the Rockwell chipset. This is an ASVD AudioSpan modem and comes with a mic headset — good for online gaming. Some corners have been cut but it has an on/off switch and a 9/25-pin serial lead. The nine status LEDs are bright but the labels could be clearer. The Tashika installs as a K56flex modem and the Rockwell V.90 upgrade wizard is provided on floppy for this single-mode modem. Installation was straightforward but the original INF file sets the DTE speed to 57.6Kbps, corrected by the V.90 upgrade.

PCW DETAILS

Price £70.44 (£59.95 ex VAT)
Contact Software Warehouse
01675 466467
www.softwarehouse.com.uk

Usability	★★★★
Overall	★★★

Zoom FaxModem 56Kx

A well thought-out 56K dual-mode modem which can run V.90 or K56flex out of the box. There are 14 status LEDs, including indicators for EC/DC, V.34 and 56K, fax and voice message. It has a front-panel on/off switch but sadly a continental two-pin mains plug. The Zoom comes with the Zoomlink utilities CD, an antique offering which badly needs updating. It comprises Communicate Lite, an all-in-one comms/voice package, and 440Kb of various goodies. There are Acrobat versions of the reference manual, and a proper (compact) owner's manual.

PCW DETAILS

Price £89 (£75.75 ex VAT)
Contact Zoom Telphonics UK
01245 352403
www.zoomtel.com

Usability	★★★★
Overall	★★★★

COM One Platinum MC220

The French-made Platinum is a combo PC Card 56K modem solution. As well as data and fax, you can buy add-ons for GSM, ISDN and network support; the COM One rivals the Gold Card NetGlobal for flexibility. This single-mode K56flex modem is upgradeable to V.90 but the UK translations on its web site don't make it clear whether the upgrade is currently available. Installation was straightforward, for a combo card, because all the bells and whistles are extras. Documentation was on the thin side. The Platinum comes with a wealth of software including PhoneTools, an interesting alternative voice/fax/data utility. The bad news is that Phone Tools is a 16-bit Windows application and so not TAPI-aware, which is a shame.

PCW DETAILS

Price *£210.33 (£179 ex VAT)*
Contact *PPCP 0181 893 2277*
www.comeone.tm.fr

Usability	★★★★
Overall	★★★★

Psion Dacom Gold Card NetGlobal

This is another combo PC Card modem which covers most bases: K56flex, fax, 10Mbps Ethernet, ISDN and GSM, although you have to pay extra to get the two latter features. It's a conventional Type II card with different sockets. There is one for the network, and another for phone, GSM and ISDN adapters. The network cable has a short lead with a 10Base-T socket plus Link and Data LEDs.
This is a K56flex modem but Psion Dacom has yet to release V.90 firmware for any of its modems. Combo PC Cards can be troublesome to install but the Psion Dacom was pretty smooth, despite the fact that the card comes with no documentation whatsoever, which is just plain daft.
A floppy disc carries the online manual.

PCW DETAILS

Price *£257.33 (£219 ex VAT)*
Contact *Psion Dacom 01908 261686*
www.psiondacom.com

Usability	★★★
Overall	★★★★

The V.90 standard

The V.90 specification finally agreed by the ITU in February bridges the gap between the rival x2 and K56flex protocols, providing a solution that has the potential for greater stability and speed. It draws from the rival 56K technologies in near equal measure, taking the best technology from each, using the K56flex connection sequence and x2 modulation technologies.
Apart from guaranteeing interoperability between competing vendors, these advances should result in more consistency from connection to connection than with either of the previous 56K protocols. Also, the reported connect speed will be more accurate, and the connection speed should remain constant during a file transfer, barring a change in line conditions. This might mean a lower initial connect speed, but the actual throughput should be slightly higher.

● Connection

The connection or line-probing sequence establishes the clarity and quality of the phone connection. The V.90 standard implements a line-probing technique from K56flex called Spectral Shaping. V.90 accurately determines the qualities of the signal path, optimising signal-to-noise ratios for maximum throughput.
As new digital line-noise types are identified, the modem can be updated to better handle them. This will allow vendors to tweak modem performance for specific countries or regions.

● Modulation

Modulation, also known as "symbol encoding", is the process of converting digital data into an analogue signal and vice versa. Symbol encoding uses both the phase and the amplitude of an analogue waveform to send and receive bits of data. The key to symbol encoding is to reliably interpret tightly-packed bits from an analogue curve. More bits packed on a single curve yields more data throughput on a modem.
The V.90 standard implements a symbol encoding technique from x2 called Modulus Conversion.
The K56flex alternative, called Shell Mapping, was more compute-intensive and required additional hardware.

Xircom RealPort Ethernet 10/100 + Modem56

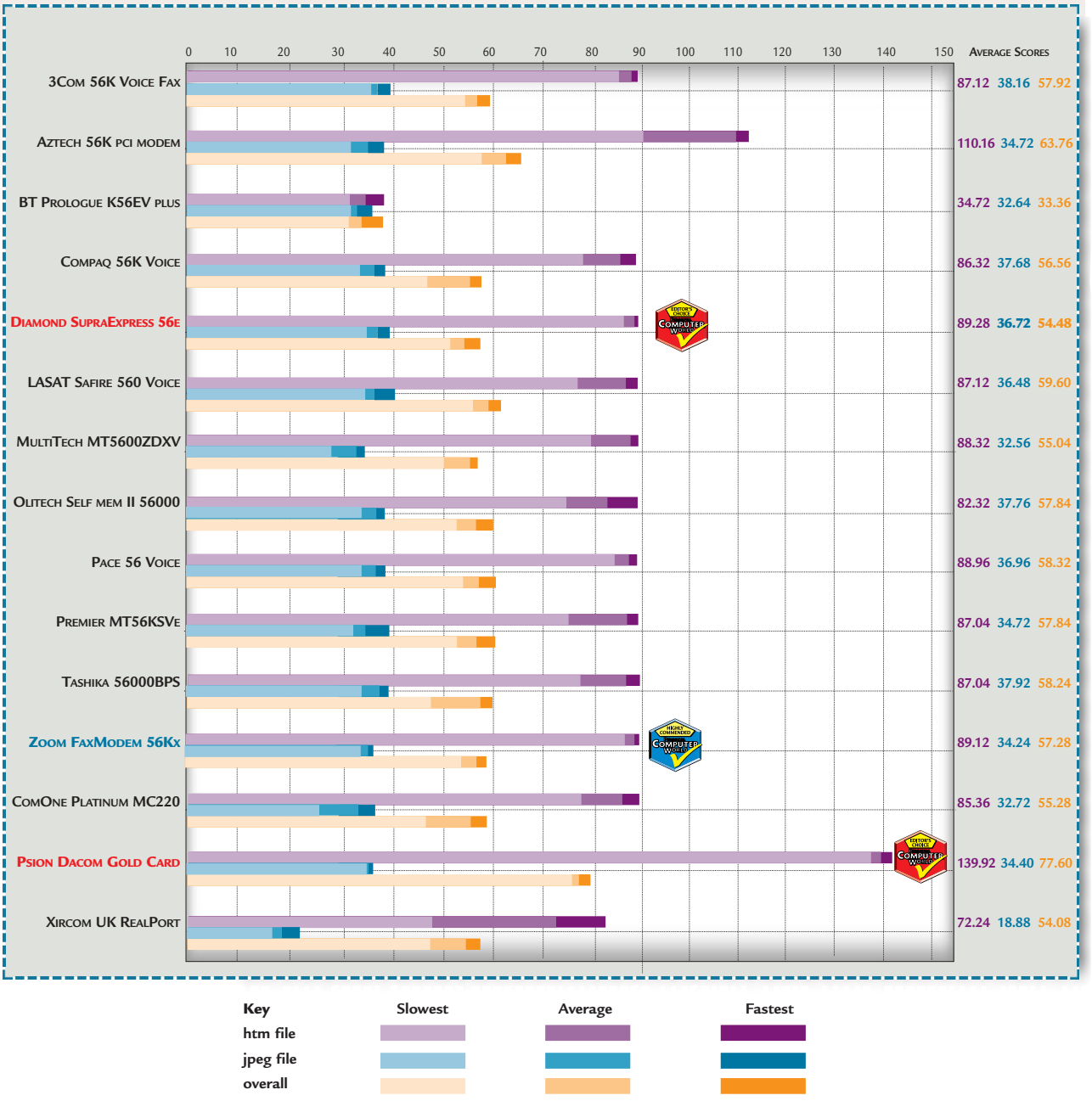
Combining V.90 data, fax, Fast Ethernet and GSM support, the RealPort's claim to fame is the use of normal sockets for the leads you plug into it. This is a Type III card made of tough Lexan material, with room for a 10Base-T RJ-45 socket and a pair of RJ-11 sockets for the phone line and handset. British Telecom, of course, does not use RJ-11s so the advantage of the RealPort in the UK is debatable. It does have four status LEDs, however, unusual for PC Card modems.
This model is a single-mode K56flex modem and, at the time of writing, only a beta of V.90 firmware was available. Installation was problematical under Windows 98 and it really needs a "clean" PC to start with. I suffered loads of trouble with this card: at one point, inserting it actually caused Windows 98 to crash spectacularly.

PCW DETAILS

Price *£280.83 (£239 ex VAT)*
Contact *Xircom 01256 332552*
www.xircom.com

Usability	★★
Overall	★★★

PCW Labs Report



How we did the tests

Most of the modems we tested adhered to the new V.90 standard. As the V.90 standard is asynchronous, with download speeds of 56Kbps and upload speeds of only 33.6Kbps, we concentrated on the download speeds of these modems. We connected to an ftp site on Direct Connection, which supported both the V.90 and K56flex standards. We chose to use an ftp site because, as there would be little traffic, each modem would be accessing the site under roughly the same circumstances.

We loaded five 1Mb files, each of a different type, on to the ftp site. There was one executable, one zip file, one htm and two graphics files (a tiff and a jpeg). Each file type was chosen as being representative of the files typically downloaded, and their various compression rates would give a range of results. Using each modem, we downloaded each file 20 times each. We recorded the time taken to download each file, and have shown the slowest and fastest download times as well as the average download time (*above*). The figures are shown in kilobits per second (Kbps). The figures at the side of the graph indicate average connection rates for each of the file formats and are colour coded according to file type. Overall speeds are the combined results from all file types.

As each file format can be compressed to varying degrees, the data transer rates will also vary. Jpeg files are already compressed, but htm files are not and so can benefit hugely from on-the-fly compression. Hence the htm results which seem to be impossibly high, but which are in fact perfectly normal.

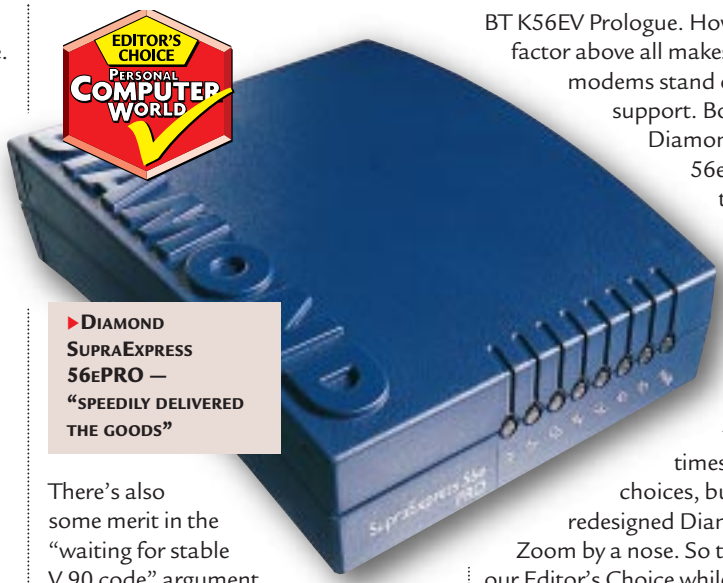
Editor's Choice

Here's our choice of modem and PC Card for carefree comms — these are modems à la mode.

By and large, 56Kbps modems are almost ready for prime time. Virtually all are based on the Rockwell K56flex chipset (with the obvious exception of the x2-based 3Com range) and all deliver appreciably faster performance than their V.34 predecessors. However, the old-timers are far more "honest" and are more likely to deliver their rated 33.6Kbps throughput than any of the 56K class, all of which are subject to the vagaries of the PSTN and rarely top 50Kbps, even with the wind behind them.

You can probably expect maximum transfer rates in the real world to be in the 44Kbps to 48Kbps range. Nevertheless, the 56K class comes a reasonably close second to ISDN's 64Kbps rate and makes the cost of upgrading to it, or Home Highway, debatable. For the moment, 56K modems remain the most hassle-free and inexpensive way to speed up your web browsing.

Surprisingly, although the standard was effectively set in February, many modem manufacturers have yet to release V.90 firmware. To some extent, this is not a pressing problem as most ISPs have still to make the switch. In any event, many K56flex modems are single-mode devices and can hold only one set of firmware — K56flex or V.90. Try connecting to a K56flex ISP with a V.90 modem and the odds are it will connect at 33.6Kbps.



▶ DIAMOND SUPRAEXPRESS 56EPRO — "SPEEDILY DELIVERED THE GOODS"

There's also some merit in the "waiting for stable V.90 code" argument.

Among the desktop modems, £90 or less seems to be the going rate for a 56Kbps model. At this price there's no shortage of "no-name" brands around (rebadged, anonymous, Taiwanese models). Intrinsically, these should be similar to their pricier, branded equivalents: after all, they all use the same Rockwell K56flex hardware. However, other aspects such as online support and documentation make them less attractive in the long term.

We feel you get better overall value from well-known modem makers. Despite their common ancestry, there is a wide discrepancy in branded-modem pricing. The Pace 56 Voice and the 3Com 56K Voice Faxmodem are both good products and so merit an "Honourable Mention", but their three-figure price tags are just too high. As for the others, there is quite tight bunching, and picking a winner is a tough call.

◀ ZOOM FAXMODEM 56KX — "WELL THOUGHT OUT"

If you're into online gaming and need simultaneous voice and data, consider a modem with a mic headset, like the BT K56EV Prologue. However, one factor above all makes two sub-£90 modems stand out: dual-mode support. Both the Diamond SupraExpress 56e PRO and the Zoom FaxModem 56Kx have this feature, which is essential during these transitional times. Both are good choices, but the cheaper, redesigned Diamond pips the Zoom by a nose. So the Diamond is our Editor's Choice while the Zoom is Highly Commended.

On the PC Card front, there is fierce competition among combo cards. In terms of functionality, all three offered more or less the same range of options. Only the Xircom RealPort lacked support for ISDN. It was also the dearest. The cheapest was the COM One Platinum but that was a bare-bones data/fax modem. The Psion Dacom Gold Card NetGlobal costs £40 more but includes network support. If you want full modularity, plump for the Platinum; if you want more standard features, pick the Psion Dacom. Overall, our favourite was the Psion Dacom Gold Card and so is our Editor's Choice of PC Card modems.

▲ PSION DACOM GOLD CARD NETGLOBAL — "COMBO PC CARD MODEM WHICH COVERS MOST BASES"

The ISDN alternative

V.90 not fast enough for you? Then consider ISDN instead. Here's what you need to know.

If V.90 isn't fast enough for you, then the most common alternative short of a leased line is the Integrated Services Digital Network, or ISDN. ISDN is a digital line and, unlike regular lines and modems, your data is never converted into tones but remains digital, end to end. ISDN has been available in the UK for many years now but it is only in the past year or so that BT has actively marketed the service. ISDN is also provided by some other telecom carriers in certain areas such as CableTel, Energis and Cable & Wireless.

Basic Rate ISDN or BRI (currently marketed by BT as ISDN 2e) is not only cheap to install — £99 at the time of writing — but it is an established comms technology which enjoys good operating-system support as well as a wide range of inexpensive hardware. ISDN cards can be had for less than £70. BRI comprises two 64Kbps "Bearer" or B channels, which can be combined (or aggregated) for a maximum capacity of 128Kbps without compression; roughly four times the capacity of a V.34 modem. Such connections are treated as two calls but as they should now last half as long, the speed premium shouldn't be too much. Sadly, while most UK ISPs offer ISDN connections at no extra charge, they do not offer 128Kb connections — well, not for "tenner-a-month" dialup accounts. However, MSN does offer this in the United States. If you want a 128Kb ISDN link to your ISP, then you have to pay quite a bit extra for it.

An ISDN 2e line comes in to your premises via a wall socket with two RJ-45 sockets and not the more familiar single BT 600 phone socket. You can only connect ISDN equipment directly to an ISDN line, and ISDN equipment cannot be used on normal analogue lines. However, if your ISDN device has analogue ports, you can plug your phones or faxes in there and use them in the normal way. Effectively, you have a pair of phone lines with ISDN 2e.

The ISDN 2e tariff is unbelievably complicated. While ISDN running costs are modest — call charges are the same as voice calls — the quarterly rental is high; typically £133.75 (ex VAT). However, you do get a £230 call allowance to soften the blow. In addition to offering faster data speeds, ISDN has very quick connect times, perhaps just two or three seconds compared to the 30 seconds typically required by an ordinary modem. So, if you connect frequently throughout the day and need to send lots of data, ISDN is worth considering.

In addition to offering faster data speeds, ISDN has very quick connect times

A domestic version of ISDN 2e was launched this year by BT on 15th September. Called Home Highway, it upgrades your existing phone line by splitting it into two channels: each can be used as a digital or analogue (normal) phone line. Your new Home Highway junction box will have four outlets: two for digital equipment such as a PC, and another two for analogue equipment like phones, faxes and answering machines. You can connect a combination of equipment to the outlets and use any two outlets simultaneously.

Home Highway is not cheap. Upgrading an existing phone line will cost £99 and the quarterly line rental will be £102, though this will include a free call allowance of £38. Call charges are the same for ordinary lines.

▲ BT HOME HIGHWAY REPLACES YOUR STANDARD PHONE JACK WITH A BOOK-SIZE WHITE BOX

Rather depressingly, compared to an "ordinary" ISDN 2e line, Home Highway offers little in the way of cost savings; perhaps as little as £15 per quarter. The yearly rental cost of an ISDN 2e line is £535. This drops to £305 when the call allowance is deducted. The yearly rental cost of a Home Highway line is £408, which drops to £254 after deducting the call allowance. By comparison, the yearly line rental of an ordinary phone line is £106. [Prices quoted are ex VAT.]

● *Also see* www.homehighway.bt.com

What you need to know about ISDN hardware

ISDN Terminal Adapters (TAs) come in two flavours, Active or Passive. An active TA is one which has an on-board processor, typically a Digital Signal Processor, and firmware which handles all the protocols and controls the device: for example, the Eicon DIVA Pro. A passive TA is one in which the data pump is driven directly by drivers installed on the PC. A passive device is thus a lot simpler and cheaper because it acts purely as an interface to the ISDN line. Passive TAs are usually internal cards (ISA or PCI bus) and are considerably cheaper than active TAs, which are usually external models. Although a passive device does use some of your PC's CPU power, you are unlikely to notice anything.

If you run a small network, consider one of the new breed of personal ISDN routers, such as the 3Com OfficeConnect ISDN LAN modem — £300 buys you a four-port hub plus ISDN router. With all your workstations plugged in to the hub, you merely have to fire up a browser for the router to automatically dial out and connect — a process that takes just a few seconds.

Up-and-coming technologies

Here are the main runners and riders in the race to provide better and faster communications.

ADSL

Like cable, DSL (Digital Subscriber Line) technology was developed in the late eighties to deliver video-on-demand but over ordinary, twisted-pair copper phone lines, the existing copper pairs that connect the world's 800 million telephones. Despite this advantage, the roll-out of ADSL has been slow: by the end of the year there will be only 25,000 US ADSL subscribers at most.

There are various flavours of DSL, the most popular being Asymmetrical DSL (ADSL). Under ADSL, voice data occupies that portion of the audio spectrum between 0kHz and 4kHz, while data uses 4kHz to 2.2MHz. Data is sent through two channels, one for upstream and another for downstream. It's asymmetrical because the downstream and upstream channels are transmitted at different speeds. Downstream speeds go as high as 8Mbps, while the upstream rate tops out at 1Mbps. Because it uses a range of frequency bands, you use the same copper wire to simultaneously send data, receive data and talk on the phone (in theory, that is).

The other DSL technologies, gathered under the "xDSL" label, include high data rate DSL (HDSL), rate-adaptive DSL (RADSL), symmetric DSL (SDSL) and very high data rate DSL (VDSL). The latter offers speeds as high as 70Mbps but only over distances of less than a mile. ADSL is considered to be the most viable version of DSL as it works over longer distances of up to two miles.

An ADSL connection requires two modems: one on the subscriber side and another on the telco's or ISP's end. The subscriber can only place calls to the modem at the other end of the line, not to other ADSL-equipped computers. More likely, an ADSL connection will always be connected, just like a leased line. This makes it an excellent vehicle for internet connectivity.

Universal ADSL

The ADSL that home users will eventually see in the UK will most likely be a slower version, offering lower throughputs in return for a cheaper, simpler technology. Its development is being supervised by the Universal ADSL Working Group (UAWG). Similar in principle to the G.Lite standard under development by the ITU, the proposed UAWG standard, known as ADSL Lite, will enable users to download data at up to 1.5Mbps and upload at 512Kbps. Although this is just a fraction of the normal 8Mbps available from full-rate ADSL, it's still about 25 times faster than the rate of analogue modems and should keep the initial price of ADSL modems below £200. In any event, neither PCs nor network computers can support full ADSL bandwidth, and the internet itself lacks the bandwidth required by a mass deployment of ADSL. The UAWG has opted for a "splitterless" solution. Full ADSL requires a low-pass filter, or splitter, to isolate analogue phone devices from the RF (radio frequency interference) put out by ADSL, which should reduce costs and speed telephone companies' deployment of the service by allowing users to install their own ADSL modems.

BT is currently trialling ADSL (not ADSL Lite) in West London, and Florida firm direcNET Telecom has announced plans to offer 2Mbps ADSL internet access to businesses and homes for £199 per month. The expected UK launch is set for the third quarter of 1998.

Cable modems

The early deployment of cable modems seems as far away as ever: the cable TV network in the US is already well established yet the uptake of cable modems has been slow. By the end of the year, US analysts predict that no more than 0.5million users in the US, out of 12million cable users, will subscribe to a cable modem service.

The prospects for cable are tantalising. The cable network is digital from end to end and thus eliminates the slow "local loop" bottleneck at the customer's end.

Other PSTN solutions

Right now, V.90's asymmetric 56Kbps/33Kbps is the fastest throughput we'll see with ordinary modems over ordinary phone lines: with exchanges using 64Kbps links for the PSTN, there's just no bandwidth left. But there is a way to achieve higher throughputs — channel aggregation. This involves "bonding" two V.90 modems connecting two ISP accounts over two phone lines to form a single Multi-Link PPP connection, delivering a theoretical maximum of 112Kbps. You need no special kit to do this, just Windows 98 or the Windows 95 Dial-Up Networking upgrade v1.2 and a lot of patience! Some exotic hardware performs a similar trick to bump up throughputs, such as Ramp Technologies' WebRamp personal router which can harness three modems to act as one. Sadly, the speed gain isn't linear: with two modems you get perhaps 75 percent of the theoretical maximum, and with three you get two-thirds. Another example of this approach is Diamond's forthcoming ShotGun technology. Like ISDN, ShotGun offers bandwidth on demand, bringing up the second line as needed, so if an incoming voice or fax call is detected, the second line is released. You can use either a pair of SupraExpress 56K modems or the forthcoming SupraSonic II dual modem. While these modem solutions are cheap and easy to install, they double your line and (probably) ISP costs, although in the US, ISP NetCom is offering a dual analogue dialup account for about £20 per month. [*See Contacts box, p224.*]

Cable-modem solutions can promise very high throughput but in practice this will be variable and unpredictable. Throughput will vary, depending on the number of people sharing a line: the more people online, the less bandwidth each gets. In theory, a user could get as much as 30Mbps of bandwidth, although, on average, bandwidth will be typically about 2Mbps.

Another problem is asymmetry: most cable networks were not designed with high-speed comms in mind. At present, many US cable modems only deliver high speed in one direction with upstream traffic being carried over a dialup modem connection. Symmetrical transmission is coming, but its rollout has been slow in the US. The biggest problem is that two-way cable connectivity requires cable companies to install special head-end equipment for two-way communication.

Like ADSL, cable remains a standards minefield, and as a result you'll probably have to buy proprietary hardware direct from the individual cable networks. One big factor expected to drive cable modem sales is the agreement by leading players to adhere to the Data Over Cable Service Interface Specification (DOCSIS), a standard devised by the Multimedia Cable Network Systems (MCNS) consortium which represents cable TV firms. It has been adopted as a *de facto* industry standard and is an international standard recognised by the ITU.

In the UK, progress on the cable-modem front has been glacial. Cable operator Nynex undertook cable modem trials in Manchester but was swallowed up by Cable & Wireless (C&W) and the trial was terminated shortly afterwards. The only bright light was the announcement, this July, that C&W had ordered 100,000 Pace Micro Technologies digital set-top boxes. These incorporate a high-speed cable modem conforming to the open MCNS standard.

Last May, the UK's ComTel cable company announced the development of a cable modem service in conjunction with the US cable modem internet provider @Home Network. The Thames Valley and Oxford areas will be the first to receive the service, with the remaining 11 franchises rolling out over the next two years. Pricing is expected to be in the region of £30 to £40 a month with no usage charges. Businesses are excluded from subscribing. It devotes a single, 6MHz-wide channel to data on ComTel's broadband bi-directional service, following the MCNS DOCSIS protocols. This gives 27 or 36Mbps from supplier to home, with 320Kbps to 10Mbps in the other direction; however, the channel may be shared, with up to 600 users potentially slowing down the service.

Digital PowerLine

In October 1997, US telecoms giant, Nortel, and UK power utility subsidiary, NORWEB Communications, announced the feasibility of delivering 1Mbps internet access over ordinary electricity power lines, access being gained through mains socket outlets rather than phone lines. Digital PowerLine technology uses a signalling scheme to separate data from electrical interference on the power line, allowing users to connect even if the power goes out. Fibre-optic cabling connected to a central switch carries data between substations and homes, much as it would work on a network of computers. Customers will need a £200 interface card and software for their PCs to handle logging on, security and subscriptions.

Nortel's signalling scheme carries data between the local electricity substation and home. Substations are linked by fibre-optic to a central switch to provide access to the rest of the world.

● *NORWEB plans to begin rolling out Digital PowerLine in its home town, Manchester, later in 1998.*

PCW CONTACTS

ADSL Forum **www.adsl.com**
Cable & Wireless Watch
www.unmetered.org.uk/watch/index.htm
Diamond Multimedia
www.diamondmm.com/shotgun
Eutelsat **www.eutelsat.org, www.convergence1.com, www.easynet.net**
Hughes Olivetti 01908 319101
www.direcpceu.com
MegaSpeed **www.btinternet.com/~direc/telecom.htm**
NORWEB Communications
0800 1951234 **www.norweb.co.uk**
Universal ADSL Working Group
www.uawg.org

Satellite-based internet services

Two satellite-based internet services are available in Britain, both using Eutelsat's Hot Bird satellite for a fast downlink and a land-based ISP for the uplink. The oldest is Hughes-Olivetti's DirectPC service which offers a Turbo Internet delivery at up to 2Mbit/sec (data rates in all these services depend on the load on the transponder). As the uplink is only at the speed of your landline, sending a lot of data will be no faster than when using a conventional service. Start-up costs vary according to which firm installs your satellite dish, but are not cheap at around £500. Then there is a £15 per month subscription and finally a per-megabyte download charge.

There are two main advantages. One is to people in remote areas, where an ISDN link is too expensive. The other is for organisations which want to use DirectPC services to deliver bulk data to multiple clients. Large firms are already using it to deliver data and even TV to dispersed branch offices.

The other Eutelsat-based service, Convergence1, is still at the pilot stage. This uses the Digital Video Broadcasting (DVB) signal as a carrier and is run in conjunction with Easynet, which provides the landlink. Pricing was not known as we went to press, but Easynet's Justin Fielder said there would be no per-megabyte charge and that he hoped to offer "twice the speed of ISDN at half the cost."

Such services could become far more interesting next year when digital PC TV cards hit the shops. This may create a viable market for content loaded on Eutelsat or fast ISP servers. There are various ways this can be used, but the potential is there for small-scale business activities — sales of music, live concerts, software or whatever — exploiting one-to-many broadcasting, which is clearly the most efficient use of satellites. Reception can be passive, like TV, so the punters are not paying line charges.

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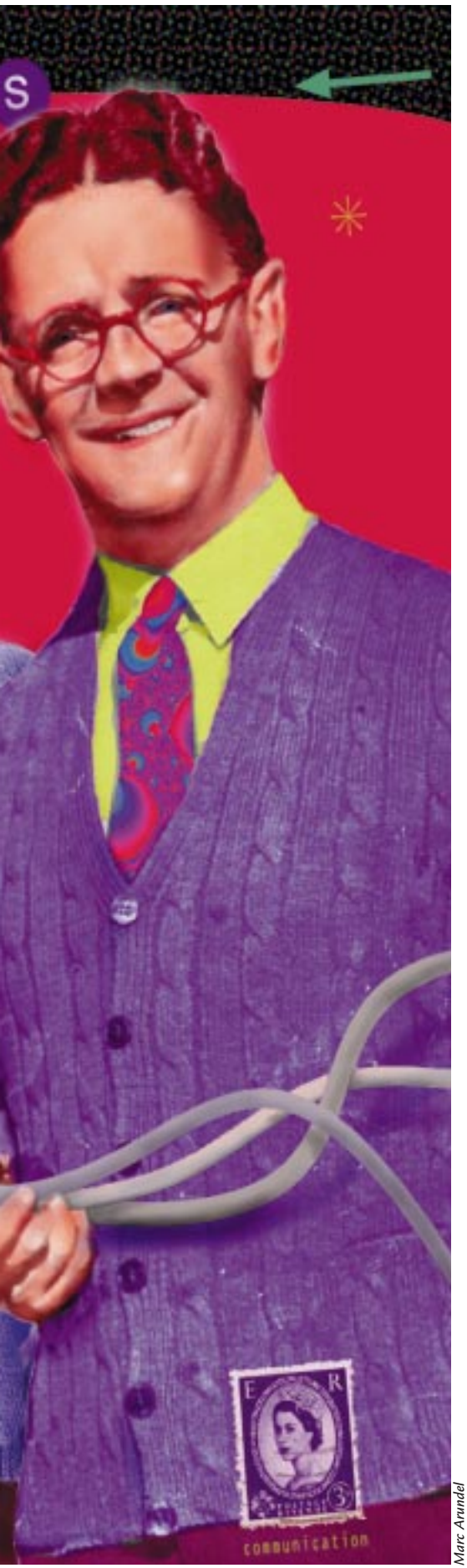


Marc Arundel

As PCs find more and more ways of connecting to each other, Ian Wrigley tunes in to a fast-moving software market.

Comms Dancing

Whether it's checking electronic mail, connecting your machine to another on the network, faxing from your PC or downloading the latest patch for your software from the web, everyone's using comms (or communications) software.

As well as traditional comms software, a host of new solutions are coming of age. You can talk to people via your PC just as you would by phone, using the internet instead of a standard telephone line; you can pick up faxes in your office in Scunthorpe from anywhere in the world; you can control one machine from another several thousand miles away. And on it goes.

The secret, however, is to pick the software that's right for the job. There are, for example, many many email packages around, but some will have too high a specification and some will be too basic for your needs. Too many people soldier on with the wrong type of software because they have not properly weighed up exactly what they need, and what each option offers, before they buy. Whether you are looking for an email package, PC-to-PC connectivity, fax software or something more esoteric, we'll show you what to look for, how to evaluate your requirements and how to make your final decision. Along the way, we'll examine some specific packages, but remember: you should work out exactly what you need from the software, then check out the specifications of all the different packages on offer. That way, you will end up with a solution that's exactly right for you.

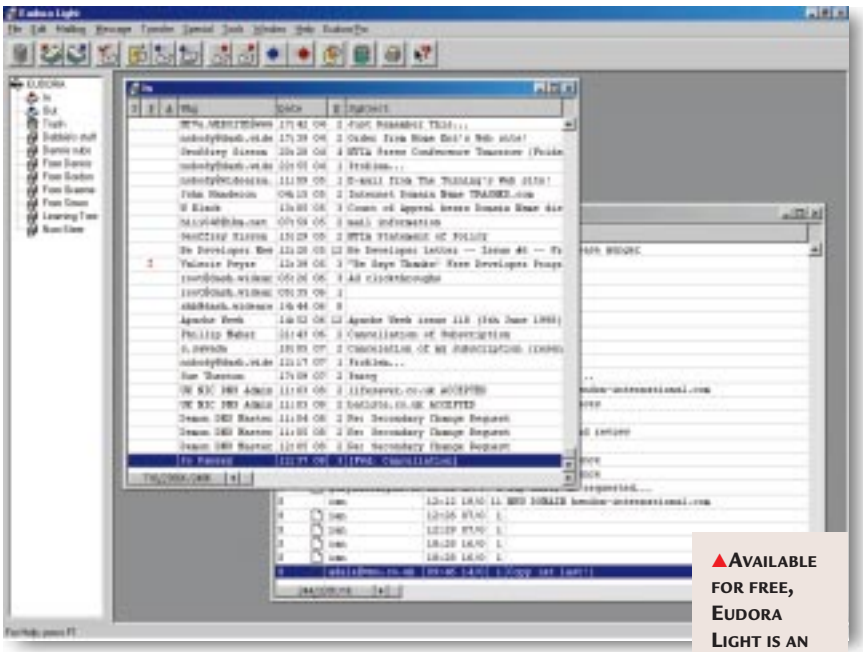
Contents

Email packages

Whether you're a one-man band or a mega-corporation, electronic mail is an important business link.

Just about everyone uses email these days: indeed, it is often used when a simple phone call would be a much better idea. Electronic mail has been around ever since the first Unix systems, although these days mail readers are somewhat more user-friendly than the basic Unix command-line interface. There are basically three different types of email systems: those designed for internal company use; those designed for wide area use, normally via the internet; and those which work well in both environments.

As most people are now connected to the internet, email packages need to be able to cope with both internal and external email equally well. So if you are looking to implement a new email system, or upgrade or change your software, you need to look at exactly your needs, or those of your company, now and in the future. Here, we will look at a number of different scenarios and try to pick out some possible options for each one. Remember that many companies claim their packages are just as good for two-person organisations as they are for 2,000-employee companies. And in some cases that's true. But realistically, there's no point in going for a massive system if you'll never want to link more than a dozen people together. And likewise, some systems which are perfect for 100 people start to struggle when you get over twice that many trying to collect their mail at 9a.m. on a Monday morning.

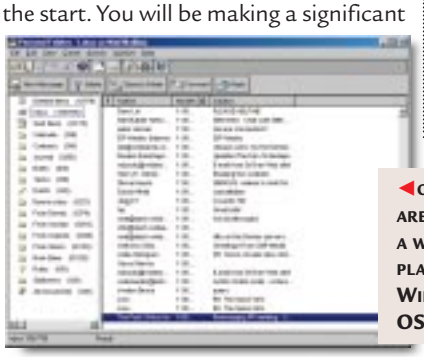


▲ AVAILABLE FOR FREE, EUDORA LIGHT IS AN EXTREMELY POWERFUL MAIL CLIENT. THE COMMERCIAL VERSION ADDS EVEN MORE FEATURES

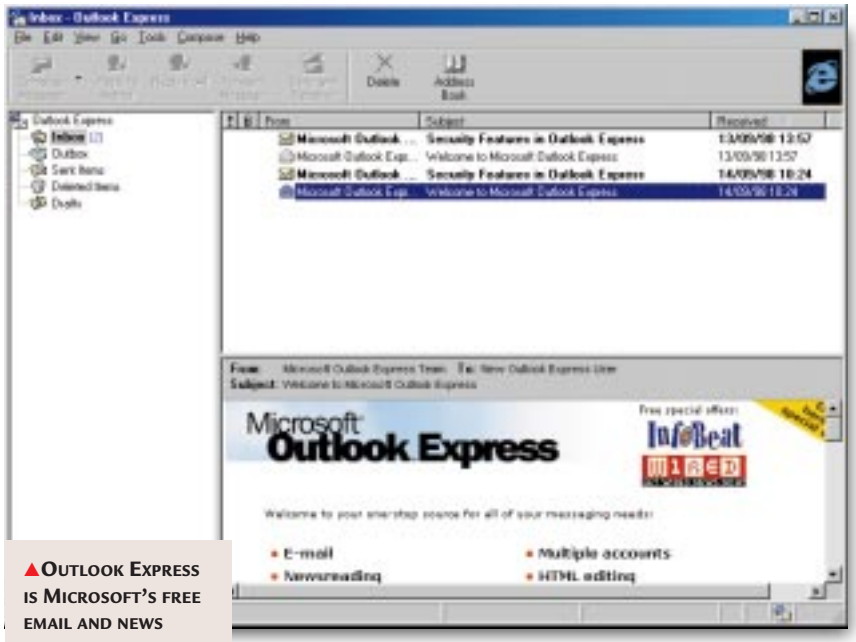
Large companies

If you are specifying the email system for a large company — one with more than a few hundred employees — then choosing the right option is vitally important from the start. You will be making a significant investment in hardware, software and training, so you'd better get it right first time. Arranging email for large numbers of people is not easy. You need to combine power and speed with ease of use, as many of the people who use the system will not be particularly technically adept. (Tip of the day: if there's a feature allowing users to "mail everyone", disable it. There are many stories of novice users sending emails along the lines of "Can the person parked in my space please move their car" to all 50,000 people around the world working for a multinational organisation.) Cross-platform compatibility is another significant issue, especially for large companies. Although Windows-based PCs make up the vast majority of all desktop systems in most companies, you may well also have users of Macs, Unix boxes and other disparate pieces of kit. They will not want to change their machines just because you've picked a PC-only email system. Don't forget people on the move, either; users may need to be able to collect their email from palmtop devices, for example. You will find that the cost of ownership of a large, complex email system is significant. Big companies will probably need someone dedicated just to maintaining and administering the email system — and at least some of your other IT support staff will need to have some understanding of the system, too. Dedicated servers will be needed to accept, store and forward email, and they should also have fast access to the internet if employees are spread around the world and use the net for inter-company communication. One very popular option is **Microsoft Exchange Server**. This runs under Windows NT Server and is possibly the most adaptable mail server around. It supports just about any mail protocol you can think of, including existing standards such as SMTP (Simple Mail Transfer Protocol) and POP3 (Post Office Protocol version 3), as well as up-and-coming standards like IMAP (Internet Message Access Protocol). If these acronyms don't mean much to you, don't worry; basically, Microsoft Exchange should talk to just about any

The cost of ownership of a large, complex email system is significant



◀ CC:MAIL CLIENTS ARE AVAILABLE FOR A WIDE RANGE OF PLATFORMS, FROM WINDOWS THOUGH OS/2 TO THE MAC



▲OUTLOOK EXPRESS IS MICROSOFT'S FREE EMAIL AND NEWS READER, BUNDLED WITH INTERNET EXPLORER. A COMMERCIAL VERSION, OUTLOOK 98, ADDS SCHEDULING AND CONTACTS DATABASE FEATURES

email client you can think of, on pretty much any platform. Microsoft encourages people to use Outlook (which we'll say more about later) and certainly this has advantages, such as being able to link people's schedules as well as email. But you may prefer a different email package, or have people working on platforms other than Windows or the Mac.

Another widely used solution is **Lotus Domino 4.6**. The Domino Mail Server gives full access to mail standards such as POP3 and IMAP, as well as interfacing to Lotus Notes clients. Notes is an extremely popular information management system used by many of the world's top companies, and the Domino server allows Notes users access to many extra features on top of standard email. Domino is also available as the Domino Web Server, which gives you all the email functionality as well as internet and intranet server and development applications. Domino might be especially worth considering if your current servers are not Windows-based; although it runs on Windows NT 4 and Windows 95, the Domino server will also run on OS/2 Warp 4, AIX, Novell NetWare and Solaris.

Lotus produces another email package, **cc:Mail**. This system has been around for several years, and as the internet has grown, it has adapted from being an internal mail system with external gateways for multi-office companies, to a fully-featured mail package capable of handling thousands of users. In many ways it's a competitor to Microsoft Exchange, and the server runs on a Windows NT server. It supports just about all email clients (using POP3), as well as being able to use web browsers to access mail, and also has dedicated mail clients for the Mac, DOS, OS/2 and all flavours of Windows.

Another option is to use a Unix-based mail system. All Unix systems support email, via a program called **Sendmail**. This is not particularly easy to set up, but is more than capable of handling many hundreds or thousands of users once it is configured. Other, free, mail programs for Unix such as **Zmailer** are also available, offering extra features or different configuration options. The beauty of such systems is that they use standard protocols such as SMTP and POP3, so anyone with a POP3 mail client can connect to check and send mail. While solutions such as Domino, cc:Mail and Microsoft Exchange Server have become popular because of their wide range of features and the fact that they will run on an NT server, there are still many companies out there using Unix-based mail systems with no problem at all. And it's worth noting that if you connect to the internet via a dial-up Internet Access Provider (IAP), your email is almost certainly handled by Unix systems — which proves that they are capable of dealing happily with many thousands of mail accounts.

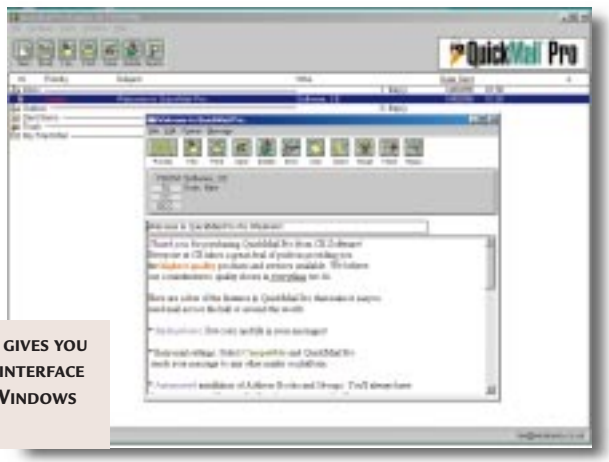
Choosing the right option is important from the start

If you are considering any of these systems, remember that they are complex. They work very well, and can be used by companies of any size, but you will need to budget a fair amount of time and expertise to setting up and maintaining them. It isn't something you can do in one afternoon.

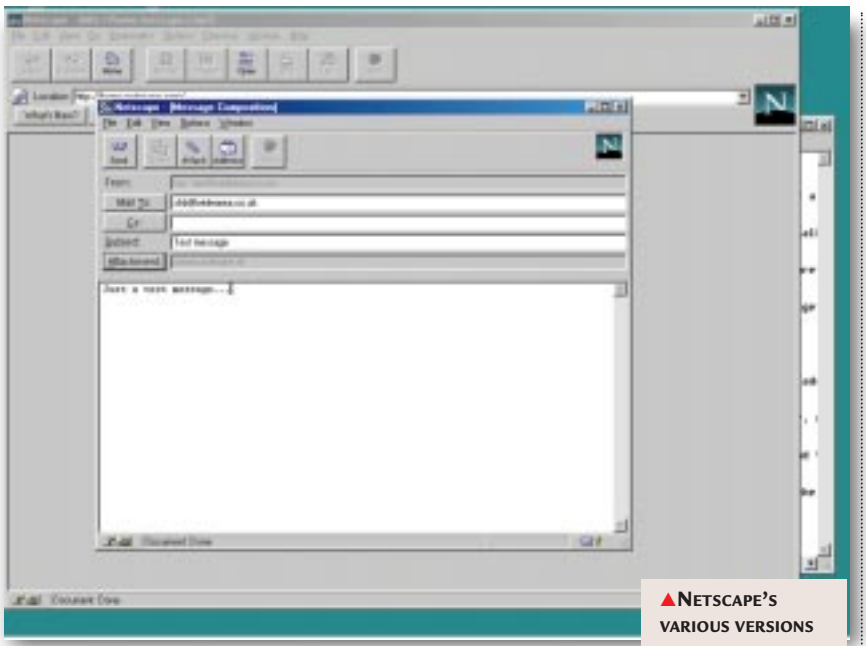
Small-to-medium businesses

If you are setting up email for a smaller business, then you can certainly still use one of the above systems. And indeed, many do: **Microsoft Exchange Server**, for example, is very popular in many SMEs (small-to-medium enterprises). One reason for this is that it works both with Outlook Express, which is part of Windows 95 and 98 and allows you to read email and internet news, and the full Outlook 98 program. Exchange Server is also a personal information manager, allowing you to keep an address book and calendar on your PC, then link to other people's schedules to organise meetings and so on. Lotus Domino, of course, also provides these features via its Notes client.

Another option is CE Software's **QuickMail Pro**. This is basically an internet-standard mail server (it uses the



▶QUICKMAIL PRO'S CLIENT GIVES YOU AN ATTRACTIVE, GRAPHICAL INTERFACE TO YOUR EMAIL. MAC AND WINDOWS CLIENTS ARE AVAILABLE



▲NETSCAPE'S VARIOUS VERSIONS ALL INCLUDE AN EMAIL TOOL, SO YOU CAN SEND AND RECEIVE EMAIL FOR FREE

SMTP and POP3 protocols) running on Windows NT or Windows 95. Like all servers that use standard protocols, QuickMail Pro can be used with any POP3-compliant mail client, but it works best with its own — available for both Windows and Mac.

The server can be configured to run as an intranet-only server or as one which also communicates with the internet, either via a permanent connection or a dial-up account. When using the QuickMail client, users can send their mail as one of several different designs of form — for example, a "while you were out" form, an "invitation" form, a "for your information" form and so on, rather than just as plain text. You can even design your own forms, if you wish. The original QuickMail was a Mac-only system, but QuickMail Pro has turned it into a full, cross-platform solution that doesn't require too much administration to set up and maintain.

Tiny-to-small businesses

If you are intending to send lots of internal email, then you will need to choose a solution which gives you an in-house server; something like **QuickMail Pro** would be a good start. However, if your main email use will be via the internet, then you might be able to manage by just using the email account, or accounts, provided by your IAP. The advantage of this is that you don't need a server within your company; you let the IAP do all the work for you. You can use whatever POP3 or SMTP-based email server you want (check with the IAP to make sure it supports the same protocol as your mail package, although it would be very strange if this was not the case); to send or check mail, you simply need to connect to the internet.

This approach is great unless you find yourself sending lots of email internally, or until your company grows to more than a few employees. At that time, you will find that the cost of continually phoning up the IAP will exceed that of installing an email server internally and getting that server to dial the internet just once every couple of hours to send and check for mail. This way, internal mail can be delivered immediately, without having to go via the internet.

Mail clients

As we've seen, some of the larger systems have their own mail clients. However, they all support others, and there are plenty to choose from. For starters, you can use the email client that ships with either **Internet Explorer (Outlook Express)** or **Netscape Navigator/Communicator**. These are free, and many people use them happily. But you can look around for other packages; one of the most popular is **Eudora Pro**, from Qualcomm. Eudora is a very sophisticated email program, with plenty of options to filter and sort messages, keep them in different locations ("mailboxes") and so on. Best of all, there's a free version, **Eudora Light**, which can be downloaded from the company's web site. This gives you a flavour of Eudora's power, and is used by many people as their only mail program. But only with the Pro version do you really get the full power of the program.
Both the Pro and Light versions are available for the Mac and Windows.
Pegasus is another free email program, originally designed for NetWare networks but now used by mail people as a general internet email client. Again, it supports all the major features; and since it's free, you can try it out before you make a decision whether to standardise on it. Pegasus is PC-only.
Turnpike is not just an email program but a full internet access suite, including news and Telnet (which allows you to log on to Unix machines remotely). It is a commercial package, but a free 30-day trial can be downloaded from the company's web site. Finally, if you use CIX, you can use the **Ameol** program, which allows you to read and compose email off-line, as well as downloading items from the system's chat areas for off-line reading. CIX is fully connected to the internet, so you can send internet messages from the system.

PCW DETAILS

Lotus Domino
Price *Server £1,325.40 (£1,128 ex VAT), Notes client £97.53 (£83 ex VAT)*
Contact *Lotus 01784 455445*
www.lotus.com

Lotus cc:Mail server
Price *£475.88 (£405 ex VAT)*
Contact *Lotus 01784 455445*
www.lotus.com

Eudora Pro
Price *£24.99 (£21.27 ex VAT)*
Contact *RMG 0181 875 4441*
www.eudora.com

QuickMail Office
Price *Five-user pack £299.95 (£255.28 ex VAT)*
Contact *Computers Unlimited 0181 200 8282*
www.cesoftware.com

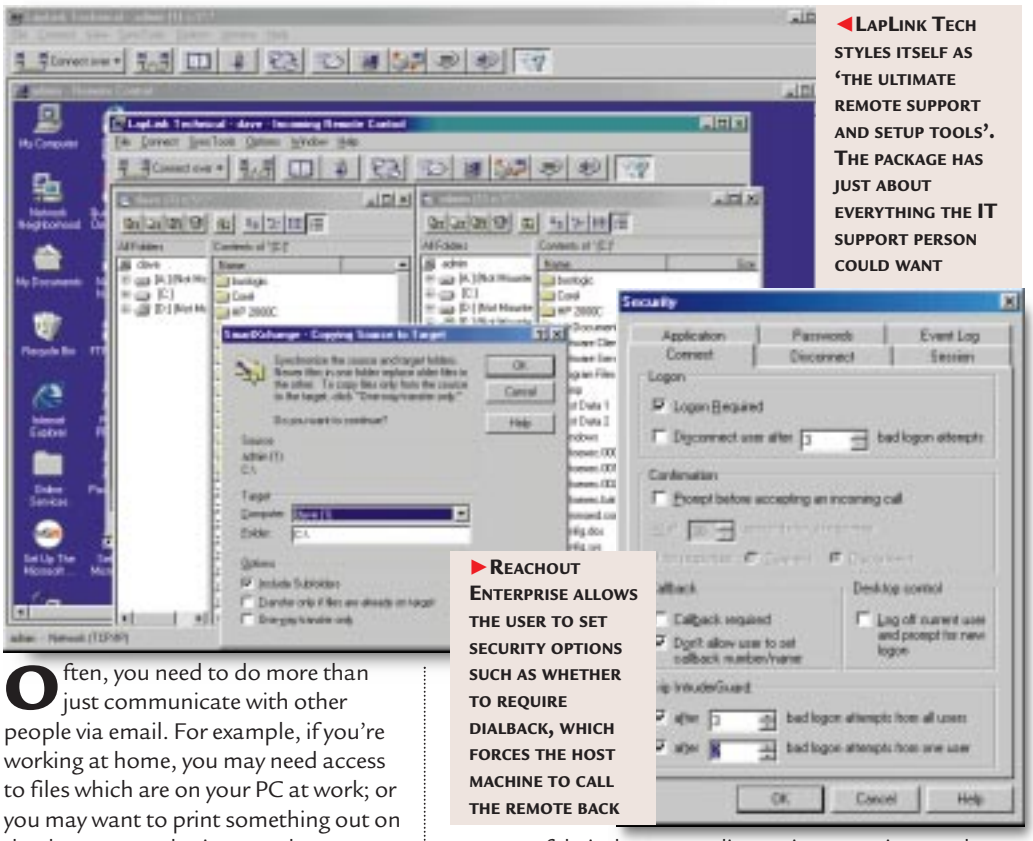
Microsoft Outlook 98
Price *£99 (£84.26 ex VAT)*
Contact *Microsoft 0345 002000*
www.microsoft.com

Pegasus
Price *Free*
www.pegasus.usa.com

Turnpike
Price *£46.94 (£39.95 ex VAT)*
www.turnpike.com

Remote access

It's a kind of magic: remote access software can help get all aspects of your business under control.



◀ LAPLINK TECH STYLES ITSELF AS 'THE ULTIMATE REMOTE SUPPORT AND SETUP TOOLS'. THE PACKAGE HAS JUST ABOUT EVERYTHING THE IT SUPPORT PERSON COULD WANT

▶ REACHOUT ENTERPRISE ALLOWS THE USER TO SET SECURITY OPTIONS SUCH AS WHETHER TO REQUIRE DIALBACK, WHICH FORCES THE HOST MACHINE TO CALL THE REMOTE BACK

Often, you need to do more than just communicate with other people via email. For example, if you're working at home, you may need access to files which are on your PC at work; or you may want to print something out on the departmental printer so that someone in the office can read it. Staff at helpdesks may find that they spend half their lives walking from machine to machine, examining the software that's installed and showing users how to perform tasks.

Remote control

In all these cases, remote access software can help. Packages which fall into this category are designed to allow users to connect to one machine from another, either somewhere else on the network or via a dial-up connection. The first time you see a remote access package in action, it looks rather like magic: you watch the cursor move, applications open and close, and words appear typed on the screen as though by an invisible person sitting at your keyboard and mouse. In fact, it's someone who's not even in the same room.

Of course, remote access programs can easily lead to cries of "Big Brother" and of unwanted management surveillance. But used correctly, they can be a massive aid to productivity. Home workers, for example, don't need to copy the entire contents of their document directories to their laptops or to disks for use on their home machines; they can simply dial in and retrieve the files they need. And for helpdesks, software like this is a real boon; the support person can simply connect into the remote user's machine and perform the task while talking the user through it on the phone.

All the remote access products on the market work via either a local area network (LAN) or a dial-up connection, and require software both on the remote machine and the one from which you're connecting. If you are connecting via the local network, you will use one of a number of protocols (the language computers use to communicate with each other on the network). If you are using a dial-in connection, then you can either dial directly in to your machine, if it is set up to allow this; or, if your company has a permanent internet connection, you can connect by dialling your local internet access provider using your internet account. This is likely to be slightly slower than a direct dial connection, but it does mean that you don't need a modem attached to your office machine and that you can connect in from any other internet-connected machine.

Used correctly, remote access programs can be a massive aid to productivity

The principal packages in this market are **LapLink**, **pcAnywhere**, **Reachout Enterprise**, and **Carbon Copy 32**. All do a good job and the differences between them tend to be mostly cosmetic. We last reviewed these remote access products in our November 97 issue and although several have since undergone version changes, the major features remain the same. So here we will briefly run through each package, pointing out primarily where they differ, rather than the features they all share.

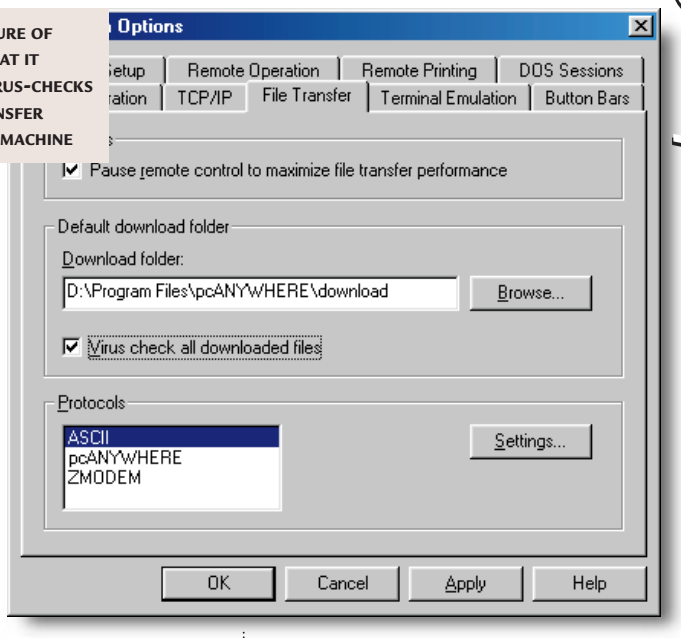
All of the packages allow you to transfer files between the host and remote machines and control the host machine from the remote, either via dial-up or network connection. And all support TCP/IP, so as long as your host is configured correctly and is permanently connected to the internet, you can control it after dialling in to your internet access provider (IAP).

The package that has changed most since we last examined them is probably **LapLink Tech**. Although other versions exist, we looked at the high-end package, which includes a number of new features aimed at making LapLink Tech the complete system administration tool. It now includes Dr Solomon's WinGuard anti-virus program, and Ghost Special Edition, a program

which allows you to "clone" hard disks so that you can, for example, store a complete backup of a machine or upgrade the hard drive by cloning the contents of the old drive to a server, installing a new drive, then copying the contents back.

LapLink Tech's remote access features now allow you to converse with someone sitting at the host using both machines' sound cards; but since doing this is likely to reduce data transfer speeds, you may well be better off just using the phone. You can also print directly from the remote machine to a printer on the host's network: before, you would have to copy the file to the host, then remotely control it in order to print. Some extra improvements have also been added to the user interface of the program. All in all, LapLink Tech is an excellent choice for remote access.

▶ **A GOOD FEATURE OF PCANYWHERE IS THAT IT AUTOMATICALLY VIRUS-CHECKS ANY FILES YOU TRANSFER FROM THE REMOTE MACHINE**



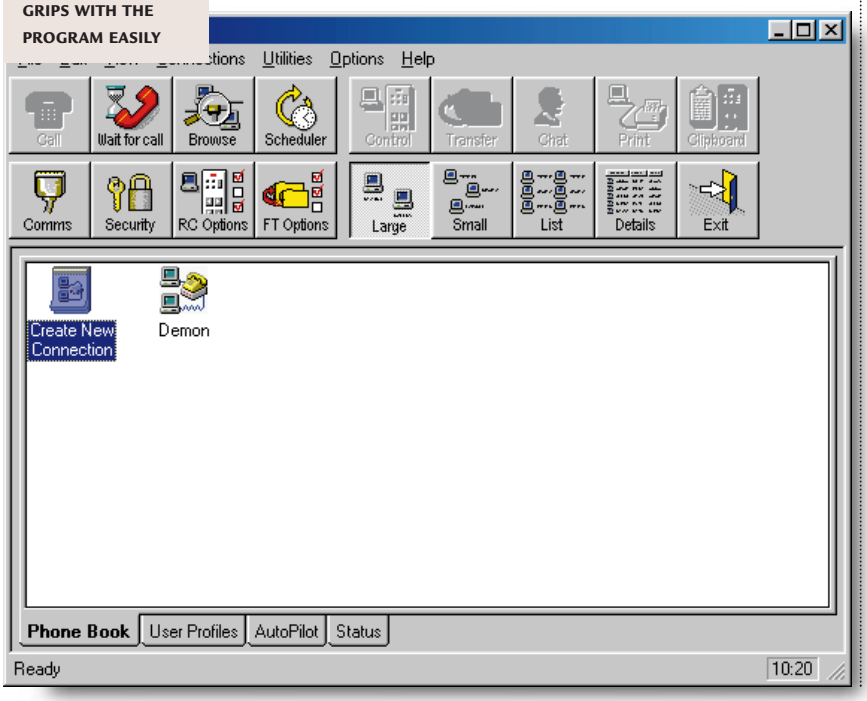
We last reviewed version 7.5 of **pcAnywhere**. It is now at version 8 and again includes some extra features. It integrates pcAnywhere's remote callers with Windows NT's User and Group security, and includes stronger encryption for security. Multiple remote machines can connect to one host, which could be useful for training, and you can choose to suppress things like the host's desktop wallpaper to increase the speed of remote control operations.

● A new version of pcAnywhere for CE is now available. Look out for a review in next month's *PCW*.

Reachout Enterprise also does a good job of both remote control and file transfer between the remote and host machines. Where it really shines, though, is in its ActiveX for Internet Explorer or plug-in for Netscape Navigator. This means that if the host machine is connected to the net, you can control your machine from any internet-connected PC, even if you don't have the full remote access software installed.

The last time we looked at the final package in our round-up, **Carbon Copy 32** from Compaq (formerly Microcom), we praised its ease of setup: it automatically walks users through the setup process and points out any problems on the way. Version 5.0 has some new features including file encryption, integration with Windows NT security and the ability to talk to the remote user using the computer's sound cards. Like LapLink Tech, it enables you to print remotely without transferring the file first, and the package includes a version of Carbon Copy for Windows CE so you can communicate with your palmtop as well as your desktop machine.

▼ **CARBON COPY 32 HAS A NEAT, BUTTON-BASED INTERFACE THAT MEANS EVEN INEXPERIENCED USERS CAN GET TO GRIPS WITH THE PROGRAM EASILY**



Remote access choice

It would be difficult to recommend a specific remote access package. Although the manufacturers may demur, they all provide many of the same features and, from the user's point of view, work in much the same way. However, LapLink Tech includes anti-virus software and disk cloning via Ghost Special Edition, so this may be something to consider when making your purchasing decision.

PCW DETAILS

Traveling Software Laplink Tech
Price *£169.95 (£114.64 ex VAT)*
Contact *Traveling Software 01344 383232*
www.laplink.com

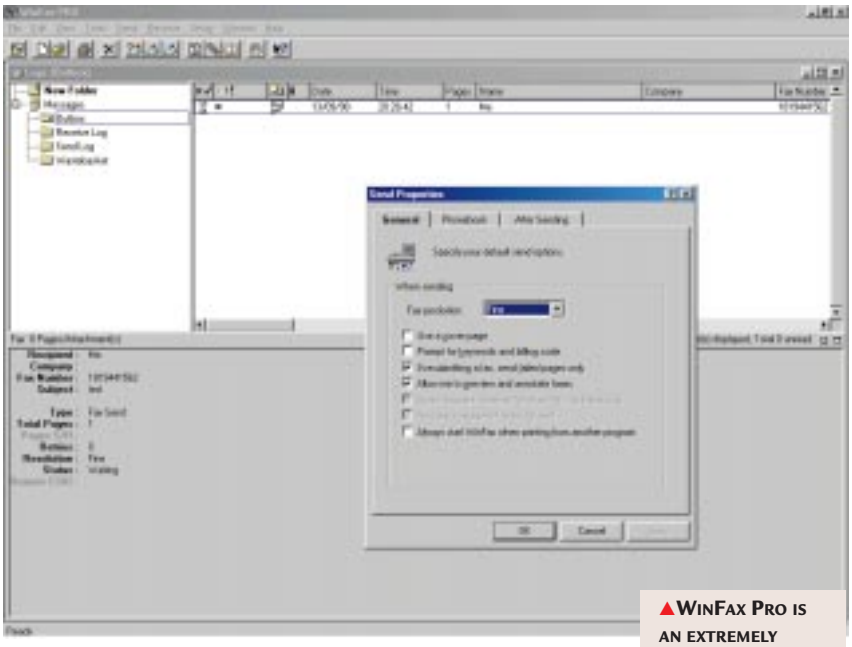
Stac Reachout Enterprise
Price *£149 (£126.81 ex VAT)*
Contact *Stac 01344 302900*
www.stac-europe.com

Symantec pcAnywhere
Price *£175.08 (£149 ex VAT)*
Contact *Symantec 0171 616 5600*
www.symantec.com

Compaq Carbon Copy 32
Price *£105.75 (£90 ex VAT)*
Contact *Compaq 0845 270 4000*
www.compaq.com

Fax software

Many people still prefer the fax to any other form of electronic document exchange.



▲WINFAX PRO IS AN EXTREMELY WELL-FEATURED FAX PACKAGE. A CUT-DOWN VERSION IS FREE IF YOU BUY OUTLOOK 98

You may think that faxing is old technology, but there are an awful lot of fax machines out there, and for a lot of people faxing is still the preferred electronic document exchange mechanism.

So, the obvious thing to do is to fax directly from your PC. And for this, you'll probably be looking at either **Microsoft Outlook 98** or **Symantec WinFax**. Outlook 98 is Microsoft's fully-featured version of Outlook Express, which ships as part of Internet Explorer. It's an email client and personal information manager; you can use it not only to read your email, but also to store all your contacts information and use it as a calendar, too. And using Microsoft Exchange Server, you can even schedule meetings with other people from within the program.

When you buy Outlook 98, you are entitled to a copy of Symantec WinFax Starter Edition, which you download from the web. The Starter Edition only works from within Outlook, and allows you to fax, rather than email, a message to someone if you prefer. Of course, you'll need a modem connected to your computer to do this.

WinFax Pro is a rather more sophisticated, standalone program. It allows you to fax from any application by choosing the fax driver rather than a printer driver when you want to print the document. To use WinFax Pro from within Outlook 98, though, first you need to ensure that you have installed the corporate or workgroup version of Outlook, not the email-only version. This is true even if you are working at home, on a single machine: otherwise you can't truly integrate the two programs. Once you have installed the corporate version of Outlook (we found that we had to de-install the email-only version of the program completely and then re-install it to do this), you can follow the Help instructions that come with WinFax Pro to fax directly, rather than having to select "print" each time. WinFax Pro does have one other option: WinFax Pro for Networks. This separate package allows one machine to become the fax server for the entire network, sending faxes from any WinFax Pro-equipped machine. You simply select the fax server on your network and away you go — extremely useful for offices where installing a modem on each PC is not a viable option. In practice, we have found that fax software is useful for sending faxes from a PC — the quality tends to be much higher, since there's no scanning involved before the document is sent — but that receiving them via PC isn't always as handy. Normally, the first thing you do with a fax you've received is print it out anyway; and with the cost of plain paper fax machines now dropping to sensible levels, perhaps it makes more sense to send via PC, but to receive on a standard fax machine.

A fax is very difficult to change without that change being obvious

Our tip of the day for faxing from a PC is: scan your signature in and save it in a sensible format on your hard disk. That way you can "sign" letters before they are faxed — which looks far better than putting a "faxed from a PC" note at the bottom of a letter to explain the lack of a signature.

JFax.Com

Finally, we must mention in this category an interesting company called JFax.Com www.jfax.com. Subscribers are given a unique phone number, which they can give out as their fax and voicemail number. All faxes and voicemails are then forwarded to an email account so that they can be read from anywhere in the world, using an internet-connected machine and the JFax software. This is a super idea: it means you can receive faxes no matter where you are, solving a long-standing problem for business travellers.

PCW DETAILS

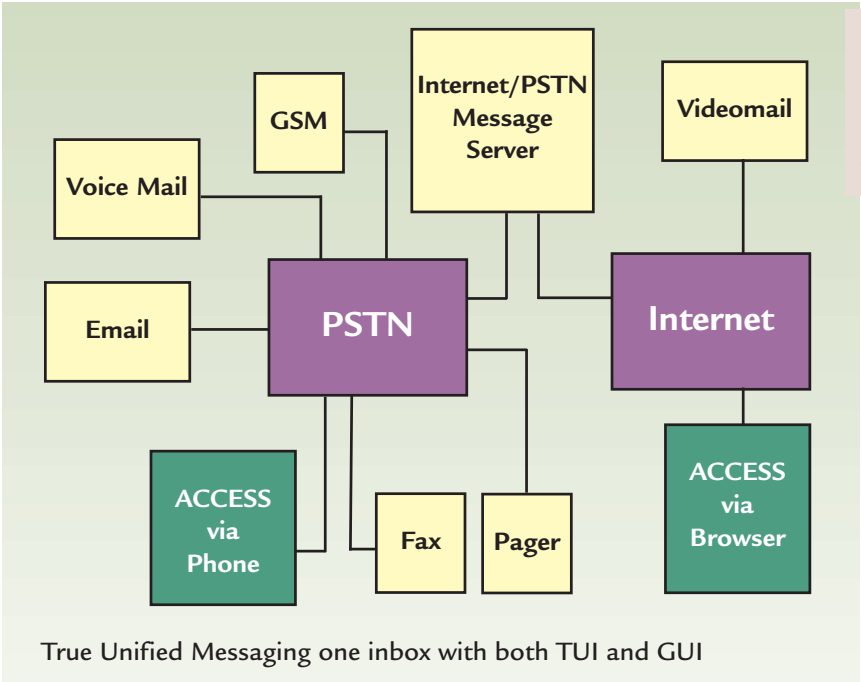
Symantec WinFax Pro
Price *£116.33 (£99 ex VAT)*
Contact *Symantec 0171 616 5600*
www.symantec.com

Microsoft Outlook 98
Price *£99 (£84.26 ex VAT)*
Contact *Microsoft 0345 002000*
www.microsoft.com

Jfax
Price *Rates vary depending on the services required*
www.jfax.com

Internet telephony

Say goodbye to expensive long-distance call charges: make your calls via the internet instead.



True Unified Messaging one inbox with both TUI and GUI

◀INTERNET TELEPHONY WILL LET YOU CONNECT TO MORE THAN JUST ANOTHER PC

Internet telephony is seen by many as a potential "killer application" for the internet. Essentially, it allows you to use the internet — via your dedicated, leased-line connection or using a local dial-up call to your internet access provider (IAP) — to make and receive voice calls. This means that instead of paying expensive long-distance phone charges, you can call people on the other side of the world for just the local call charge to your IAP; or, if you are on a permanent internet connection, for no cost at all. This, of course, has made some telecoms companies rather unhappy. If you can call across the world for the cost of a local call, how are the long-distance carriers going to make any money?

Uneasy feeling

Internet telephony has also made many IAPs uneasy. The problem for them is that people using internet phones tend to use up rather more bandwidth than people surfing the web — and the more bandwidth you use, the slower everything gets. For that reason, when internet phones first made an appearance in 1995, some IAPs even banned their use. These days, though, as bandwidth for all but the smallest IAPs has increased, this is less of a concern; and indeed, some IAPs are even offering internet telephony applications as part of their service. Internet phones normally work using your PC's sound card. Software on the PC digitises your voice as you speak into the microphone and sends the resulting data across the net to the person at the other end of your call. The software at the other end decodes the signal and plays it back through the sound card.

Early attempts at internet telephony tended to be half duplex; in other words, only one person could speak at a time. This was due to bandwidth considerations — how much data your modem could transmit at one time — and also because the software was working very hard to digitise your voice, so until high-speed PCs were prevalent it could only really cope with one task at a time. These days, virtually all internet-phone software is full duplex, so you can both talk at the same time, just like on a normal telephone. And the quality has improved, too. Early attempts at the software made each caller's voice sound as if it was being received over a very dodgy short-wave radio, but compression techniques from companies like Voxware www.voxware.com have improved to the point where it is now possible to have a perfectly reasonable conversation with someone a continent away.

When internet phones first made an appearance, some IAPs even banned their use

There are several internet-phone applications around. At the moment, both you and your receiving partner must be using the same software. However, a new standard, H.323, should standardise things to the point where it won't matter which application you use.

Board meeting

The benefit of using your computer as a telephony tool is that it's not just voices which can be transmitted. Microsoft's NetMeeting, for instance, allows you to collaborate using a "virtual whiteboard" — you sketch something on your machine's screen and it appears at the other end of the connection — and even enables videoconferencing, if both parties have some form of video camera attached to their PCs.

This is all very well, but most people would much prefer to talk on the phone than yell into a computer microphone. And the computer-to-phone network interface is where the really exciting work is going on.

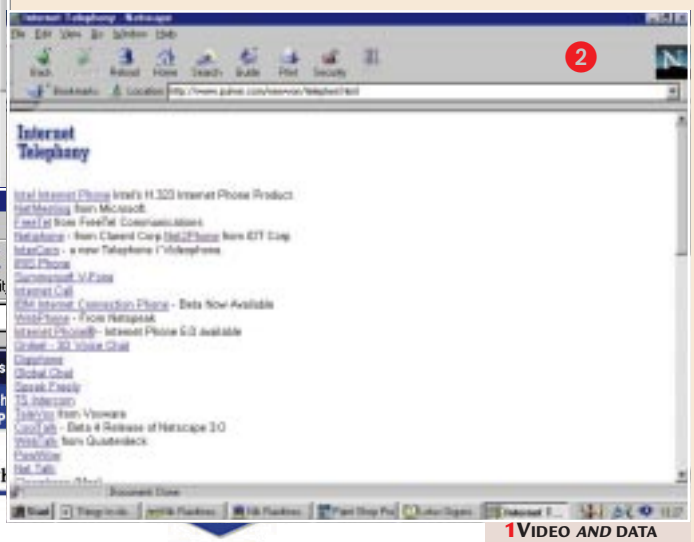
The idea here is that you call a gateway from your normal phone. The gateway takes your call, digitises it, and sends the data down the internet to the receiving gateway close to the destination. The receiving gateway de-digitises the data, then completes the final portion of the call by standard phone line again. The real benefit of this is that, again, the long-distance charges have been eliminated; instead, only two local calls are being paid for, one to the gateway, one from the other gateway to the recipient.

Several large companies, including traditional telecoms carriers who can see the benefit of using the internet for at least some of their traffic, are actively exploring this type of scheme. Of course, the quality is more variable than with traditional phone lines, but the cost saving can outweigh this. And, interestingly, some providers are now producing turnkey systems which can be installed by companies with their own permanent internet connection. This sort of system may make a lot of sense for organisations with offices in different parts of the world, which are faced with massive intra-office phone bills. Again, a minor deterioration in the quality of some calls — often there is no deterioration, given a reasonable internet connection — may well be justified by the cost savings.

AVAILABLE PRODUCTS

The internet phone applications available to you depend on what platform you are using. Some, like **NetMeeting** and **CoolTalk**, come with Microsoft's and Netscape's browsers. Others, like the **Internet Phone**, from the company which first introduced internet telephony, VocalTec, are available for download from the company's web site. VocalTec Internet Phone, for example, is a free download, so you can try the system out before you pay for the full version. You can find it at www.vocaltec.com. Likewise, **WebPhone**, from www.netspeak.com, is downloadable as a trial version; the company says you should ensure you have made at least one successful call, to be sure that the system works for you, before you pay $49.95 for the full version. **Net2Phone** www.net2phone.com allows you to make calls to normal phones from your PC. The company charges on a per-minute basis for the call and offers rates such as $0.10 per minute to the US from anywhere in the world. The system doesn't work the other way around, though, and you can't receive incoming calls on your PC — it's net-to-phone only.

- If you are interested in **corporate applications** for phone-to-internet, it's worth looking at VocalTec's site www.vocaltec.com. The **VocalTec Telephony Gateway** does just this, and is available as a full package running on a Windows NT server. If you want to know more about this subject, a good starting place on the web is www.pulver.com/newvon/teleptext.html, which provides a list of links to other companies' sites.



1 VIDEO *AND* DATA OVER THE NET? WEBPHONE MAKES IT POSSIBLE

2 THE PULVER SITE IS YOUR ONE-STOP-SHOP FOR INTERNET TELEPHONY

3 AT 10 CENTS A MINUTE WORLDWIDE, NET2PHONE IS GREAT VALUE FOR MONEY

As the relentless demand for storage continues, Adele Dyer looks at advances in the field.

Crystal vision

Remember when a 40Mb hard disk seemed huge? Now we have enormous amounts of storage available and still need more. With current technology, bulk storage often means just that; and with the need for more storage space for even larger files in the future, new technologies have to be developed. For some time we have thought of storage in two-dimensional terms, as data recorded on to a flat surface like a hard disk or CD-ROM. But research is under way that would enable 3D data to be created in the form of holograms and stored in crystals.

The idea of using holograms was originally mooted in the seventies. The basic theory is fairly simple: two laser beams are used simultaneously to alter the state of particles in crystal, creating electronic patterns. These patterns can then be read by another laser beam and interpreted as data. Within the crystal there are many thousands of layers, each of which can store a "page" of data. As the crystal can be seen from many different views, with each view storing a separate set of data, you can squeeze an enormous amount of information on to a tiny area. You could store two MPEG2 feature films – around 12Gb – on a crystal the size of a sugar lump. Researchers have managed to squeeze up to 10,000 pages, each with one megabit of information, on to a crystal around a centimetre square. More importantly, the data can be accessed extremely fast. These speeds can be achieved because there are no mechanical moving parts; an entire page can be retrieved at once, rather than each bit of data in a series being fetched individually from a rotating disk.

Researchers are aiming for a data throughput rate of at least one billion bits per second – more than ten times the speed possible today. This high-speed throughput and capacity would mean fast file access and faster download times, making it ideal for recording high-quality video. It would be invaluable for almost instantaneous searches on huge data libraries. Data integrity would be enhanced, as data information is spread throughout the crystal by laser. As there is no specific point at which the data is stored absolutely, the crystal can be damaged and still retain data: if you break the crystal in half, you will still be able to read the data, but at only half the signal strength.

If you think this all sounds too good to be true, you would be right. There are several problems inherent in the technology. Firstly, holograms are volatile. Creating the hologram is relatively easy, but getting it to remain unchanged within the crystal is not. Secondly, if you can store the hologram, the problem then lies in how to read the data without corrupting it. In other words, if you create a hologram by shining a light at a crystal, how do you prevent the data from being corrupted when you shine another light at it to read it.

The California Institute of Technology is trying a new approach, using crystals doped with small amounts of iron and manganese atoms.

▲ TWO-DIMENSIONAL RECORDING MAY BE AROUND FOR A FEW YEARS YET, BUT WITH THE DEVELOPMENT OF CRYSTAL STORAGE, ITS DAYS ARE NUMBERED

You can squeeze an enormous amount of information on to a tiny area. You could store TWO MPEG2 FEATURE FILMS on a crystal the size of a sugar lump

The atoms are excited by illuminating them with ultraviolet light at the same time as recording the hologram using red light beams. When the data is read using a red light beam only, the manganese atoms can be read; but in the absence of ultraviolet light they are not excited and so retain the data without loss. Even with this advance, however, it will be some time before we see holographic storage replacing hard disks.

Reports of the death of paper have been exaggerated. Paul Trueman finds it has an unexpected future.

Pulp fiction

There are numerous competing technologies heading our way in the next few years, all united in their attempts to replace the common paper book. The technologies being developed by rivals at MIT (Massachussets Institute of Technology) and Xerox PARC are not only using the concept of a paper book as a physical and theoretical shell for their ideas, but are going on from that to redefine the whole idea of reading.

The MIT Media Lab is developing an electrophoretic alternative to the paper solution, codenamed "The Last Book". The theory is that the Last Book will be made up of real paper substrates that contain thousands of individual electrically addressable particles of electronic ink – "e-ink", that can reconfigure itself over and over again on the same page *ad infinitum*. The e-ink developed by Joseph Jacobson and his team consists of electrically susceptible two-colour micro-particles, suspended in a clear outer shell. The charge across the electrodes defines the position of the particle, flipping it over to display one or the other colour. The spine of the Last Book will contain a small display, from which the reader can select the tome of their choice. At the touch of a button, the book will effectively re-draw itself to whichever work the user requests, transforming it from Hamlet to Trainspotting and back. While far cheaper than producing a liquid-crystal TFT display, the paper will be considerably more expensive than treated pulp, with a 21.59x27.94cm page costing between $1-10 per page (MIT's approximation), rather than a few cents per page. Jacobson and his team reckon on an eventual paper thickness of 200 microns.

The book will re-draw itself to whichever work the user requests, transforming it from HAMLET TO TRAINSPOTTING AND BACK AGAIN

▼A VERSION OF THE ELECTRONIC BOOK FROM A COMPANY CALLED EVERYBOOK: ARE WE FACING A FUTURE WITHOUT LIBRARIANS?

Each page has a common set of address electrodes linked to a single controlling chip in the spine of the book. The display driver contained within the chip will be robust enough to sense and work around a damaged page, printing out on the remaining pages. Also under development is a plan to design the display to be touch-sensitive to a stylus, allowing the user to indicate when they wish the type to be enlarged, or to add their own annotations.

MIT's "rival", Nicolas K. Sheridon, came up with the idea for the Gyricon twenty years ago, but nothing came of it at Xerox PARC where he worked. Sheridon returned to his idea five years ago, and now it is only a few years from being brought to market. The "digital ink" theory behind the Gyricon is rather more tangible than that of the Last Book's micro-particles. The display has the texture of rubber crossed with thick cardboard, and is made up of thousands of minute rubber beads, each varying from 0.01-0.03mm in diameter. The balls are mixed into molten transparent silicone rubber, then cooled and cut into sheets. When the sheets are soaked in oil, they expand and the balls are left free to rotate. When a charge crosses the screen, the beads flip one way or another (it's a Xerox trade secret how they actually do this), and because they have a different colour each side, the display can reconfigure itself upon each charge. The models in development are powered by small solar cells, and the integrity of the displays remains even after two years and three million erasures.

Sheridon believes that eventually the display could be used in laptops and handhelds. "It would probably allow you to run a laptop for six months on a few AA batteries," he says, because the display doesn't need to be refreshed or be backlit.

Ben Elton posited the idea of one-book-shows-all in his thriller *Another Eden*. Elton raised the problem that people like the feel of paper when reading. After the invention of the LCD and the proliferation of the wall-size flatpanel, it seems a triumph for the Gutenberg press that the books of the future will seek success by recreating the feel of dried pulp.

hands on

contents

It's happened to us all. We're up against a deadline on an important piece of work when suddenly, without warning, and always at the most inconvenient time, it happens... some **fatal flaw** in your kit stops or, worse still, wipes out your work. **Regular backups** can often get around the problem, allowing you to restore your work from an alternative source, but what happens when it is your backup that has been destroyed? The ominous **'Click of Death'** — feared by many a Zip user — can see your precious backed-up data lost forever, and there seems to be little users can do to stop it happening. Once you hear the dreaded noise, it could already be too late to take appropriate action. In this month's *Hardware* column, Roger Gann takes an in-depth look at this worrying phenomenon that estimates suggest could affect one percent, or **100,000**, of Iomega users. The happier side of *Hands On*, meanwhile, brings news of **freebies galore** for DTP, graphics and music fans, whilst Ben Woolley whiles away a lazy afternoon perusing one of the biggest online libraries of **Earth photos** from space.

NIK RAWLINSON, *HANDS ON* EDITOR

NIK_RAWLINSON@VNU.CO.UK

OPERATING SYSTEMS

APPLICATIONS

PROGRAMMING

MISCELLANEOUS

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.

Just give us the facts

Multimedia effects on the net are OK — until they prevent you from finding information. Nigel Whitfield campaigns against multimedia froth.

Readers of a certain age might remember Darlene Love, the Ronettes and other bands produced by Phil Spector. In which case, you might also remember his trademark production technique — the "Amazing wall of sound". True afficionados of the era may even recall badges proclaiming "Back to mono". With pressure mounting on us to switch to digital broadcasting, perhaps it's only a matter of time before we start to sport badges labelled "Back to analogue" or "Keep your hands off my wireless".

Switching off

There is a serious point to all this. On one hand, stereo, digital broadcasting and similar advances are all things we will have to get used to. On the other hand, sometimes we think it's harder than it really is to do without them. Try switching off the stereo on your radio or listening to an AM radio station, and it's not really so bad after all. The same cannot necessarily be said of the internet; while there's a certain ring to "Back to V.32" it would be accompanied by a fourfold increase in your phone bill, too. And that wouldn't be progress of any kind.

It's not, of course, the users of the internet who need to be donning Spector-esque badges. With the slow connections most people have, the problems arise at the other end when a server tries to send you a huge file for an obscure plug-in and you end up spending ages just finding a contact number from a company web site.

▶FIG 1 SYMANTEC'S WEB SITE: LET'S GET BACK TO INFORMATION

There's a lot to be said for simplification. I'm not recommending badges that read "Back to Mosaic" for web browsers, but it would make life so much easier if designers thought about other things besides how many graphics they can bill their client for. How many times have you visited a site, only to be greeted by a page that reads "Click here for fast version… here for slow version" or something similar? Do we really need it?

There's a place for features and goodies on web sites. But there's a place for information, too

Something has gone slightly wrong when people are designing web sites that begin with an apology and a link to a different version, so that the majority of home users will be able to access it at a reasonable speed. Of course, there's a place for features and goodies on web sites. But there's a place for information, too. Try visiting the Symantec web site [Fig 1] at www.symantec.com and see if you can track down information about Norton Utilities for Macintosh. You might almost imagine they no longer make the product. And, if you think the problem is bad for casual users wanting to find information, think about those who have to rely on other technologies to help them navigate (for instance, people with poor sight). Try turning off the images on a web site or firing up a copy of Lynx, and see how easy it is to find your way through a page that just reads "image image image". Some of these problems are being addressed. There are new standards being set for HTML all the time and the latest revisions make it mandatory to include ALT tags to specify information about an image. There will still be old and badly coded pages out there, but it's a start, as is the initiative by the World Wide Web Consortium (W3C) to make the web more accessible to people with disabilities.

Time for action

Initiatives from the likes of W3C are not enough, though. When you visit a web site and cannot quickly find what you want, don't just sigh and carry on clicking. Click the link for the webmaster and tell them. When you're bombarded with multimedia just because you want to find out how to complain about something you bought, or you choose the "Text only" version of a site and find it's three months out of date, then it's time to make a fuss. Multimedia and all those other great features can make a difference to the internet. Just like multi-channel digital television. The two have something else in common: many people are telling us that they are good for their own sake. Anyone for a "Back to Information" badge?

Questions & answers

Q I want to contact people who work for certain companies but I don't know their phone numbers, postal or email addresses. Is it possible to search a company web site for a specific person's email address? These people are not listed on Bigfoot and the like, and Email Ferret is no help.

a *There's no simple way to search through someone's web site, although some web editors will let you load a whole site which you can then search . But that's no use at all for a site which generates pages on-the-fly, and besides, many people won't take kindly to you doing that sort of thing.*
There are two solutions.
The first is for companies to make web pages with useful information on it. The second is to see if they run an LDAP (Lightweight Directory Access Protocol) server. This is an online directory that can be queried for addresses by programs like Eudora Pro, Outlook and Netscape Messenger. You'll need to know on what machine the server is running so you can tell your email program to check it. Try obvious names such as mail.company.com, ldap.company.com and www.company.com.
Internet standards recommend an address of postmaster be valid for all mail systems, too; so, postmaster@company.com should be valid. Whether or not it's read by anyone who'll be able to help you is impossible to say. It certainly should be, but in practice that may not happen. Brute force is not recommended, but many company email systems use a straightforward way of allocating internet addresses. For example, my name might be nigel_whitfield, nigel.whitfield, nwhitfield, or nigelw. It's not foolproof, but it's worth trying. Just don't send anything embarrassing until you know you have the right address!

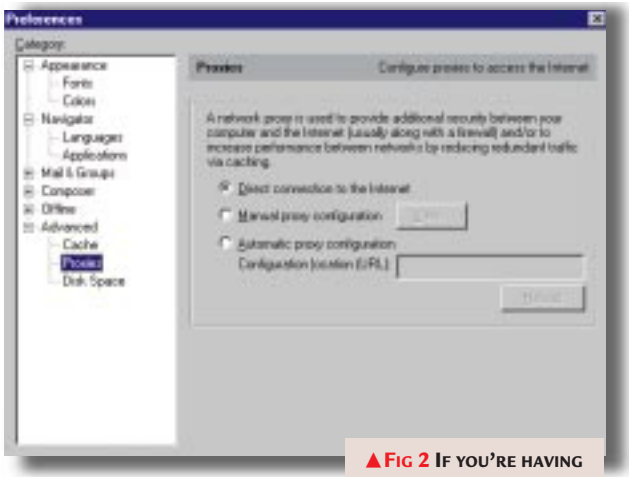
Q I've deleted Internet Explorer 4 from my system and installed Netscape Navigator. But now, when I try to access web pages, I get a message stating that I'm forbidden to access anything via proxy. What's happening? Do I have to re-install Explorer?

a *It sounds as though there are some proxy settings configured in Netscape that are preventing you from accessing the pages you want. From the Preferences screen, click on the little arrow next to "Advanced" to expand it, and then click on "Proxies" [Fig 2]. Make sure it's set to "Direct connection to the Internet". If you do want to use a proxy, use the manual configuration screen and check that the settings are correct.*

Legally, you're not allowed to connect an unapproved modem to the phone line

Q I am considering buying a PDA from the US. Aside from the obvious difference such as power adaptors and spelling, I wonder if the built-in modems in PDAs, such as the Philips Velo 500, work in the UK and Ireland? I know that the manufacturers must have the modems certified for use on each country's phone network, but if the modem is sold in an American model, does this mean it won't work on other phone networks? If the modems do work, is there any legal problem about using them in another country?

a *In general, there are only so many ways a modem can do its job and phone systems are pretty similar the world over. But there are some differences. For example, the UK phone-wiring system uses a separate wire for the bell. As a result, when you use foreign modems, other phones may tinkle during dialling, or the modem may not reliably detect incoming calls.*
Usually, you should have no problems making the modem communicate. Legally, however, you're not allowed to connect an unapproved modem to the phone line. Your phone could be cut off or you might be fined if someone finds out. That said, many modern modems have approval in different countries, often by means of software that can configure them to meet the relevant standards.



▲ **Fig 2 If you're having problems accessing web pages, check that the proxy settings under 'Advanced' are correct**

Q How do I get a form's Submit button to use a CGI script? I've written it in Perl Builder and linked it to the HTML file, but clicking Submit just resets the form.

a *You need to specify the action at the top of the form, not with the Submit button. The CGI script should be loaded on to your web server (PerlBuilder will simulate this for you, for testing). Define the action for a form with a line like*

```
<form method="POST"
action="myscript
.cgi">
```

[all one line]. Your script may need a different name, to accord with the server on which it will be running. Some will want scripts to end with .cgi, or .pl, and others won't mind as long as it's in a particular directory and referred to as, say, /cgi-bin/myscript.

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Doing the impossible

Some people find the phrase "it can't be done" too much of a challenge to resist. Tim Nott confesses there is always something you can learn from readers who accept mission impossible.

Although it's a pleasure to be able to answer "How do I?" questions on the subject of tweaking Windows, it's often equally satisfying to reply that "you can't". Should you think this perverse, then perhaps I should explain that I spent a long time in the building industry, much of which was spent queuing at builder's merchant's counters.

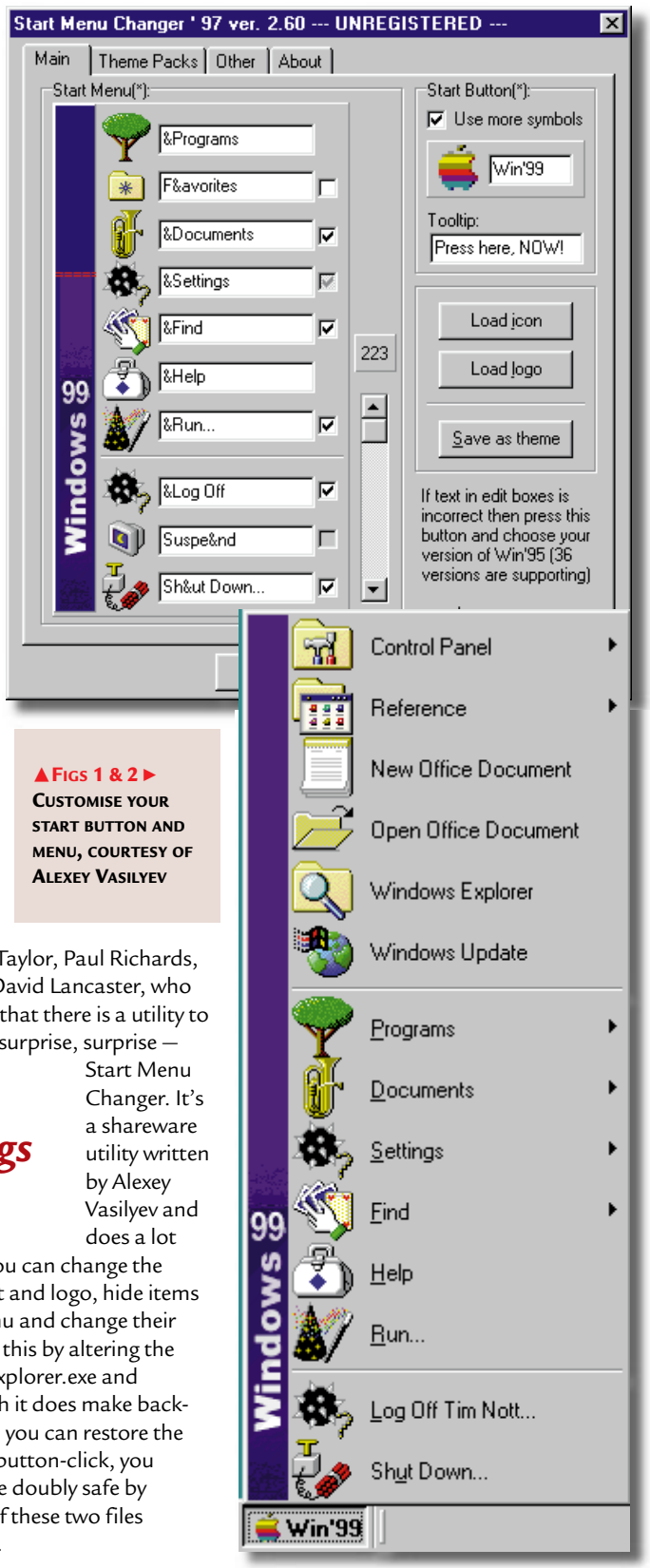
After the guy in front had been served, a piece at a time, with enough pipe fittings to plumb a major housing development it would finally be my turn, and I would explain to the lugubrious-looking man in the green overall exactly what I wanted. These people are specially trained for this sort of eventuality. Halfway through my speech he would start to shake his head sadly, following this by sucking in air through his teeth. This would normally be followed by a short coughing fit (his, not mine) which seemed to cheer him up, as after a further spell of teeth-sucking he would pronounce, with noticeable satisfaction, "No, mate. You won't get that. Not in metric. Not anywhere." So I'm just getting my own back.

Sometimes, however, I get this urge to repent when I've stated categorically that you can't do something. This is usually because several readers have written in to say "Oh yes you can." So this month I'm going to tell you how to do three things that can't be done.

The first is that old chestnut "How do I change the Start Menu graphic?" by which I mean the vertical logo that says Windows 95 or 98 on the first level of the start menu. One solution, shamelessly lifted from another magazine by several readers, was to create a bitmap, cut it up into icon-sized chunks, then edit the registry so that each chunk replaced one of the regular icons, joining together to form a continuous image. Smart, I thought, yet dumb, as it takes a lot of effort and still doesn't replace the logo.

So, a big thank you to Graham Taylor, Paul Richards, Dan Jones and David Lancaster, who all informed me that there is a utility to do this called — surprise, surprise — Start Menu Changer. It's a shareware utility written by Alexey Vasilyev and does a lot more besides. You can change the Start Button text and logo, hide items on the start menu and change their icons. It does all this by altering the Windows files Explorer.exe and User.exe. Though it does make back-ups of these and you can restore the originals with a button-click, you might want to be doubly safe by making copies of these two files first [Figs 1 & 2].

I'm going to tell you how to do three things that can't be done



▲ FIGS 1 & 2 ▶ CUSTOMISE YOUR START BUTTON AND MENU, COURTESY OF ALEXEY VASILYEV

▲ FIG 3 AUTOMATIC RESOLUTION CHANGE WITH QRES

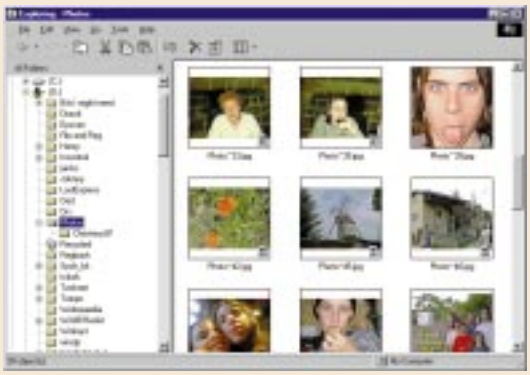
Not to be outdone, Benjamin Kitt brings news of TClock by Kazuto Sato. It's freeware, and the modest 118Kb download includes the source code for those that like that sort of thing.

This time you get two impossibles in one. You can change the start menu graphic, the start button text and icon, and even hide the start button. As far as I can tell it does all this without modifying the User.exe and Explorer.exe files. The other impossible thing it does is display the date and day alongside the time in the Taskbar tray. There's all sorts of other diversions, including alarms and customisation, but you might have to figure out some of the more esoteric options by trial and error as the help file is still under construction. It does, however, contain the succinct advice that "If you get any problems with TClock, quit using it."

The third thing you can't do, as regular readers will know, is start Windows with different screen resolutions and colour depths loading automatically. Oh no, no way, as I pointed out in September's column, as this information is stored in the common part of the registry rather than on a per-user basis. Well, as Paul Brown points out, this isn't true in Windows 98. Display settings are saved with user profiles, so if you want to start up with a different resolution (say for different family members or for games players) just create a new user from the Users icon in Control Panel [Fig 3].

Another solution is to use Berend Engelbrecht's QRES. This is an add-on for QuickRes, the resolution-changing utility that comes with the Microsoft Powertoys and is included with Windows 98 and later versions of 95. This adds another page to shortcuts, giving the new screen settings. It makes it rather more versatile, as you can effectively change the resolution for a single application, such as a game or children's title, and there's an option to restore the original settings when the program is closed. Astute readers will realise that on a multi-user machine, if QRES is applied to a shortcut in the user's StartUp folder, this will have the same effect as the Windows 98 method described above. Many thanks to Chris Elliott and Mapson for bringing this to my attention.

QUICK TIPS



◄ FIG 4 PREVIEW THOSE PICS IN EXPLORER

☛ **Here's a neat trick.** You probably know that you can jump around folder contents (and many other Windows lists such as the File Types) by typing the first letter. If you then type another letter without pausing, this will select the first item starting with those two letters. So, if I open my Windows folder and type N it takes me straight to the NetHood folder. If I then type O it skips to Offline Pages. But if I type the two letters in quick succession, it highlights Notepad.exe.

☛ **Windows 98** users who don't have a removable floppy drive (i.e. most desktop machines) can speed up booting by going to Control Panel, System, Performance, File System, Floppy Disk and unticking the "Search for new..." box.

☛ **Win 98/95 + IE4** users will probably all have found that if you view a folder "as web page" you get a thumbnail preview of a selected graphic file such as BMP, GIF and JPG files as well as locally-saved web pages. What I hadn't spotted, until Tim Dawe pointed it out, is that if you right-click on a folder and choose Properties, there's an option to enable thumbnails. Do this, open the folder, and you'll find a new Thumbnail option in the View menu and button. Choose this and all eligible files will be shown as thumbnails [Fig 4].

TECHNOLOGY IN ACTION

It's not strictly Windows, but I thought this story from reader Martin deLoughery was worth sharing. "About five months ago I was on the phone to my accountant. Towards the end of the chat I said 'By the way, are you on email yet?' To which he said 'Sorry, it's a bit adventurous for us, and I'm not sure the partners would go for it'. About three months later I got a bill from them, and at the bottom of the page I see their new email address. "Super!" I think. "That'll speed things up a bit." A day or so later I banged off an email reply and sent a cheque in the mail. SEVEN WEEKS LATER I got another letter in the post, saying only 'Thank you for your email message: it arrived safely'."

Questions & answers

Q I like the extra toolbars you can have on the Taskbar with Windows 98, especially the Quick Launch bar, but it's annoying when icons get "squeezed off" and you have to click on the almost-invisible arrow to get at the rest of the icons.

TANYA RAYMOND

A *If you grab the faint grey bar at the left of each Taskbar section, you'll find you can move them around or even drag the Quick Launch bar out of the Taskbar area. Another tip is to drag the top edge of the Taskbar itself (assuming you have got it at the bottom) to give yourself extra rows of buttons.*

Q I've recently started getting crashes when logging on to AOL – something to do with WAOL causing an invalid page fault.

BRENDAN ABBOT

A *This seems to be a problem with the version of the AOL software supplied on the Windows 98 CD-ROM finding the wrong version of Msvcrt.dll. If you download the later version of AOL 4.0 from http://aol.com the problem should go away.*

Q I have downloaded some pictures and saved them to disk. If I try to open all of them I get a separate Internet Explorer window for each picture. How can I open all the pictures in one Internet Explorer?

AHMAD NORDIN

A *No, mate. You can't (shakes head sadly and slowly). Not unless the pictures are attached to a web page. Your best bet is to use a program such as Paint Shop Pro (in our CD-ROM software library) that will display more than one graphics file at a time. Alternatively, see this month's quick tips [p259].*

Q Recently my friend got Windows 98 and I wanted to copy some files to his PC. Because the files were too big to copy to floppy I used MS Backup. When I tried to restore the Backup files on to his PC they did not appear to be on the disk. I tried to restore the files on my Windows 95 PC and they worked. Is there any way I can get it to work with Windows 98?

IAN RONALD

A *No, mate. Not no how (sucks air in through teeth). You can't restore backups made with Windows 95 on to a Windows 98 machine. Of course, if you use WinZip to compress all the files to a single Zip file, you'll find it has an option to span multiple floppy disks.*

Q I would like to know how to disable and hide Run, Find and Settings in the Start menu without any new software. Is this possible?

RUPERT

A *Yes it is, but it's not for the faint of heart. You need to use the System Policy Editor which is on the Windows 95 CD. Go to the Admin\Apptools\Poledit folder and read the installation instructions in Poledit.txt. You'll find instructions in the Resource kit helpfile, which is also on the CD in Admin\Reskit\Helpfiles. With Windows 98, go to the Tools\Reskit folder on the CD and open Readme.doc which gives full instructions for installing both the Resource Kit and the Policy Editor. System Policies is a complex subject and to cover it in depth would take several months of Hands On, so I'm not going to go into depth – it's all in the Resource Kit help file (Windows 95) or the online book (Windows 98).*
But to answer the question, it's quite straightforward to disable these entries on a standalone PC set up for a single user – i.e. the "All users have the same settings" option is checked in Control Panel, Passwords, User Profiles.
Back up the registry and run Poledit. Go to the File menu and choose Open Registry. You'll see two icons appear, labelled Local Computer and Local User. Double-click the latter, and click on the book icons to expand the tree. Under System, Shell, Restrictions, you'll find the options you are looking for: note that you can't remove the entire Settings entry, but you can remove the folders (e.g. Control Panel and Printers) and the Taskbar settings. Tick the restrictions you want enforced, OK out of the box, close Poledit and confirm the changes to the registry. When you restart the PC, you'll find the relevant commands hidden and disabled – the Control Panel and Printers folders will also be hidden in Explorer [Fig 5].

▲ FIG 5 RESTRICTING USERS WITH THE SYSTEM POLICY EDITOR

Q I have created a custom-made boot disk which will format my hard disk, copy CD-ROM drivers to it and then run Windows 98 setup using the msbatch.inf file created by Microsoft Batch 98.
I would like to know if there is any way that I can format my hard disk without FORMAT.COM asking for me to press Y to start.

PETER GEDDES

A *Do I have this right? You want a boot disk that automatically formats a hard disk without confirmation? Just suppose the disk got left in a floppy drive by accident and the machine was switched off. Switch on again and it's goodbye data, goodbye applications, goodbye operating system.*

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Powertoys
www.microsoft.com/windows95/info/powertoys.htm

QRES
http://home.wxs.nl/~einhard/qres.html

Start Menu Changer
www.halyava.ru/aaalexey/StartMenu.html

TClock
http://member.nifty.ne.jp/kazubon/download/tclocke.htm

Buried treasure

Roger Gann digs deep into the Redmond files and reveals a treasure trove of undocumented DOS dodges to make your life easier.

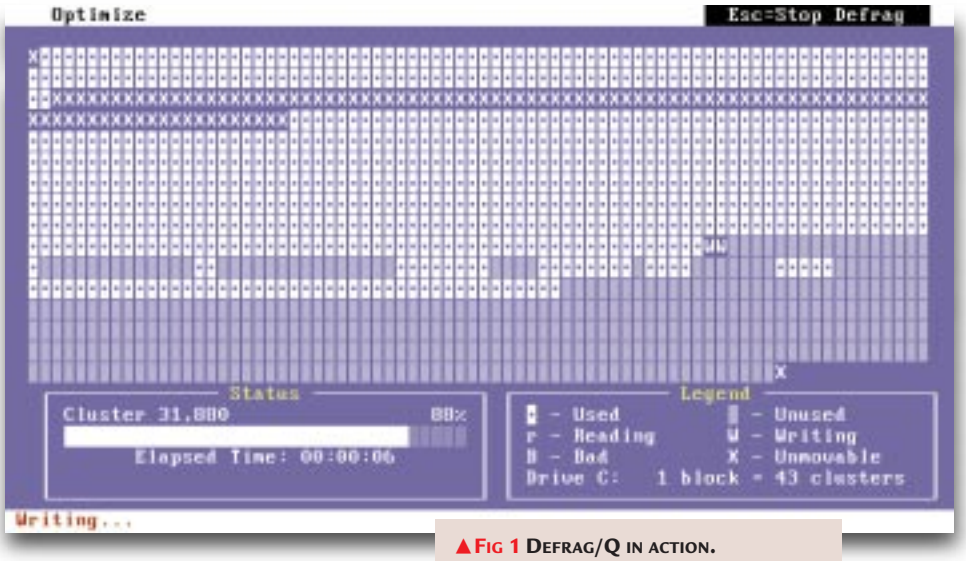
In last month's column I revealed some fascinating undocumented DOS titbits and promised more for this month. So, true to my word, here they are, pulled from the X-Files in deepest Redmond! Once again, these vary in importance from trivial to intriguing. Note that most, but not all, will work with Windows 9x.

1 DEFRAG /Q. While Windows 9x isn't so fussy, Windows 3.x requires contiguous free space on a hard-disk drive in order to create a permanent swap file. You create this contiguous space by running a file defragmenter (such as DEFRAG, included with MS-DOS 6.2) which moves all the files on a disk, leaving a single, unbroken, vacant space on the drive.

☛ **You can create** a permanent swap file in this space by opening the Windows 3.1 Control Panel's 386 Enhanced dialog box, clicking the Virtual Memory button and then clicking the Change button. Normally the DOS utility, DEFRAG, does two things: it rearranges each file's clusters into consecutive order, and it makes all files contiguous, leaving one large open space on the drive. But this process can be slow, unless you use an undocumented switch which speeds up DEFRAG.

☛ **Run the command** DEFRAG /Q (for Quick) at a plain DOS prompt with Windows not running [Fig 1]. DEFRAG now doesn't bother to move each file's clusters into consecutive order. Instead, it simply moves all of the disk clusters so that they reside at the beginning of the drive, leaving one contiguous space on the disk — perfect for creating a permanent swap file!

☛ **Having made** your swap file (a process that takes only a few seconds in Windows) you may want to defragment all the files completely because this gives the user faster disk access. In that case, start a full defragment with the command DEFRAG /F after exiting Windows. Not Windows 9x!



▲ **Fig 1 Defrag/Q in action. Cosmetically indistinguishable from normal modes, the /Q option merely 'compacts' all the clusters, thus saving time**

2 Break the 640Kb barrier. Sometimes 600Kb of free memory isn't enough when DEFRAG is run on a badly fragmented large disk. If you're running DEFRAG on a 386 or 486, there's an undocumented workaround. If you're using a VGA graphics card and monitor, load EMM386.EXE with the command

```
DEVICE=C:\DOS\EMM386.EXE
NOEMS I=A000-B7FF NOHI
```

in CONFIG.SYS. For a system with monochrome video, use the command

```
DEVICE=C:\DOS\EMM386.EXE
NOEMS I=A000-AFFF NOHI
```

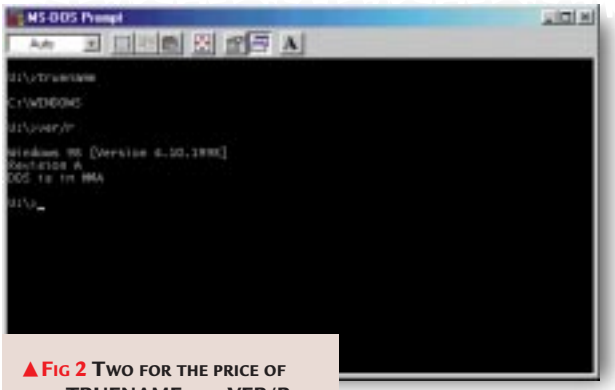
Configured this way, EMM386.EXE converts a portion of the area normally reserved for the video buffer to usable RAM and links it with conventional memory, resulting in maximum executable program sizes approaching (and sometimes even exceeding) 700Kb. This should give DEFRAG plenty of room to run. If your system uses an extended BIOS, the extra RAM will not be linked with conventional memory. Instead, you'll gain an extra 96Kb of UMB (upper memory block) RAM, or 64Kb on monochrome systems.

Note that most, but not all, will work with Windows 9.x

☛ **You might think** that this is a great way to get more memory for RAM-hungry games, but sadly it isn't. Since this workaround uses memory normally reserved for your graphics adapter, you can't run any graphics-based programs while your system is set up in this way. Since DOS 6.0's DEFRAG program is a text-only application, you won't run into problems.

3 INSTALLHIGH. You are probably aware of the INSTALL command, which loads TSRs from CONFIG.SYS, rather than AUTOEXEC.BAT. But that's only half the story. DOS 6.0 also supports a similar but undocumented command, INSTALLHIGH. This loads TSRs into upper memory from CONFIG.SYS in much the same way that LOADHIGH loads them into upper memory from AUTOEXEC.BAT.

☛ **You could argue** that it's better to load TSRs from CONFIG.SYS simply because it accepts the question mark parameter (?) and allows for the F5 and F8 keys, which let you skip CONFIG.SYS or pass over it one line at a time. Adding the question mark to a statement that loads a driver or a TSR makes DOS prompt you before executing the program. This is useful when you don't want to waste memory loading a program you don't need at every session.



▲ FIG 2 TWO FOR THE PRICE OF ONE: TRUENAME AND VER/R IN ACTION, UNDER WINDOWS 98

For example, enter this command in CONFIG.SYS to generate a YES/NO query before DOS attempts to load the program:

```
INSTALLHIGH?=C:\MOUSE\MOUSE.COM
```

Press Y to load the program or N to skip it.

☛ **To load TSRs** and device drivers high, you need to have EMM386.EXE loaded in CONFIG.SYS with INSTALLHIGH commands after it. But there's a small caveat: INSTALLHIGH doesn't support the LOADHIGH /L switch available in AUTOEXEC.BAT, which allows you to specify the memory region that your program loads. A TSR loaded with INSTALLHIGH is always placed in the largest free upper memory block.

4 SWITCHES = /W. This is one for users of older versions of DOS. It is not relevant to Windows 9x. MS-DOS 5.0's SWITCHES command supports an undocumented switch that enables Windows 3.0 users to move the file WINA20.386 out of the root directory. Usually, this virtual device driver can work only if it's located in the root directory. However, add a SWITCHES=/W statement to CONFIG.SYS and a DEVICE command specifying the new file location to the [386Enh] section of SYSTEM.INI, and you can move WINA20.386 wherever you like. So, if you moved the file to your \WINDOWS\SYSTEM directory, the line would look like this:

```
[386Enh]
DEVICE=C:\DOS\WINDOWS\SYSTEM\WINA20.386
```

Note that WINA20.386 is not required for Windows 3.1 or 3.11.

5 Long paths. One of the long-standing shortcomings of DOS is the parsimonious 127-character limit it places on commands. In fact, it's a bit less than this; the PATH statement actually limits the length of the PATH environment variable to 122 characters (plus five for PATH=). DOS 6.0 finally breaks through this limit by allowing PATH statements to be created in CONFIG.SYS with a SET command instead. To set up a long path statement, open AUTOEXEC.BAT in EDIT (DOS' text editor).

☛ **Move down** to the PATH statement, press Home, press Shift+End to select the entire PATH line, and press Shift+Del to cut the statement.

☛ **Without exiting EDIT**, press Alt+F, O to open a file, type in CONFIG.SYS and press Enter. Press Y when prompted to save the file and CONFIG.SYS appears in the editing screen.

☛ **Press Ctrl+End** to get to the bottom of your document, and press Shift+Ins to paste the old path into CONFIG.SYS.

☛ **Press Home** to return to the beginning of the new path line, and insert SET and a space before the path statement. For example, this statement adds DOS, WINDOWS, and UTILS to the path environment:

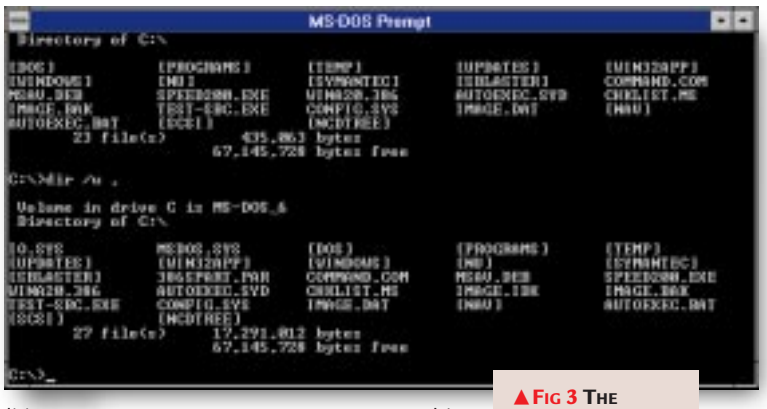
```
SET PATH=C:\DOS;C:\WINDOWS;C:\UTILS
```

☛ **Press End** to reach the end of the statement and add more directories separated with semicolons without worrying about the line's length.

☛ **Press Alt+F, S** to save the file, and Alt+F, X to exit EDIT. Reboot the computer in order to make your changes take effect.

You don't get owt for nowt, though, and this method has a couple of drawbacks. Firstly, DOS won't show any path directory entries past the 127-character limit when you enter PATH at a DOS prompt. Secondly, you can't alter paths on-the-fly, as you could when the PATH was specified in AUTOEXEC.BAT: you cannot, for instance, manipulate it in a batch file using the %PATH% variable either.

6 TRUENAME. This is another classic DOS secret which first surfaced with MS-DOS 4.0. Pass TRUENAME a filename, and it returns a fully "qualified" filename. That is, one that includes a drive letter and a complete path to the file from the root directory. Its most important use is probably on networks where drive mappings and use of the SUBST command hide the real path from the user. TRUENAME can "see through" aliases created by commands such as SUBST and other network utilities.



▲ FIG 3 THE ELUSIVE COMMA MAKES ALL THE DIFFERENCE, REVEALING HIDDEN OR SYSTEM FILES

7 VER/R. This is an odd one [Fig 2]. Enter VER with the undocumented /R switch and, in addition to reporting the version and revision of DOS on your PC, it will also tell you whether DOS is loaded into high memory area (HMA). This information is useful if you have to reserve HMA space for, say, NetWare shells.

8 DIR. Another trivial oddity. By adding a humble comma [Fig 3] to the DIR command, it will list all System/Hidden files, rather like DIR/OS but saving you a few keystrokes. This one doesn't work under Windows 9x.

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Cool storage

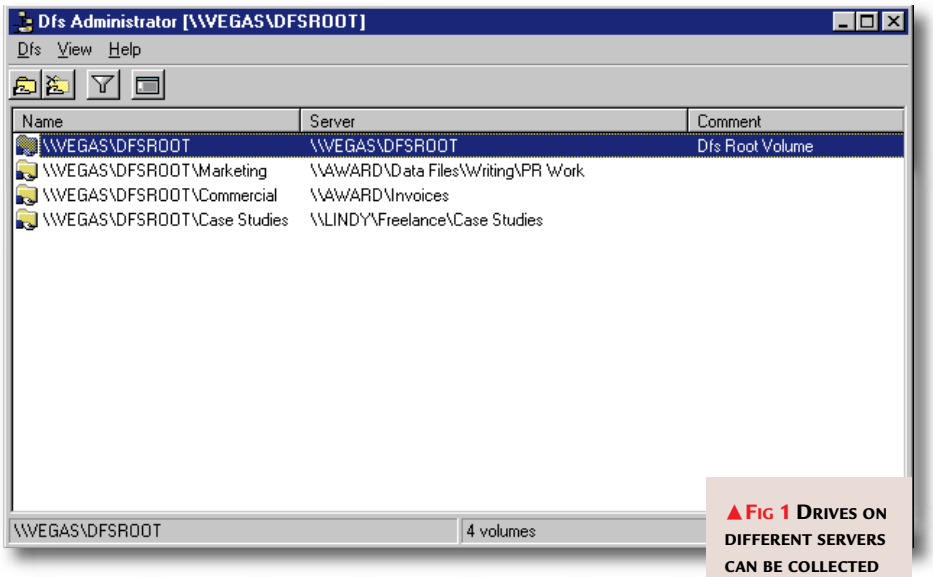
Andrew Ward assesses the advantages Microsoft's directory file system (DFS) for NT 4.0 and 5.0.

If you are a network administrator who has ever wanted to attach to a deep nested directory within a share, for example by typing something like this:

```
net use Q: \\SERVER\SHARENAME
\a\long\directory\path
```

you'll know that you can't do it if the server is Windows NT 4.0. Until now, that is, as you can install DFS, Microsoft's directory file system.

DFS will be part of Windows NT 5.0 and is available now for Windows NT 4.0. Its primary purpose is to allow network administrators to define a logical view of an organisation's file storage [Fig 1] which hides the physical structure from users. For example, you may have material stored in different folders on different drives on a number of servers around the organisation, which all relates to the marketing department. These folders can be collected together under a share named "Marketing", so that the user does not have to navigate the network to find all the marketing materials. Of course, this means extra work for administrators, since the DFS tree has to be built to combine the various shares from different servers under the DFS root directory. Two tools are provided for DFS administration to ease this burden: a graphical DFS manager and a scriptable command-line tool. There's no need to install any new software on the client systems, or even on the systems whose directories are being administered by DFS.



▲ FIG 1 DRIVES ON DIFFERENT SERVERS CAN BE COLLECTED TOGETHER TO PRESENT A LOGICAL VIEW OF STORAGE

The primary purpose of DFS is to allow network adminstrators to define a logical view of file storage

As far as I can tell, DFS needs to be installed only on the server which is subsequently going to own the share. Thereafter, from the point of view of the client systems, the DFS tree simply appears as a remote drive like any other. It appears that one server can own one DFS tree. With this extra level of indirection, server replacements can be hidden from users, who will now navigate via the DFS names rather than actual server names. If a server has to be changed for whatever reason, or a drive or its contents moved from one server to another, the user need not know. Another benefit of DFS is that you avoid the problem of running out of drive names: if you need to add more shares and directories, they can be added under the same DFS root. Installation is a little tedious. After executing the downloaded file, you have to go to the Network Control Panel, select the Services tab, click Add and then Have Disk (even if you see Distributed File System listed among the choices). There's no browse button in the Have Disk dialog box, so you have to type in the path manually, which will be something like:

```
C:\WINNT\system32\dfs
```

Then, after one of those infamous NT reboots, you're on your way.

Incidentally, you'll be pleased to hear that for Windows NT 5, the development team has been told to treat any requirement for a reboot as a bug, pure and simple. So most of these reboots will eventually become a thing of the past. Another feature of DFS is load balancing and resilience against failure. If you specify two directories on different servers for the same DFS path, then DFS will alternate requests between the two directories. If one of the servers disappears, then all requests will be directed to the other. However, DFS doesn't do any synchronisation or replication, so an administrator will have to ensure that the content of the two directories is identical, and this feature will clearly be of practical use only for read-only directories.

Being able to attach to a folder nested deeply within a DFS share is actually just a side-effect of DFS, but for some administrators, this will be a big enough

benefit to make DFS worth installing. To download DFS for Windows NT 4.0, visit www.microsoft.com\ntserver and look for Microsoft Distributed File System on the Downloads page.

Go ahead and su

No doubt you all remember the "su" (super user) command from Unix. Indeed, maybe some of you still use it. The Windows NT version will log you on as any user other than the one you are running, but the most common use is to grant yourself administrator rights so you can carry out a particular task without having to go through the pain of logging off and logging on again.

Many of us have probably (but unwisely) given in and resigned ourselves to permanently running with administrator rights, because we so often stumble across those little tasks that require administrator privileges. It would be much safer to use the "su" command, and only become an administrator when you need to, says Colin Simpson. Where do you find this magical su.exe? It's supplied with the Windows NT Resource Kit, but beware. The one that came with the original resource kit required a lot of user permissions to run in the first place. You needed rights to Act As Part Of The Operating System, Increase Quotas, Replace A Process Level Token, and Restore Files And Directories, which somewhat limited its purpose as a general-purpose user upgrade tool.

But no longer. Colin has spotted that with Resource Kit Supplement 2, a new service-based component avoids the need for these rights (although, predictably, you need to be an administrator to install this component in the first place). To run this component, from \I386\NETADMIN on the resource kit CD, type:

```
suss -install
```

The most obvious use of su to emulate the Unix functionality is to type:

```
su administrator
```

which will create a command prompt window logged in under the account administrator (assuming you have such an account on your system). Before that you will be prompted for a password, just as in Unix. You can circumvent the password request by redirecting stdin to a file containing the password, followed by a carriage return.Unfortunately, those of us who've been seduced by the GUI interface feel pretty helpless faced with a blank window and a command prompt [Fig 2], so what we really want is the Explorer. But, as Colin has found out the hard way, that doesn't work. You just end up with exactly the same rights as the already-running instance of Explorer which is managing your desktop.

As always, there is an answer, and that is to turn to the trusty old file manager (winfile.exe) and/or program manager instead.

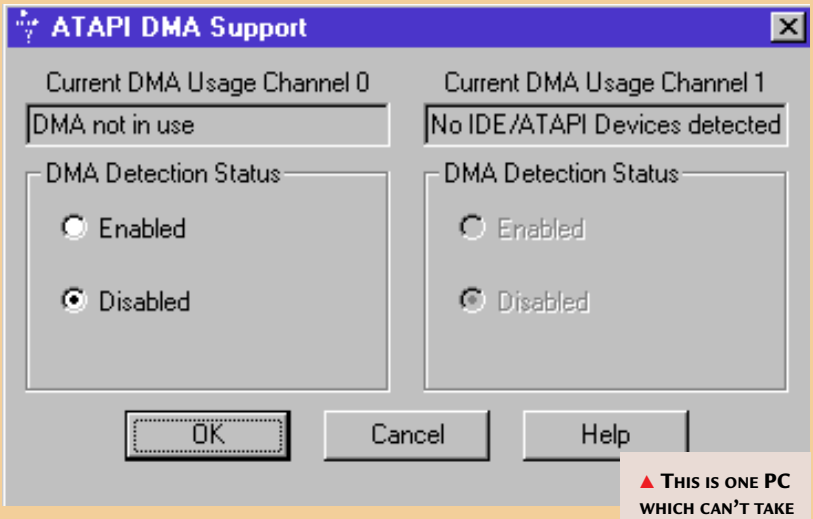
Colin has even found a way of making a control panel under the program manager, by creating a program group and putting in command lines like the example below. This one runs the desktop control panel applet, and obviously you can make others to run the various other applets.

```
rundll32.exe shell32.dll,
Control_RunDLL D:\WINNT\
system32\desk.cpl
```

The other interesting behaviour Colin has observed is that with Windows NT, drive mappings go with users and not the machine. Thus, if the desktop user has a particular drive mapping set, then the super user will not have access to that drive without setting up another mapping. And when you do, you can't use the same letter. For example, if the desktop user maps "F:" to \\VEGAS\DFSROOT, then the su session not only doesn't have access to that mapping, but can't use drive "F:".

With Windows NT, drive mappings go with users, not the machine

TAKE THE DMA TEST

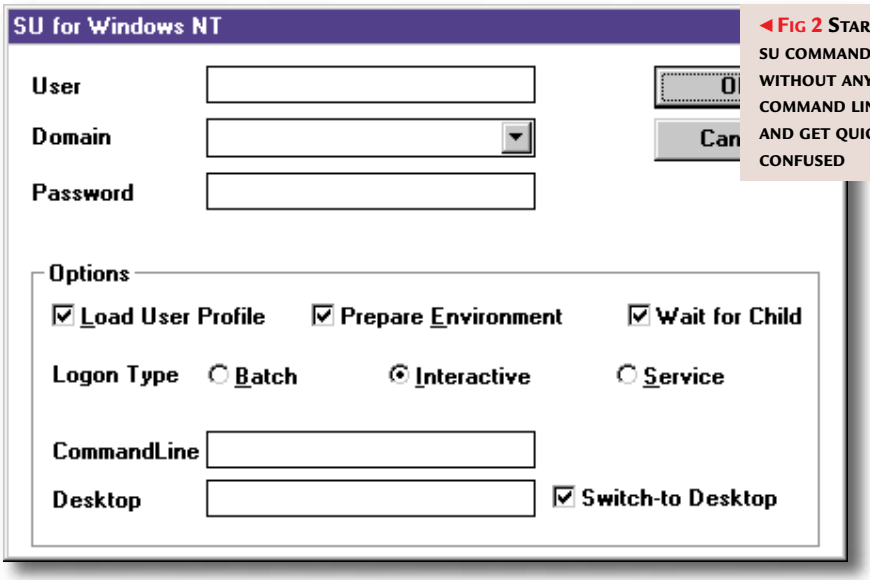


▲ **THIS IS ONE PC WHICH CAN'T TAKE ADVANTAGE OF HIGH-SPEED IDE DMA**

Many of Intel's more modern core logic chipsets include a high-performance, multiword DMA mode for transferring data to and from the IDE drive. A DMA bus-mastering capability that can make use of this mode was included in the atapi.sys driver that shipped with Windows NT Service Pack 3, but to turn it on, and potentially speed up hard-drive transfers, you first need to run a utility that also came with the service pack.

To find the utility, look for dmacheck.exe in the \support\utils\i386 directory. When you run it, observe the warnings given, and take a backup of all your data before you take the plunge.

Whether or not dmacheck.exe will succeed on a particular system is impossible to predict, since it depends not just on the chipset but on motherboard and BIOS factors as well. If it doesn't work, then there's some hardware limitation which means you can't use that facility. There's little point in looking to see what chipset version you have — that won't suddenly make it start working.



◀ FIG 2 START THE SU COMMAND WITHOUT ANY COMMAND LINE, AND GET QUICKLY CONFUSED

Conversely, if the super user sets up a mapping to a particular share, this won't be accessible to the desktop user. And Colin warns that you should remember to remove any drive mappings you make before terminating the super user session.

The one thing Colin hasn't found a way to do via a su session is to configure printers, since this is a function now carried out within the Explorer — there's no legacy printman.exe we can run. Can anyone help? Note also that the su command can usefully be combined with the scheduler service to run commands at specific times with required privileges.

At your service

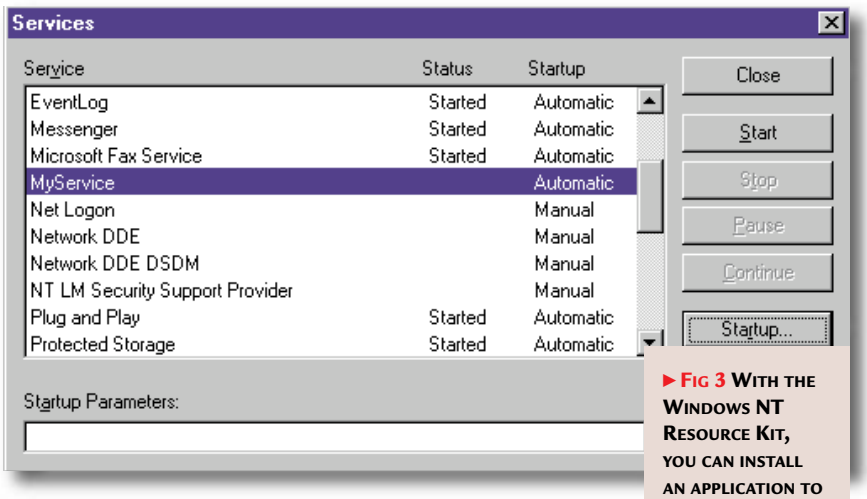
Jason Moxham writes to ask whether there's any mechanism to run a program under Windows NT as soon as a system boots up, so that there's no requirement to have a user log in first. As you probably know, there are many programs that run in this way on the average NT system, but they are all system services rather then normal executable application files. Fortunately, there is an answer. SRVANY.EXE allows you to run applications as services [Fig 3] and it comes with the Windows NT Resource Kit. To find it, look in the \I386\CONFIG directory of the CD-ROM.

Another benefit of using SRVANY, apart from removing the requirement to have a logged-on user, is that you can run an application with a different logon account than that of the currently logged-on user. This might be useful where you want something to run with administrator rights. To use SRVANY.EXE, it first needs to be installed as a service itself, using a command-line such as:

```
instsrv MyService "d:\program files\windows nt\accessories\srvany.exe"
```

INSTSRV.EXE can be found in the same location on the CD-ROM as SRVANY.EXE itself. You can install INSTSRV as many times as you like, but use a different service name each time ("MyService1", and so on). Now, go to the Services Control Panel, and specify the account that the service will run on (you can also do this via the INSTSRV command line). If you need to interact with the application via the screen and keyboard, specify the LocalSystem account and set the appropriate checkbox — but bear in mind that you then won't have network access. This isn't quite as bad as it sounds, because via a (documented) registry tweak you can name specific shares that will be made available to the LocalSystem account. Unfortunately, setting the application you want to run and its parameters requires fiddling with the registry, unless the service is configured to be started manually, which of course rather defeats the object.

On the subject of services and the registry, INSTSRV has another very convenient use, which is to remove unwanted services without needing to access the registry. Handy if you want to clear up leftover services (many applications don't seem to remove services when you uninstall them). For detailed instructions on the rest of the procedure, see the SRVANY.TXT documentation file with the Resource Kit. Remember, though, that you may have trouble with certain applications: they are running in a different context to the logged-in user and might not have access to the DLLs or other components they need. Also, some badly written applications running as a service will incorrectly terminate when the currently logged-in user logs off.



▶ FIG 3 WITH THE WINDOWS NT RESOURCE KIT, YOU CAN INSTALL AN APPLICATION TO RUN AS A SERVICE

PCW CONTACTS

Andrew Ward *can be contacted via the PCW editorial office (address, p10) or email* NT@pcw.co.uk

Picture that Palm

It is not impossible to take screenshots from the Palm, as many would believe. Mark Whitehorn presents some solutions to this and a whole handful of tips and tricks.

Recently, I wrote about taking screenshots from the Psion and Win CE machines. I contacted the people at 3Com who assured me that they knew of no way of doing this with a Palm, so I threw the question open (*PCW*, September). I received lots of replies with many different methods to achieve the required end result. Thanks to all who wrote in.

Just in case you thought this column wasn't hip, this first reply comes from a cat! Eek The Cat alcuin@bigfoot.com tells me: "I am the owner of a PalmPilot and have found that it is the practice of developers to use the emulator available from Palm's web site to make screenshots. My Pilot tip is one of personal preference. Since the graffiti area already has a 'hot corner' for the onscreen keyboard, I reassigned the motion from the graffiti area to the top of the screen to display the graffiti help. I find this much more convenient than the sticker help. This setting can be found in Preferences/Buttons/Pen."

I located this emulator at palmpilot.3com.com/devzone/pose/pose.html. I downloaded it, and it is on our cover-mounted CD-ROM as emulator.zip. While I was on that site I was amazed to discover that Panutat "Jimmy" Tejasen has ported a version of the Pilot emulator to Windows CE. I had to think about this for a while... So, I can carry a Windows CE machine around with me, but I can use it like a Palm? OK. You can find more information at www.jimmy.com/Beta/PilotCE/index.html which is where this screenshot [Fig 1] came from. Be warned that Jimmy himself says: "The speed of most HPCs is too slow to run the PilotCE emulator in real life. It's impossible to run it as fast as the real PalmPilot machine." True, but that doesn't stop it from being a truly wild idea.

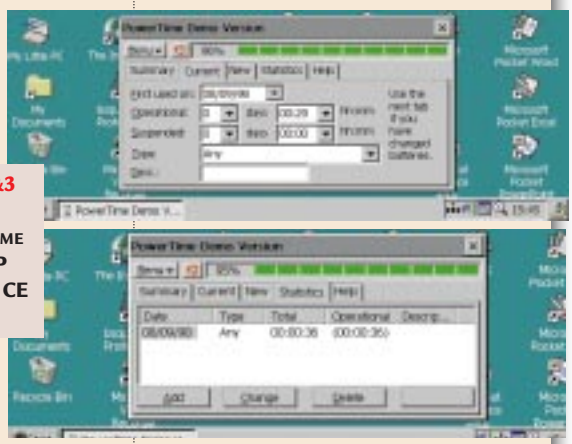
◄FIG 1 IS THIS A PALM RUNNING ON A WIN CE MACHINE, OR A WIN CE MACHINE RUNNING ON A PALM?

A totally different way of taking screenshots was provided by Kieron

TIPS AND TRICKS FOR WIN CE

Jon Whiten whiten@ usa.net writes: "Password-protect the device to keep your data secure. Then, the only way to bypass the password is to pull the batteries and hence lose all data. This will keep your information away from prying eyes."

Battery life is never as long as one would hope for. The current WindowsCE devices offer various solutions to reporting battery life; from a simple Good/Bad to percentage of battery charge left.



►FIGS 2&3 USING POWERTIME ON MY HP 620 WIN CE MACHINE

A good enhancement to the above tip is PowerTime by Sixxac Software www.sixxac.com. This little package stores statistics of actual battery life as you use the unit and change or re-charge its batteries. It is eventually able to offer a percentage (and time) figure for anticipated battery life. This figure is based on the actual usage pattern for the device and so provides a real estimate of battery life. Complete peace of mind costs only US$17.95 and a preview is available.

The program actually says that you shouldn't install it unless you have downloaded it from www.sixxac.com so I haven't included it on the cover CD. Nevertheless, it seems like an excellent utility. [Figs 2 & 3]

One of the problems of a WindowsCE device can be speed. To help limit the impact of this, keep your most-used applications open for quick, one-click switching. With this, the handheld will take no longer to boot-up but the most-used applications will be instantly available.

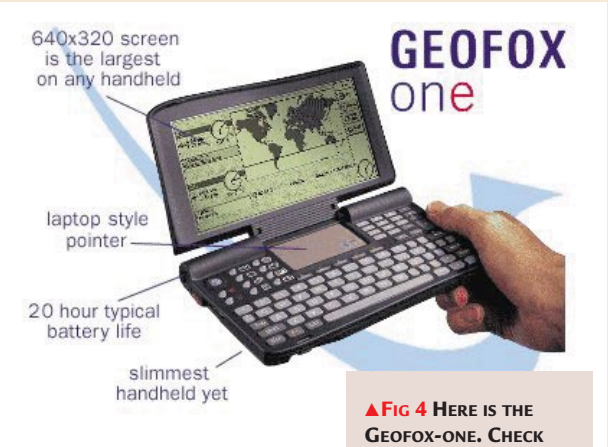
CaptCE, a screen capture utility, is available from www.oohito.com/wince/wince_j.htm. A lot of other software is also available at this site.

Edwards (kierone@teletext.co.uk) who says: "The Palm III is bundled with an application called TealPaint which can take screenshots and then, on the full version, be exported to a PC." This is interesting and may represent some kind of regional or temporal variation, since mine didn't come with TealPaint.

And here's another. This is from Richard Earney rearney@routledge.co.uk: "Snapshot, by Joseph Strout, available at ftp://ftp.strout.net/pub/snapshot.zip does Palm screenshots. It can also be obtained at www.palmcentral.com, as can just about everything else." I downloaded Snapshot, checked that it is freeware, and have popped it onto this month's cover CD. Incidentally, Richard is absolutely correct: PalmCentral is a huge resource, dripping with shareware and freeware. I have no hesitation recommending that you go there and download as much Palm software as you like.

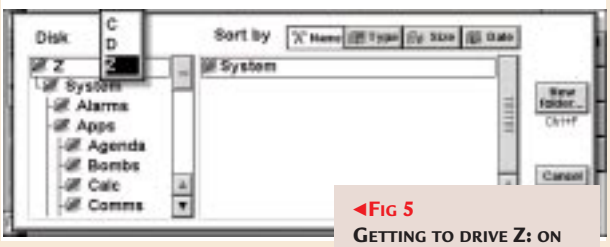
GEOFOX TIPS (but also read this if you have a Psion 5!)

The Geofox-one [Fig 4] is another PDA. It runs the same operating system as the Psion — in fact, Geofox licences it from Psion. It has a larger screen and a built-in mouse pad. I have not yet seen an actual Geofox-one but hope to soon, after which I will publish a short review for your edification.



▲FIG 4 HERE IS THE GEOFOX-ONE. CHECK OUT THAT MOUSEPAD...

Here is a fascinating FAQ list for the Geofox-one, from company representative Ian Peel. He has also included a huge list of shortcut keys for the different applications. These seem to be identical to those for the Psion 5 and therefore may be of interest to owners of those machines, too. These lists would take up the remainder of this column, so I have included them instead on the cover CD as an RTF document (I cannot do it as a straight text file because the formatting is so important for the tables).



◀FIG 5 GETTING TO DRIVE Z: ON THE PSION. CTRL TAB FROM THE SYSTEM SCREEN GETS YOU TO HERE, WHERE YOU CAN CHOOSE Z FROM THE LIST

☛ *How do I access the menu with the mouse?*
Tapping the upper right corner of the mouse pad will bring up the menu bar for the application you are using.

☛ *How can I upgrade from Message Suite 1.10 on the Geofox to Message Suite 1.50f for the Psion (downloadable at www.psion.co.uk)?*
You can do this by installing the patchv15.sis file located in the downloads section of the Geofox web site.(Which is, predictably, www.GeoFox.com.)

☛ *Is the Geofox power supply compatible with that of the Series 5?*
The Series 5 uses a 6v power supply and Geofox-one uses a 9v. The plug going in to the system has the opposite polarity between the systems. As such, they are not compatible.

☛ *How can I change default fonts? (The default Font for Agenda in Geofox is Arial 9, in Psion Series 5 it is Arial 10.)*
Create a document called Normal.uk or try looking in Z:\system\apps\word to see if the default document on your ROM is called something different.
(Hmmm... On the Psion I can get to drive Z — see *Hands On PDAs* passim and Fig 5, below — and I can find Normal, but this doesn't seem to be helpful since drive z: is read-only — *MW*).)

☛ *How can I link a Geofox to a Mac? I urgently need a scheme to build a male DB9 to male Mac DIN8 adapter, in order to use the PC cable provided with my Geofox-one. What are the exact pin correspondences? For instance, where does pin 1of db9 male go on mac DIN8, and so on? I have VirtualPC 2.0 and would like to use it to emulate Epoc Connect 2.1.*
The Geofox-one pinouts are at www.geofox.com/support/faq/index.html in System Questions.The Mac pinout is: 1 DTR. 2 CTS. 3 TD. 4 Ground. 5 RD. 6 RTS. 7 DCD.8 DSR. The pins are more or less as illustrated in Fig 6.

[FIG 6] Pin points

	8		7		6	
5				4		3
		2		1		

☛ *How can I use the Geofox as a terminal emulator?*
Use the pre-installed Comms application (under Comms & Dialler).

☛ *What other web browsers can I use with the Geofox?*
Other than the pre-installed browser, there is a new version available from Psion Software on its EPOC World site, which supports frames. Opera is also reportedly working on a port of its browser to Epoc32, which will even support SSL3.0 in addition to other features.

This brings us to an interesting point: do you want me to carry on putting freeware/shareware on the *PCW* CD-ROM? Before you all answer "Yes, of course!" consider this: computer viruses are a pain and the PC world has responded with virus checkers and the like. The PDA world has been mercifully

Remember that PDAs are not small PCs

virus-free so far but it is foolish to think that this state of affairs will continue. However, even when virus checkers appear, they will lag behind the viruses. Remember that PDAs are not small PCs, so the current virus checkers are useless. If I continue to put programs onto our CD-ROM it is virtually certain, despite our rigorous checks, that one day I will unwittingly distribute something infected, neither on purpose nor maliciously. It remains a possibility.

The other side of the argument is that these programs are out there on the net anyway, so it doesn't really matter if they appear on a CD-ROM as well. The bottom line is that there is no way I can guarantee that anything that appears on the CD-ROM is safe (incidentally, that also applies to SnapShot on the current disc). So, should I supply programs that may not be safe? Send in your votes, please, to the usual email address (*see "PCW Contacts", below*).

Not-so-dumb terminals

Reader Joe Tarrant jtarrant@compuserve.com writes: "My web site is dedicated to dumb terminals and terminal emulation. I have a list of terminal software applications (mostly apps for PDAs). I think all computers should be able to wire-up, not just the popular boxes running Windows and Mac OS8, so I'm adding information to my site on how to connect virtually anything as a VT100, which is still the computer world's Esperanto. Unix doesn't care what's connecting up to it, and it's a lot easier to connect a machine as a terminal than go setting up TCP/IP and all that. It runs faster, as well."

VT100 is still the computer world's Esperanto

The site is at ourworld.compuserve.com/homepages/jtarrant/.

I have a younger brother (Jamie) who is also a PDA freak. A couple of years ago he was on-site with a client when the sole dumb terminal in the machine room blew up. So, rather than drag one in from the user areas, Jamie pulled out a Psion 3 (complete with that horrible cable) and proceeded to drive the Unix box from that. This gobsmacked the Unix drivers on-site, who couldn't get over their big, powerful box being driven from a handheld. To my shame, until Jamie told me about it, I had never really considered the terminal emulation to be anything other than a useful tool for connecting to bulletin boards. Since then, I have used a PDA in the same way several times and have found that having a "dumb terminal in the pocket" is wonderful.

The collection of tips and tricks which appear this month have been sent in by readers of this column. Your email response has been immense. Thanks for all the information, and keep it coming.

TIPS FOR PILOTS (AND OTHERS)

Mike Schorah mike.schorah@dial.pipex.com sent in these tips and tricks. Many of them are more about the effective use of a PDA than Pilot-specific, so users of other machines may wish to browse, too.

- **When adding** an appointment to the Date Book, get into the habit of adding a To Do to prepare for it.
- **When lending** a book or CD to someone, add a To Do to remind yourself to get it back!
- **Use shortcut texts** to save entering standard text, like "Prepare for".
- **Set up** a custom field in the Address Book to note the name of family members, assistant etc., so you can make personal references when you next talk to someone.

This one sounds just a little creepy to me — overtones of Big Brother, somehow. Still, never mind.

- **Keep a note** attached to the record with brief details of the last conversation, using the date-stamp shortcut.

This sounds more like it. Shades of Woodward and Bernstein. "It must be true, it's in my notes."

- **Paste the text** of word-processed documents onto the icon on the Pilot Desktop and HotSync so that you can work on a letter or part of a report while on the move. HotSync on your return and then transfer back into the word processor. This way, you can make valuable use of odd moments in your day away from your main PC.

I agree. I have never got on with the Pilot as a device for entering text of any length, but I do proof-read a huge amount of material in a year. By about the third draft, the changes are minor and well within the capabilities of the Pilot. Even if you decide that a more drastic change is required, you can mark it for further attention when the words are back under keyboard control.

- **When adding** an appointment, note down the travel details and/or agenda at the same time.
- **Book a day out** at a different location by adding an appointment set to "No time". Your reminder will appear at the top of the day's agenda with a diamond icon by it. Several days away together can be set up as a recurring item.
- **Note birthdays** and anniversaries as To Do items set to show a few days before the event, but with the name of the celebration and its date as the text of the To Do. When it's over, don't tick it as complete, but reschedule it for next year.
- **Book preparation time**, or thinking time, into your Date Book so that it does not get squeezed out by other things to do.

Ah, yes, I agree wholeheartedly. But if only I could actually get this one to work in practice.

PCW CONTACTS

Mark Whitehorn *welcomes readers' correspondence and ideas for the Hands On PDAs column . Contact him via the usual PCW editorial office (address p10) or email* **pda@pcw.co.uk**

Encryption prescription

Chris Bidmead is not one for keeping secrets, but here he explains cryptographic file systems and shows you how to construct one, with hidden advantages.

A story on the BBC news web site at http://news.bbc.co.uk tells of IT journalist Kenneth Neil Cukier being stopped by UK Customs on his way back from Paris on the EuroStar. The official wanted to scan the hard drive of his laptop. Apparently, these checks for pornography at the borders are becoming routine but in this particular instance the Customs official was foiled as Kenneth's laptop wasn't a standard PC. "Our scanner doesn't work on Apples," said the official. I wonder what the scanner would have made of an ordinary laptop running, say, Linux?

As a writer who makes a living sharing his thoughts, I can't say I'm an avid supporter of privacy. After all, the whole free software movement is about the huge advantages of *not* keeping secrets. But Kenneth's brush with the State set me thinking about cryptography. The only encryption I've done before manually sets a password on individual files. A much better way is to run an encrypted file system; effectively a directory and its subdirectories where files are automatically encrypted on saving and decrypted when you open them. The encryption process is invisible and doesn't get in the way of your ordinary use of the disk.

So how does this keep your secrets? File systems need to be mounted before you can access them. Many operating systems do this automatically, and the fact that Unix uses an explicit mount command to connect its file systems to the operating system can be one of the first big points of bafflement for the beginner. Unix can be set up to mount particular file systems automatically at boot time or even dynamically on demand. Regular users of Unix see this flexibility as one of its big plusses.

A cryptographic file system (CFS) is designed to be manually mountable against a password, as in the CFS package developed by AT&T Labs employee, Matt Blaze. Linux users can snag this pre-compiled, either as a Debian package (at www.debian.org and search for CFS) or as an RPM (follow the links from www.relay.com).

▲Unix on Atari

MARK CRUTCH XAV@COMPSOC.MAN.AC.UK LAST MONTH REMINDED THIS COLUMN THAT YOU CAN RUN PRETTY DECENT UNIX-LIKE OPERATING SYSTEMS ON ATARI STS AND COMMODORE AMIGAS. HERE ARE SOME SCREENSHOTS OF HIS OLD ATARI DESKTOP [BOTTOM LEFT], THE FREEDOM FILE SELECTOR [BOTTOM RIGHT], THE MULTITOS TASK-SWITCHER [CENTRE] AND SOME TYPICAL ATARI ICONS [TOP LEFT]. THE WEB PAGE IN THE BACKGROUND IS WWW.ATARICOMPUTING.COM, WHICH MARK CALLS "THE LAST BASTION OF SERIOUS ATARI NEWS"

LEARN ABOUT DES

DES stands for Data Encryption Standard and you can learn more about it at www.distributed.net/des/. The main page is about the DES Challenge: the use of idle time on multiple machines around the world to crack DES encryption. Links from this page take you to descriptions of what DES is, how it works, and why the US Government seems to think it's part of the armaments industry and therefore should be subject to draconian (but as it turns out practically meaningless) export restrictions. For a more detailed exposé of just how ludicrous this is, see Phil Karn's story at http://people.qualcomm.com/karn/export/index.html about how the US Department of Defense allows the export of a book on cryptography, but has ruled that a floppy disk containing source code from the same book is a "controlled encryption Item that cannot be legally exported from the US".

Path to Enlightenment

I get sent some pretty rakish screenshots from time to time, but this demonstration of Enlightenment, using the latest GTK+ toolkit with themes, is world class. If the amazing transparent terminal windows don't show up well on this page, you can see the original at David Coulson's site at http://technoir.nethead.org

The package cfs-1.3.3 includes the CFS daemon (cfsd) and a utility for building cfs directories (cmkdir). There are also two other utilities , cattach and cdetach, for attaching and detaching the cfs directories; roughly equivalent to mounting and dismounting them.
The idea is that the encrypted data ends up on the directory you made with cmkdir but is saved and retrieved through a sort of "virtual mount point".
You create the initial directory using a password — or rather, because this is DES encryption (*see panel, p272*), a "pass phrase" with a minimum of 16 characters. You need the same phrase again in order to make the virtual connection with cattach. Once you've broken the virtual connection with cdetach, all the data on the encrypted file system becomes inaccessible.

Because Blaze's design uses NFS to integrate the file system into the operating system, the whole package runs in user space and you don't need to recompile your kernel.

Hardened hackers may prefer the alternative approach of a kernel patch. You can get this from http://ftp.replay.com/security/linux/all/. The NFS approach has the additional advantage that the real encrypted file system can be running on a remote machine, while what I'm calling the "virtual mount point" is local. Of course, this raises the interesting question of how to protect the flow of data between the virtual mount point and the remote file system — a snooper on the network will see it in clear, because the encryption only takes place once the data goes through the encrypted file system and hits the hard disk. For this reason, Blaze's package includes ESM, the encrypted session layer. In the simple

MORE FUN WITH MV AND CP

In the October issue, reader Alex Holden corrected an earlier implication I had made that the cp utility cannot preserve timestamps on the files it copies. I apologised for publishing "a piece of gnarled old Unix wisdom that may have been superseded by subsequent evolution of cp".
Alex then went on to say: **"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..."**
Several of you have mailed me to point out that this is wrong. Now Alex and I both have egg on our faces, because what we have here is a piece of even more gnarled old Unix wisdom. Back in the very early days of Unix, I seem to remember, mv simply used the rename(2) call, which left the target filename anchored to the same inode (i.e. they had to be on the same file system). For some reason, this piece of obsolete information has stuck in my memory. Today's mv supplements rename(2) with the equivalent of cp(1) and rm(1) as necessary. Alex has taken the trouble to go into this at some length with me.
Let us now get this straight. At least in the case of the GNU file utilities: cp can preserve timestamps (-p), faithfully copy symbolic links (-d), and move whole directories (-R). And mv can move individual files (but not directories) across file systems.
Alex continues: **"It would be nice if mv behaved consistently... Apparently the FreeBDS mv command has already been improved to remedy this...by transparently performing a recursive copy and delete if necessary."**
Oliver Kiddle opk@thoth.u-net.com tells me that the Silicon Graphics Unix variant called IRIX can do this, too. I don't have access to IRIX, but I can confirm that BDS's mv can move an entire directory across a partition (or "slice", as FreeBDSers prefer to call it).

[FIG1]

Adding the mount to /etc/rc.d/rc.local

```
# added to the end o f/etc/rc.d/rc.local
if [ -x /usr/sbin/cfsd ]; then
  /usr/sbin/cfsd && \
    /bin/mount -o port=3049,intr localhost:/.cfsfs /crypt
```

implementation on my Caldera OpenLinux system I kept the encrypted file system local and omitted ESM.

● **Here are the basics.** Log in as root and make sure your NFS daemon is already running. Then create a permanent mount point as an anchor for NFS (I called mine /.cfsfs). Close down all its permissions with chmod 0 ./cfsfs. Include this directory in the NFS export list, which is usually the file /etc/exports. I added the following line:

```
/.cfsfs   localhost   # used
 for CFS
```

The localhost qualification ensures that only my machine is going to get its hands on the file system. So, /.cfsfs operates "below the waterline" and the visible directory is the one that is going to be NFS-mounted on this. I can perform the mount manually (provided I've remembered to restart the NFS daemon to get it to reread /etc/exports) but if I want encryption as a regular feature of my system it makes sense to add the mount to /etc/rc.d/rc.local.

(In case you haven't met this yet, this is the init file that is the last to run when you boot, and is tailored for local use; a sort of AUTOEXEC.BAT.) [Fig 1]

Now everything is ready for cmkdir and cattach. At this point you can login again as an ordinary user. The logical encrypted directory we're about to create will appear as a subdirectory under /crypt but first we need to decide where the physical data is going to be stored. We need a partition with plenty of space (*Hint*: *run the df command at this stage to see how much space you have on your partitions*.) Assuming that /opt/system already exists, the directory creation command will look something like this:

```
cmkdir /opt/system/secret_
garbage
```

If you've installed CFS from the RedHat RPM package you can type man cmkdir to see some interesting command-line options offering various kinds and levels of encryption. The default is two-key hybrid mode triple DES. The instruction cmkdir will offer a prompt for a Key, and this is where you type in a phrase or saying (minimum 16 characters). It had better be something you remember because without it you won't be able to get your data back. A second prompt asks you to repeat the key as a precaution against typing errors. So, cmkdir now churns that phrase into the directory and eventually returns you to the commandline prompt. Now we run something like:

```
cattach -l
/opt/system/secret
_garbage safe
```

This creates a directory by the name of safe under /crypt that the system will see and use as an ordinary directory. I use the -l command line option because by default the encryption algorithm will also crunch the inode number and the creation time into the encryption. This makes the already devilishly difficult DES even harder to crack, but it does mean that if you back up /opt/system/secret_ garbage and then restore it, the files it contains will be on new inodes and therefore indecipherable. The -l switch (lower security mode) leaves out the inode and creation time, which means you can save the encrypted data, ensuring that wherever you restore it you can recover it with the same key phrase.

When you've finished using your /crypt/safe directory, run cdetach and the vault door closes. And, cattach even has a time lock on the virtual directory, automatically disconnecting after a certain length of time or after a preset period of inactivity.

Wizzing around

Chris Seager cseager@compuserve.com has come up with a neat fix for the problem I mentioned (*PCW*, October) about not being able to run X as a user. Wiz is a general-purpose utility that allows a preconfigured list of users to run utilities as root without the need to su to root first.

[FIG2]

Box: wiz.c

```
#include<stdio.h>
main(argc,argv)
int argc;
char *argv[];
{
  int i;
  char buffer[1024];
  if (setuid(0) == -1){
    printf("Service not
available.\n");
    exit(1);
  }
  if (argc < 2) system
("su -");
  else {
    buffer[0] = '/0' ;
    for (i=1;i<argc;i++) {
      strcat(buffer,argv[i]);
      strcat(buffer," ");
    }
    system(buffer);
  }
  exit(0);
}
```

(→ continues on next line)

It's very like a feature called Open Sesame I use a great deal in NeXTStep, so I've made it a regular part of my Linux setup.

1 **Save the code** in Box: wiz.c [Fig 2] and compile it thus:

```
gcc -o wiz wiz.c
```

2 **Then, as root**, copy it to somewhere on your path like /usr/local/bin, and change the ownership and group of the executable to root and sys (chown root.sys wiz).

3 **Set wiz setuid root** and remove the general executable permission (chmod +s,o-x wiz).

4 **Add any users** you want to permit to use wiz to the group called sys by editing /etc/group (see man group). They'll probably have to log out and log in again to get the benefit.

One of the main uses I have for wiz is doing quick admin tasks when I'm running as a user. To edit, for example, the group list, instead of having to su to root and then run emacs, I can just do:

```
wiz emacs /etc/group
```

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Warp on

Terence Green presents step-by-step instructions on how to install Warp from a hard disk.

Life is strange. You spend ages waiting for a new server OS and then three turn up together. Elsewhere in this issue [p126] you can read about NetWare 5.0 which has been shipping since September 1998, and Windows NT 5.0 which should ship before the millennium arrives. Aurora, the next version of Warp Server, is now in beta and due to ship in early 1999. Aurora is evidence that Warp is far from dead and, as this column has said many times before, where there's a server update the client cannot be far off. Obviously, a new Warp client wouldn't include server-specific items such as the Aurora Journalled File System (JFS) which quickly recovers after crashes (with the assistance of a transaction log) but support for new hardware, kernel updates and the like will surely follow Aurora's release. Aurora's JFS raises the limit on file and partition size to two terabytes, and since we're talking server OS here, the high availability that JFS is designed to support will be complemented by server-mirroring software. This hooks two servers together so that if one crashes, the other takes over its workload. Aurora will also have a Logical Volume Manager which enables storage to be managed dynamically, growing partitions on the fly and creating logical drives that span several physical disks.

Aurora includes support for the Intelligent Input/Output Architecture Specification (I2O), a new I/O industry-standard interface for storage and network adaptors, and for symmetric multiprocessor systems with up to 64 Intel CPUs. Aurora also has systems management for servers and client desktops, centralised management of Windows NT 4.0 servers, Dynamic DNS, DHCP services, LDAP support, Virtual Private Networking and a Unix Network File System (NFS) redirector, as well as support for clients running OS/2, DOS, Mac, and all versions of Windows from 3.x to NT.

It's fascinating to see Aurora lining up alongside Novell NetWare 5.0 and Windows NT 5.0 in the 1999 timeframe, because all the features and attributes listed above can also be found in the other two. It's easy to form the impression that the PC world is a series of wars (font wars, GUI wars, desktop OS wars *et al*) leading to one dominant product. Well, it just ain't so, because one size does not fit all and that is why firms looking for a year 2000-ready, high-availability, IP standards-based, Intel-based server platform designed for heterogeneous networks are spoilt for choice.

A NEW ERA FOR WARP SERVER DAWNS WHEN AURORA SHIPS NEXT SPRING

Installing Warp

I am indebted to Trevor Hemsley for posting these instructions, to the comp.os.os2.setup newsgroup, on how to install Warp from a hard disk. Trevor notes that this information comes from IBM.

- **If you have** the CD-ROM version of OS/2 Warp and your CD-ROM drive is currently unsupported by OS/2; or, if you have DOS installed on your system and it recognises your CD-ROM, you can use the following procedure:

Hard Drive to Hard Drive Installation

1 **First of all**, start your system from DOS.

2 **Make a** temporary directory called TEMP; type MD TEMP. Press Enter.

3 **Type in** the code below (where X: is the CD-ROM drive and C: is a drive that contains enough disk space to place the images and OS/2):

```
XCOPY X:\os2image\*.* /S C:\
TEMP
```

and then press Enter.

Note — size = 35 or 525 and X: is the CD-ROM drive letter.

4 **To create** the installation diskette and diskette 1, type the following and press Enter:

```
X:\makedsks
```

5 **This creates** an Installation Diskette, followed by Diskette 1. After the new DISK1 is created, press Ctrl+Break.

6 **Edit** the CONFIG.SYS on the new DISK1. Change:

```
SET OS2_SHELL=SYSINST2.EXE
```

to

```
SET OS2_SHELL=SYSINST2.EXE
 C:\TEMP
```

Save and Exit the file.

7 **You can start** the installation if you have the following: Installation Diskette; DISK1 Diskette; Diskette images in the TEMP directory on the hard disk. Insert the OS/2 Installation Diskette in drive A: and restart your system.

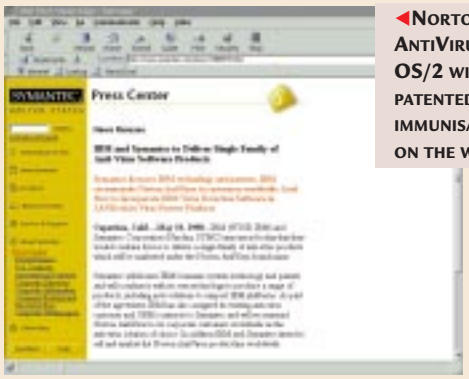
8 **Insert DISK1** when prompted and continue the installation.

DOIP and ISP

Allan (no surname supplied) wrote to ask which internet service providers (ISP) can be used with Warp. The answer is, just about all of them. You need to locate the Dial Other Internet Provider (DOIP) program in the Internet Programs (modem) folder and add an entry for the ISP. Most ISPs now offer PAP/CHAP PPP and dynamic IP addressing, which means that you need only enter the ISP

ANTI-VIRUS CORNUCOPIA

IBM and Symantec announced in May that Symantec would use IBM's virus control technology in Norton AntiVirus software. This includes a new Norton AntiVirus for OS/2 which IBM will be bundling with various products in place of IBM Anti-virus. You can find more details about Norton AntiVirus for OS/2 at www.symantec.com or www.av.ibm.com. The joint IBM/Symantec announcement generated quite a lot of discussion on Usenet and I was amazed to discover just how many OS/2 anti-virus products there were out there in addition to Symantec, IBM, and our very own Dr. Solly! Most of them offer demo or evaluation versions, too:



NORTON ANTIVIRUS FOR OS/2 WITH IBM PATENTED VIRUS IMMUNISATION IS ON THE WAY

VIRUS CHECK PRO ENABLES MULTIPLE VIRUS SCANNERS TO BE USED AS ONE

Data Fellows has F-Prot for OS/2 at www.f-prot.com.

Kaspersky Labs is beta testing AVP for OS/2 at www.avp.ru/english/news/eval.html.

Norman Data Defense Systems has Virus-Control for OS/2 at www.norman.com.

Network Associates' McAfee Virus-Scan for OS/2 is at www.nai.com. There are even some specialised front-ends. McAfee's virus scanner is a command-line utility so jazz it up with **PMFee Version 1.1** from Tom Steen at his web site at www1.tip.nl/~t207448/ or, if not there, at the OS/2 SuperSite www.os2ss.com/users/tjsteen/. Or, try Carsten Mueller's **Virus Check Pro 1.0** which is a front-end that supports IBM AntiVirus, Sophos Sweep, Dr. Solomon's Anti-Virus-Toolkit, McAfee Virus-Scan, H&BEDV Antivir/2 and Norman Virus-Control and is available in the English, Dutch and German languages. Those with serious virus problems (universities and colleges for instance) like to use at least two anti-virus scanners and Virus Check Pro allows you to do this easily with one click or via drag-and-drop. Although OS/2 is not especially known for virus attacks, any PC boot sector can fall victim to an infected floppy diskette which has been accidentally left in the drive at boot time. And of course, if you run either Word or Excel in a Windows session and exchange documents with other users, it is worth scanning for macro viruses.

SHAREWARE MULTILINGUAL GRAPHICAL FRONT-END FOR MCAFEE VIRUS-SCAN

PMFee and Virus Check Pro are shareware and can also be had from BMT Micro at www.bmtmicro.com.

FIG1 SIMPLE ISP DIAL-UP TO PAP/CHAP PPP WITH DIAL OTHER INTERNET PROVIDER (DOIP)

telephone number, your user name and password, the domain name (for example, isp.co.uk) and nameserver IP address (ask your ISP) and the modem details in the DOIP configuration notebook [Fig 1].

If you miss out anything, DOIP will ask you to enter it before saving the new configuration. If you leave out your login ID or password, you'll be prompted to enter them each time you initiate a call with DOIP.

BITS & PIECES

Timur Tabi's New User web page at www.os2ss.com/Information/NewUsers/ features a comprehensive set of links to OS/2 resources on the web.

Netscape Communicator 4.04 for OS/2 Warp should be released by the time you read this. You can download it free at http://service.boulder.ibm.com/asd-bin/doc/en_us/catalog.htm or wait for us to get it onto the *PCW* cover-mounted CD-ROM. It's a much smaller download than Navigator 2.02 because the Java support is no longer bundled and can be added separately.

Fix Pak #8 for Warp 4 We hope to be able to have the latest Fix Pak on next month's cover CD.

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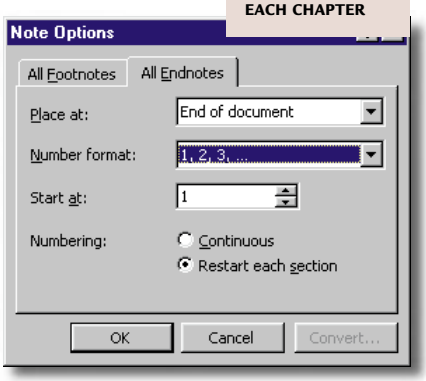
Academic interest

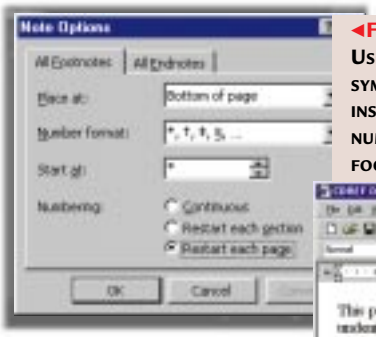
Referencing is an essential part of putting together an academic document. Tim Nott guides you through footnotes and endnotes in Word and shows how to use them effectively.

This month's batch of email brought a number of queries about Word footnotes from reader Paul McCabe who is about to begin writing a thesis. Since there were enough queries to fill the entire *Q & A* section on its own, I thought perhaps a brief tutorial might be in order. First, you can create footnotes and endnotes from the Insert, Footnote... command. Footnotes go at the bottom of the page, and endnotes at the end of the document or section, and a superscripted (raised) character marks the text that refers to them. Like this[1].

Footnotes are fairly straightforward and usually used for explanatory or commentary text. As soon as you create a footnote, you'll see it at the bottom of the page when in Page Layout view. Usually, if you're writing an academic paper, you're going to be using endnotes to refer to items in a list of references



▼FIG 1 ENDNOTE OPTIONS: THIS GETS THEM ALL IN ONE PLACE BUT WITH A NUMBER RESTART FOR EACH CHAPTER

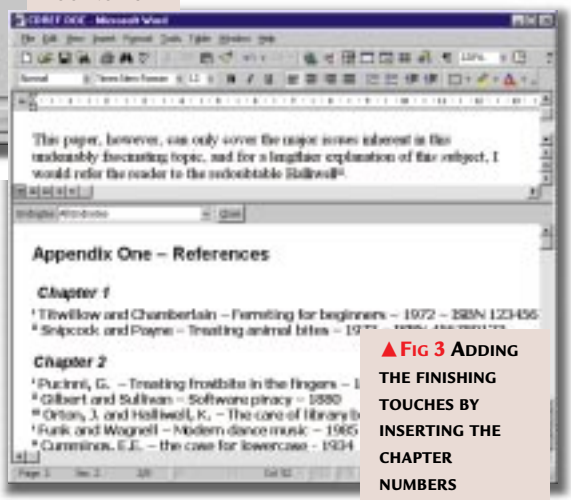


◀FIG 2 USING SYMBOLS INSTEAD OF NUMBERS FOR FOOTNOTES

(e.g. "Snipcock, J. — A History of Ferreting — 1973 — ISBN 123456789"). But there is no reason why you cannot use both, provided you use a different numbering system for each. There are several numbering options [Fig1], including the use of symbols, so you can for example choose 1, 2, 3... for your endnotes, and *, †, ‡... for footnotes [Fig 2].

Endnotes get rather more complex. You can either opt to have these placed at the end of each section (typically a chapter) or at the end of the document. You are offered the further option of having them continuously numbered, or restarting for each section. If you were using a lot of references, you would want to use the latter approach so as to avoid having ludicrously high reference numbers in the text.

What is not so apparent is that you can mix these options to get the best of both worlds: in other words, have one set of endnotes in an appendix at the end of the document that nevertheless restarts the numbering for each chapter. Then you can either go to the end of the document in page view, or open the endnote viewing panel from the View, Footnotes... command in order to add the relevant headings for each chapter. [Fig3] shows this process partly completed.



▲FIG 3 ADDING THE FINISHING TOUCHES BY INSERTING THE CHAPTER NUMBERS MANUALLY

If you decide to add an endnote in the middle of an already annotated chapter, it will adjust the numbering to suit. If you want to remove a footnote or endnote, the same applies, but you should tackle this from the text end by deleting the reference mark rather than trying to delete the note itself. You can use the Edit, Go to... command (or the browse buttons in Word 97) to jump through note references. The endnote panel, if open, will stay synchronised. In Word 97 you can also see a tooltip containing the note text if you hold the pointer over the note reference.

If you want the endnotes to start on a separate page, insert a page break between the end of the last chapter and the start of the notes. Finally, you do not have to accept the standard font formatting for footnotes or endnotes, nor do you have to format them individually. If you go to Format, Style... and choose "All Styles" from the list box you will see entries for footnote and endnote text, which can then be modified as per any other style.

WORD TIP OF THE MONTH

If you hold down Alt and Shift then press the up and down arrows, this will move the entire paragraph containing the cursor upwards or downwards. The left and right arrows promote or demote the heading level of the paragraph.

Questions & answers

Q We've been having a very strange problem with fonts in Word lately, which we don't seem to be able to resolve. Basically, the fonts have completely disappeared. When a document is opened, it defaults back to Roman 10cpi (or whatever font the document was in originally) and no other fonts are listed in the drop-down list. This first happened a couple of months ago, then seemed to correct itself and has now re-occurred. It has happened on more than one machine.

TOBY C. GROVES

A *Although I've covered this in previous issues of both Hands On Word Processing and Windows, it's such a common problem that it deserves a regular airing. For Word to display TrueType fonts, the default or current printer must be capable of printing them. So, for example, if you never print from a laptop PC, preferring to transfer the files to a desktop, you probably won't have installed a printer driver on the former. The solution is to "Add new printer" from Control Panel — usually the make and model you use on the desktop. Even though it may not be physically connected, this will still let you see the TT fonts in Word. Note that you can install the "phantom" printer to "File" rather than a physical port. Note also that the "Generic Text" printer driver doesn't support TrueType.*

Q I have a number of hyperlinks in a document which open other documents, which in turn are password-protected against editing (specimen forms, for example). Sometimes, the operation of opening the target from the hyperlink bypasses the password dialog box and the supposedly protected file is opened in editable format.

PHIL BRADSHAW

A *This sounds like the famous Word 97 to Word 6/7 converter bug in action. Office 97 comes with a filter to enable Word 6 or 7 users to open files created in Word 97. However, the latter uses a different form of encryption. The upshot of all this is that if you save a Word 97 file password-protected against editing, then open it in Word 6 or 7, using this filter, the protection doesn't work. The user can edit and save the file as if it had never been protected, and when re-opened in 97 the protection will have vanished. On the other hand, if the file has been password-protected for opening, rather than modifying, the filter will be unable to open the document at all. Similarly, saving in Word 6/7 format from Word 97 also loses password protection.*

This sounds like the famous Word 97 to Word 6/7 converter bug in action

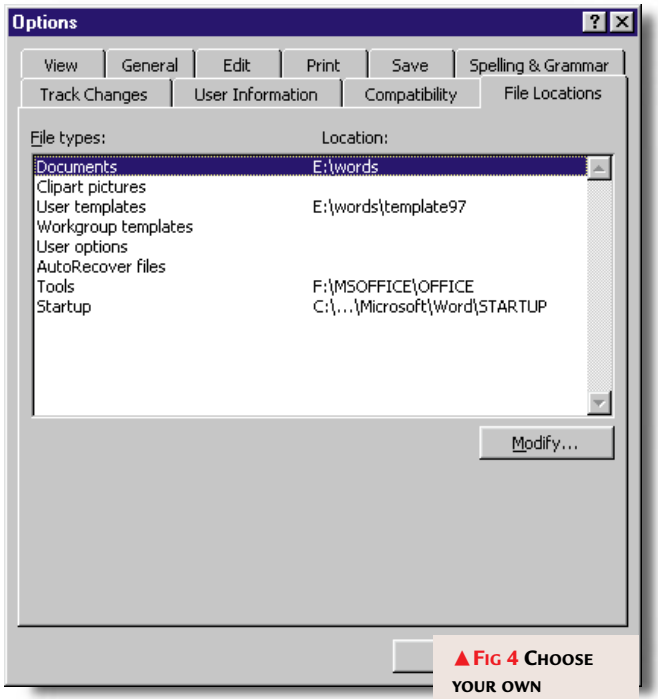
Q I have got a long document which freezes Word when loading. It gets as far as page 47 in the status bar but then it locks up solid, and I can only close Word from Ctrl + Alt + Delete.

JENNY PICKFORD

A *It sounds as if the document is corrupt. First, check to see if a backup (.WBK) file with a similar name exists, as that one may be uncorrupted. As a final resort, use the File Open "Recover text from any file" file-type option. You'll have to reformat the document, but you should get the text back.*

Q I have a strange Word problem. If I use the "Sectionpages" field in a footer, to show the total number of pages, it all works fine in page view and print preview:
I get Page 1 of 10, Page 2 of 10, etc. But when I print this, it comes out as Page 1 of 1, Page 2 of 2, etc. This happens with various PC and printer combinations.

MARTIN DE LOUGHERY, BAHRAIN



▲ FIG 4 CHOOSE YOUR OWN DOCUMENT DEFAULT FOLDER

A *This is an old-established Word bug, dating back to version 6 and there are several workarounds. One is to turn off background printing, and another is not to use "Sectionpages" in a header or footer; use the "Pageref" field instead.*

Q Can I specify the folder that Word "goes to" when I first open or save a file? It is annoying having to climb up and down the directory tree to get to my own document folder.

JAMES JEFFRIES

A *Yes — it is easily done. Go to Tools, Options, File locations, select "Documents", then press the Modify button and choose your desired folder* [Fig 4].

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Excel on the fairway

Here's an end to your problems of scheduling golf rounds. Stephen Wells tees off with a cunning spreadsheet. And, how to put some balance back into your bank account.

There's a book token waiting here for the best solution to a reader's problem. John Proud writes: "Each year 12 golfers visit Scotland. All of us are very good friends and have known each other for some years. We play six rounds of golf over four days. My problem is that I need to produce a formula so that each golfer plays with and against as many partners as possible. Round one is easy: A + B *vs* C + D, E + F *vs* G + H, and I + J *vs* K + L. Any help would be gratefully received".

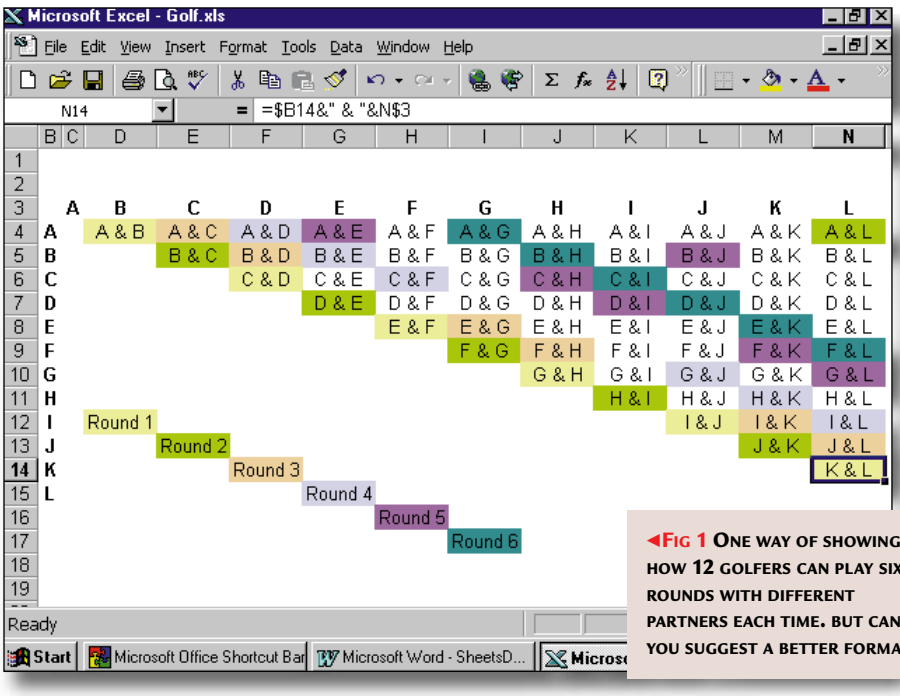
In a follow-up message, John revealed that he uses Excel and that the golfers names are Bob, Dave A., Dave H., Duncan, Ed, Graham, John C., John H., John P., Kelvin, Mike, and Steve.

There can be 66 different pairs...each golfer has a different partner for every round

The first thing I did was to figure out the potential number of teams. The COMBIN function, =COMBIN(12,2), gives the answer that there can be 66 different pairs. Then I laid out the table shown in Fig 1. The Excel 97 file is golf.xls in the *Hands On* software section of this month's cover CD. The starting formula is

```
=$B$4&" & "&D$3
```

and it replicates, with minor variations, across the rows and down the columns. It avoids the cells which would create the anomaly of A & B also being scheduled as B & A, and so on. The table solves half the problem, showing that each golfer has a different partner for every round. The only suggestion I can make for opposing teams is that each pair continues to play the next.



◄FIG 1 ONE WAY OF SHOWING HOW 12 GOLFERS CAN PLAY SIX ROUNDS WITH DIFFERENT PARTNERS EACH TIME. BUT CAN YOU SUGGEST A BETTER FORMAT?

[FIG 2] You can bank on it

```
Sub Balance()
    Sheets("Barclays").Select
    Range("F1").Select
    Selection.End(xlDown).Select
    Selection.Copy
    Sheets("December Expenses").Select
    Range("AJ49").Select
    Selection.PasteSpecial Paste:=xlValues
End Sub
```

So, in Round 1, A & B play C & D, and in Round 2, B & C play D & E, and so on. There must be a better solution which would list the players in a data table and give the results, probably with an array formula, in a columnar format.

● **I know there are** many excellent personal accounts packages these days but I've been keeping track of my finances on spreadsheets for so long now that I'm reluctant to switch. I recently added a useful macro to this year's Excel 97 expenses workbook which I thought I'd share with you. To instantly reconcile my month's running balance with that of my current account, I need to bring forward the bottom figure on my bank statement's balance column. (This is a worksheet which duplicates my Barclays PC Banking statement and is always up-to-date.) You could use this macro in any workbook where you want to bring a value forward from one sheet to another:

☛ **Open** the Visual Basic Editor using Alt+F11.

☛ **Choose** Insert, Module, then enter the procedure shown in Fig 2.

☛ **Save** your work and close VBA.

Specifically, in this instance what the macro does is go to the top of column F on my Barclays sheet, then drops to the last used cell, copies it and pastes the value in cell AJ49 on the named month's Expenses sheet.

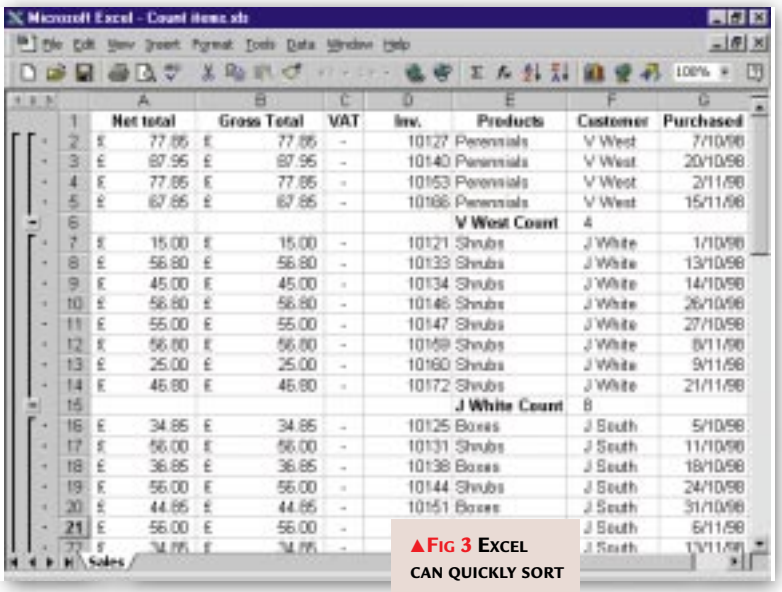
If you used the macro, you would change the listing to suit. You can run the macro any one of a number of ways. As there is only one macro in my workbook, I just press Alt+F8 and then Enter.

Questions & answers

Q When I filter a list based on a column, how can I create a cell which tells me how many items there are in that filtered list?

JONATHAN SCOTT

***A** You don't say what version of which spreadsheet you are using, nor how you are filtering. But if you are using Excel 97, you can do this. Click on your table, then choose Data, AutoFilter. Click the new arrow at the top of the preferred column, choose your option and filter. Initially, the Status Bar will show on the left, 12 of 52 records found, or whatever the results are. After that, you can click on the column letter and right-click on the Status Bar and choose Count, or Count Numbers.*
If the Status Bar is not showing, press Alt+V, S.
To insert the number of items in a cell, select the short list in the column produced by AutoFilter, then click the AutoSum tool. It will put the total in a blank cell. But if you look in the Formula Bar it will read something like =SUBTOTAL(9,D3:D30). In other words, for a filtered list, the AutoSum tool changes from SUM to SUBTOTAL. This function starts with a number from 1 to 11. If the listed values are cash amounts, with a number 9 it will total the range. To get a count of the items, change the 9 to a 2. With a 1 you would get an average.
Excel can also sort a list and count the number of different types of one field. In the same example, we can quickly sort all the invoices by customer and count how many have been sent to each customer. Click anywhere in the list. Choose Data, Sort, then the field, "Customer". Once the sort has been made you can add the counts. Choose Data, Subtotal. In the "At each change in" box select "Customer". In the "Use function" box select "Count". In the "Add subtotal to" box check "Customer". Then check "Summary below data". You should then see a result like Fig 3.



	Net total	Gross Total	VAT	Inv.	Products	Customer	Purchased
2	£ 77.85	£ 77.85	-	10127	Perennials	V West	7/10/98
3	£ 87.95	£ 87.95	-	10140	Perennials	V West	20/10/98
4	£ 77.85	£ 77.85	-	10153	Perennials	V West	2/11/98
5	£ 67.85	£ 67.85	-	10166	Perennials	V West	15/11/98
6					V West Count	4	
7	£ 15.00	£ 15.00	-	10121	Shrubs	J White	1/10/98
8	£ 56.80	£ 56.80	-	10133	Shrubs	J White	13/10/98
9	£ 45.00	£ 45.00	-	10134	Shrubs	J White	14/10/98
10	£ 56.80	£ 56.80	-	10146	Shrubs	J White	26/10/98
11	£ 55.00	£ 55.00	-	10147	Shrubs	J White	27/10/98
12	£ 56.00	£ 56.00	-	10159	Shrubs	J White	8/11/98
13	£ 25.00	£ 25.00	-	10160	Shrubs	J White	9/11/98
14	£ 46.80	£ 46.80	-	10172	Shrubs	J White	21/11/98
15					J White Count	8	
16	£ 34.85	£ 34.85	-	10125	Boxes	J South	5/10/98
17	£ 56.00	£ 56.00	-	10131	Shrubs	J South	11/10/98
18	£ 36.85	£ 36.85	-	10138	Boxes	J South	18/10/98
19	£ 56.00	£ 56.00	-	10144	Shrubs	J South	24/10/98
20	£ 44.85	£ 44.85	-	10151	Boxes	J South	31/10/98
21	£ 56.00	£ 56.00	-			J South	6/11/98

▲ FIG 3 EXCEL CAN QUICKLY SORT A LIST OF INVOICES BY CUSTOMER AND THEN COUNT THE NUMBER OF INVOICES SENT TO EACH

Q Using Lotus 1-2-3 '97
I was a bit worried when I typed in a "/" and the computer seemed to whirr around a bit. After a few seconds a little window was displayed, similar to a menu, and it called itself "1.2.3 Classic". I was wondering if you knew anything about this feature, and if anyone else who may be new to Lotus products has come across it. It doesn't seem to do much.

KIERAN BANKS

The computer seemed to whirr around a bit...

***A** 1-2-3 Classic is one of the most famous formats for spreadsheet entry. Although a little dated now, it is much loved by millions of ageing Lotus 1-2-3 fans. If you don't want to use 1-2-3 Classic, you can turn it off by choosing File, User Set-up, 1-2-3 Preferences in 1-2-3 97 and then clicking the Classic Keys tab. When 1-2-3 Classic is turned off, pressing / (slash) or < (less-than symbol) enters the appropriate character in the current cell. However, you can continue to use your keystroke macros.*

Q How can I show negative numbers in brackets in Excel 97, rather than use a minus sign? The help file says that this option depends on selecting negative numbers in brackets in Windows 95 Regional settings. I have done this for both numbers and currency but when I go to Format, Number, in Excel the negative numbers in brackets option is not available.

ROBIN BAXTER

***A** Look under format, Cells, Custom and you'll find several currency options using brackets. Pick the one you want or edit an existing one.*

Q Please can you tell me how to change the default Options in Excel 97? Specifically I would like firstly, in Tools-Options-View, the "Zero values" box to default as clear, and secondly, in Tools-Options-Calculations, the default to be "Manual".

JIM BEDFORD

***A** Open a blank workbook. Choose the settings you want. Save this workbook as Book.xlt in the XLSTART folder. When you open a new workbook it will use your new settings as the default. This way, if you or another user of your PC wants to restore the original factory defaults you can just delete the Book.xlt file or move it from the start-up directory.*

PCW CONTACTS

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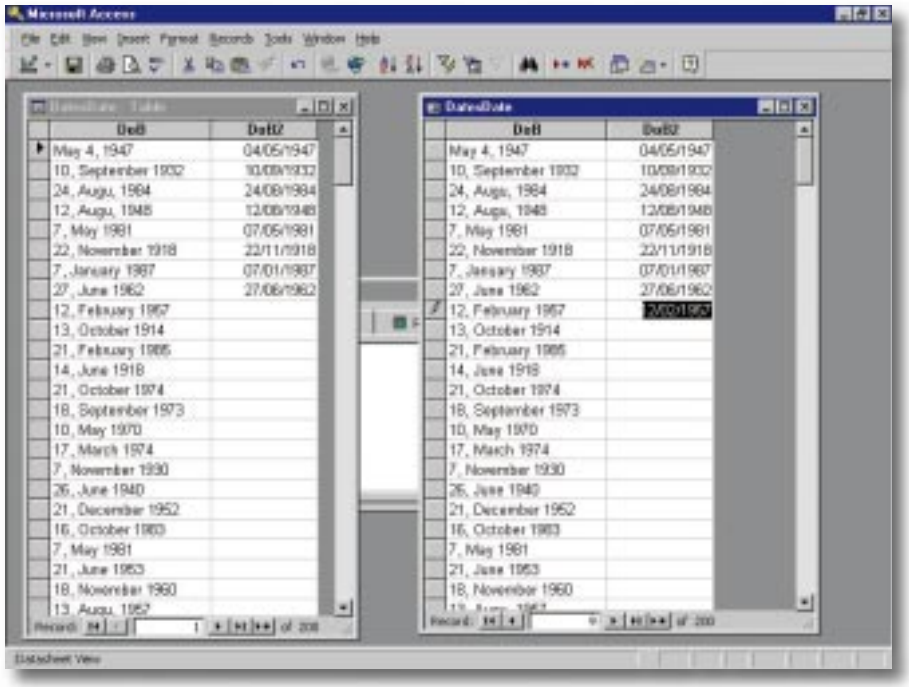
A date to remember

Why write chunks of code to make text dates recognisable by Access when you could do it the quick way? Mark Whitehorn shows you how.

John Proud writes on the subject of data conversion:
"I have nearly 8,000 data records in comma delimited form but the date field comes across as text. Other than re-keying the lot (gulp!) I am stumped. Is it possible to convert a text date (such as 23rd December 1997) into a date recognisable by Access? Any offers excluding the above re-keying option would be very welcome." Now, I know I said no more dates, but I also know that I am never going to get away with that in the *Databases* column. In addition, this is really a data conversion rather than a date problem (no, really, it is next to nothing at all to do with dates).

John's dates are in the form of text strings like "23rd December 1979" and Access 97 has a function called CDate that very nearly works on strings such as this, but in fact just happens to fail completely. What it objects to is the "rd". If you pass CDate a string like "23 December 1997" it works perfectly and, what's more, it is sensibly liberal in its interpretation of shortened forms of months. Since the original data comes as text, import it into a text field (called, say, DOB) in an Access table. This will then have 8,000 records.

Now search for "st" and replace with " " and do the same for "nd", "rd" and "th". Anyone really on the ball (I wasn't) will realise that all instances of "August" will now read "Augu", but thanks to CDate's liberal views we can happily ignore this side-effect. Next, add a second field to the table, call it DOB2 and make it of type date. At this point I almost made the mistake of writing a boring chunk of code to start at the first record, look at the string, convert it, write it into the date field and continue thus to the end. But then I thought, why not make it fun? Having been depressed by the idea that you might have to convert all the little charmers by hand, why not set up a form so that you can actually see them all being converted in front of your very eyes? Here's how you do it.



▲ FIG 3 THE CONVERSION FORM IN ACTION

- **Build a form** containing both fields. In the On Got Focus event of the DOB2 field add a single line reading:

```
DOB2=CDate(DOB)
```

- **In the form view**, put your cursor into the DOB2 field and hold down the down arrow key.
- **As the cursor** jumps to each record, the date converts and on it leaps to the next one. This is on the cover CD-ROM as DATESDAT.MDB. I've done a few, but the rest of the 200 are yours to experiment with [Fig 3].

The underlying message is that data conversion is often a multi-stage process. If you're stymied by something, try breaking the problem down. Suppose, for example, that you use Access 2, where CDate is not an option, but have a friend with Access 97. You could do the conversion in Access 97, export it again as text (but this time as "1/4/1998") and import it back into Access 2 as a date.

If Access 97 was unavailable, you could perform the manipulations in Excel or by multiple search-and-replaces in Access 2 (replacing instances of "December" with "12/" and so on. Happily, the CDate approach worked for John and he replied: "I transferred all the data and following the find and replace for all 'st', 'nd' and 'rd's to '' the data converted automatically."

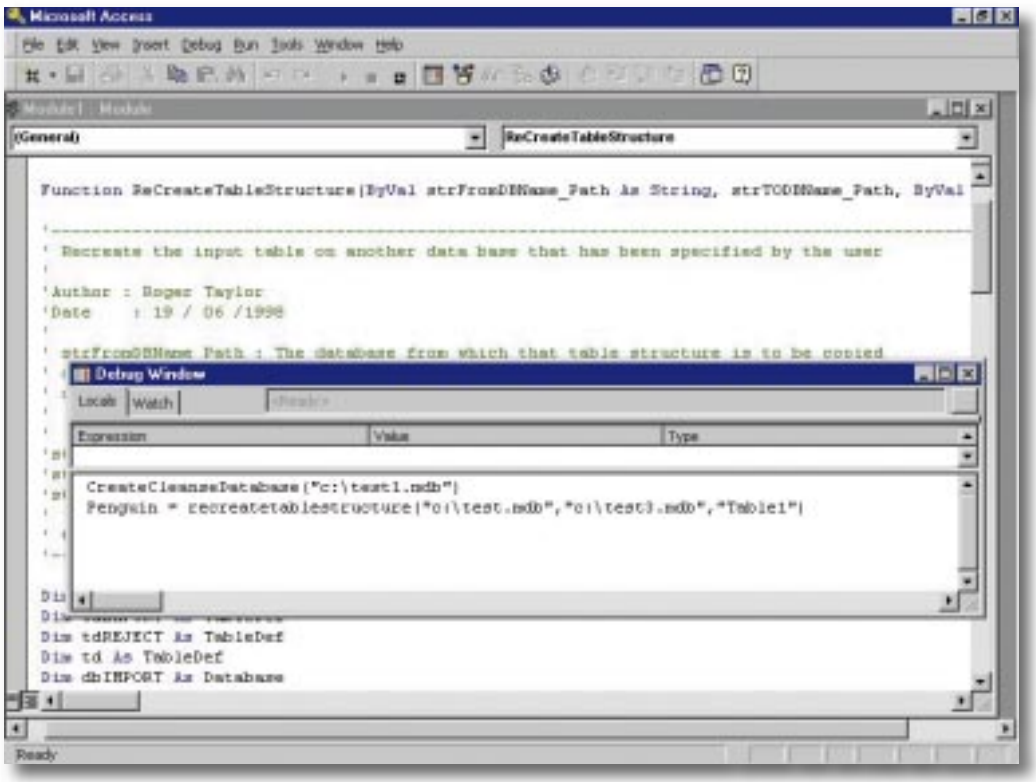
Lock and role

Several people have sent emails concerning unexpected locking problems in Access when it is used in a multi-user environment. The following background may be helpful.

I've done a few, but the rest of the 200 are yours to experiment with

If a user is altering a record, it is imperative that other users don't try to change that same record at the same time. This much is obvious. Access locks any record that anyone is editing — a process it calls, misleadingly, record locking. Despite what it says in the manuals, Access doesn't lock records, it locks blocks of the file that contains

records. So, if you start editing a particular record, Access will lock the block in the file that contains that record. If any other records happen to be embraced by that block, then they are also locked, to the annoyance and chagrin of others. Diagnosing this problem isn't helped by the fact that, although Access usually displays records ordered by primary key value, the storage order on disk is often unrelated to the primary key value. Thus as I am editing record number 4,234, I might be locking record number 3, number 9 and number 342,445.



▲ FIG 1 ROGER'S FUNCTIONS IN ACTION. YOU HAVE TO TAKE MY WORD FOR IT THAT I HAVE RUN THESE SINCE THE DIALOG BOX DOESN'T GIVE ANY FEEDBACK, BUT THEY WORKED FOR ME, HONEST

Access code

Roger Taylor writes:
"I've recently had to write a bit of code that will recreate an Access 97 table structure in another database.
I know that in Access you can use the Transfer function to do this, but nothing like it exists in Visual Basic 5.0. The code is a little ropy, but it does the job. Basically it creates another database which you specify in the Param list and recreates the selected tables structure in that database. Anyway, have fun."
Fun always sounds good, so I've included Roger's code in ROGER.MDB from which the functions can be tested using the debug box [Fig 1]. In addition, for those who are not Access 97 users, it is on the CD-ROM as dbdecd98.txt.

Taken to task

James Smith took me to task with:
"I was a little disappointed by your response to the question of back-issue Hands On articles. Why did you suggest that the gentleman in question spend £10 of his hard-earned money on a CD, when all the cover disks contain 12 months' worth of Hands On information on them for free (or £3 if you didn't want the mag)?"
Do they? Oops, sorry. Although it may not be apparent, I work for *PCW* on a freelance basis, hence my mistake.
Smith goes on: "The *PCW* CD is a great reference as all 12 months are kept in a .pdf file called (in your case) database.pdf in a directory called \handson\pdf\. It is a most useful feature, as I can leave all my *PCW* mags at home and keep three CDs in the office (to cover 12 months each) and I have access to the last 36 months of all the Hands On articles."
Thanks for the useful tip. They're always welcome, so keep them coming.

PCW CONTACTS

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PLACES TO GO

db glossary

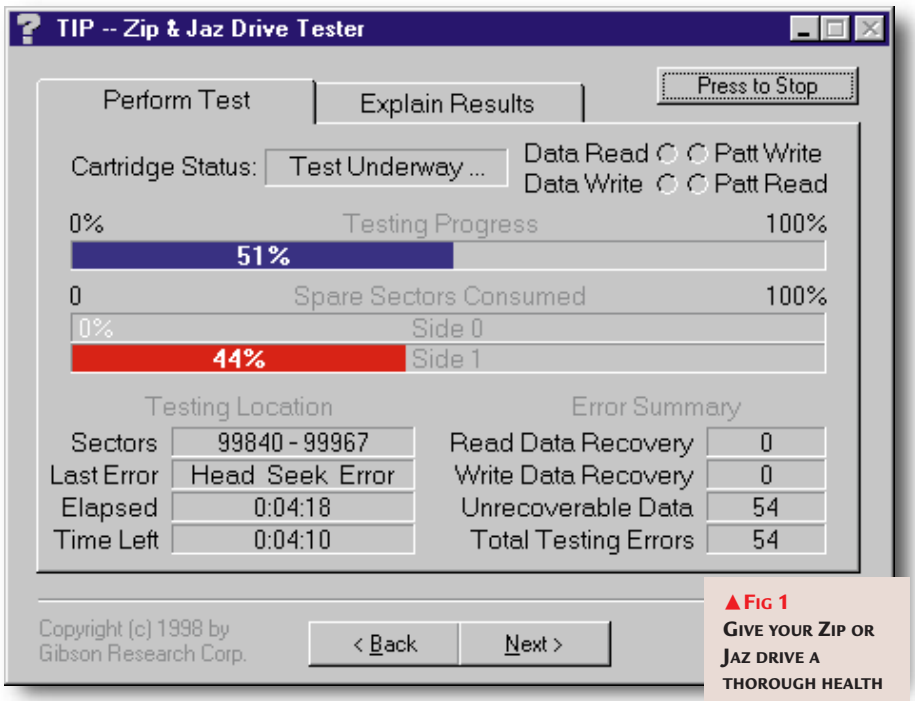
▲ FONT FROM GUY'S PAGE

Here's news of an interesting web site from Guy van den Berg: "I've been running the webdb-l mailing list for about a year. It's a list dedicated to discussing web database integration methods and products. I also host a very large database links section and a nice database glossary. I thought some of the information on these pages might be useful for your readers.
"The pages are at http://black.hole-in-the.net/guy/ and http://black.hole-in-the.net/guy/links/."
Thanks for these, Guy. They're certainly well worth browsing — and what a great font.

Trouble in Paradise

Roger Gann charts the recent troubled waters of removable storage giant, Iomega.

This month I'm devoting the entire column to just one company — Iomega. It has had a runaway success with its removable storage products, the 100Mb Zip "super-floppy" and the 1Gb (latterly 2Gb) Jaz removable hard disk. Not only were these storage devices very affordable, well specified and fast, they were, above all, cleverly designed consumer products and they looked great. The Zip drive, although it is a proprietary format, has sold like hot cakes and some ten million units have been shipped.



▲ FIG 1 GIVE YOUR ZIP OR JAZ DRIVE A THOROUGH HEALTH CHECK WITH THE TIP.EXE UTILITY

But all is not rosy in the Iomega garden. Recently, its meteoric performance as a company began to wane, losses were announced and staff were laid off. Problems with the Zip and Jaz drives began to surface; in particular, the ominous-sounding Click of Death.

Death wish

Click Of Death, Click Death, and COD are the various names ascribed to a problem facing Zip (and to a lesser extent Jaz) users. The symptoms are easy enough to describe: without warning, a drive begins emitting a series of audible and distinctive clicking sounds, either when a cartridge is first inserted or when attempting to read or write data to or from a previously inserted cartridge.

That explains the "Click'" part; what about the "Death" bit? This refers to the demise of the drive itself, often taking a disk-full of data with it. Since people tend to rely on their Zip and Jaz cartridges for the storage of their important data, this loss can be serious. And, the data loss can involve more than one disk, magnifying the total loss. No one knows for sure how many drives are affected in this way, but some have guesstimated at as many as 100,000, or one percent of the ten million Zip drives. I've not experienced the problem, thankfully.

Initially, Iomega handled this very badly, refusing to acknowledge or accept any responsibility for the problem. This policy of denial actually increased user hostility towards the company, prompting some US users to file a class action lawsuit against it. However, Iomega has seen the light and now operates a "no quibble" policy on COD drives and disks, and even on out-of-warranty drives.

Then it clicked

The Click of Death happens when Zip or Jaz drives write incorrectly to their removable media. In doing so, it can not only damage the data areas but also the factory-written low-level formatting, the head's positioning servo information, and the proprietary "Z-Tracks" that are used internally to manage and maintain the Zip and Jaz drive's cartridge data. Note that it's not the actual "click" that is the problem. This is just a symptom; it's just the sound of the heads being retracted from the cartridge, then being immediately reinserted. Most removable drives employ this tactic when having trouble reading or writing to a disk (even the humble 1.44Mb floppy does this). This removal and reinsertion is done deliberately. It recalibrates the head positioning mechanism, cleans the heads and discharges any electrostatic charges. It cleans the heads because there's no way, short of dismantling the drive, of manually cleaning the heads, because the drive spin speed is simply too high for ordinary cleaning disks to work. This distinction is important because if you take a faulty cartridge out of a clicking drive and put it into another drive it, too, will have problems reading that disk and so will click like crazy. It doesn't necessarily mean that the second drive is also dud. Reformatting the now faulty disk in a "good" drive

Problems with the Zip and Jaz drives began to surface; in particular, the ominous-sounding Click of Death

won't rectify the problem either, as the servo and Z tracks are factory written and cannot be rewritten in an ordinary drive. Typically, the format will start but will bomb out at about the 70 percent complete mark. It is also extremely unlikely that a defective disk will bring down a "good" drive. The only circumstance where this might occur is where a very bad drive actually chews up the outer edge of a disk, which then hits the heads of the good drive. But this is rarer than winning the Lottery.

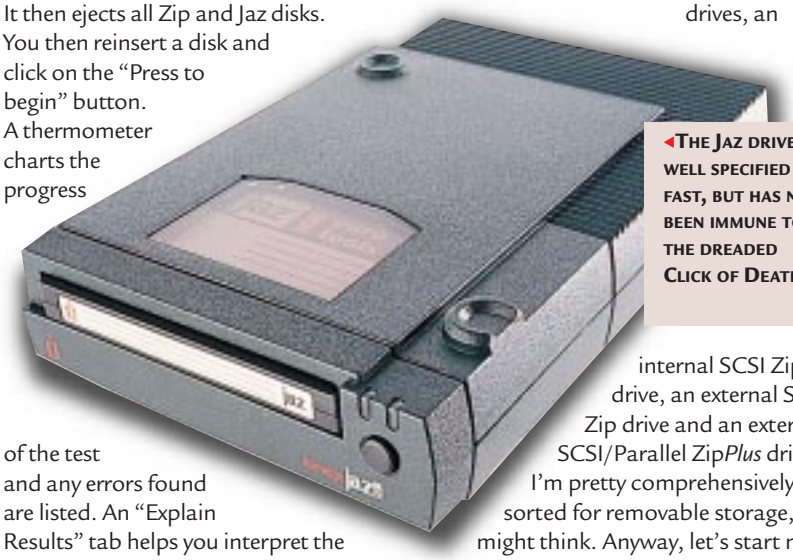
Wide speculation has occurred as to the causes of the Click of Death syndrome, from bad external power supplies and loose power connectors, to excessive magnetic oxide build-up on the drive's heads, magnetic and radio interference from nearby sources, media damage from excessive wear or mistreatment, and so on. Ultimately it's a hardware fault, which I put down to slack quality control on Iomega's part — they just don't make 'em like they used to. Anecdotal evidence suggests that the problem is most common in recently-made drives; early drives do not seem to be afflicted. It seems that in the rush to cut costs, corners were cut as well. Note that Iomega isn't the only culprit here: SyQuest has also reportedly had serious QC issues with the SparQ drive.

COD remedies

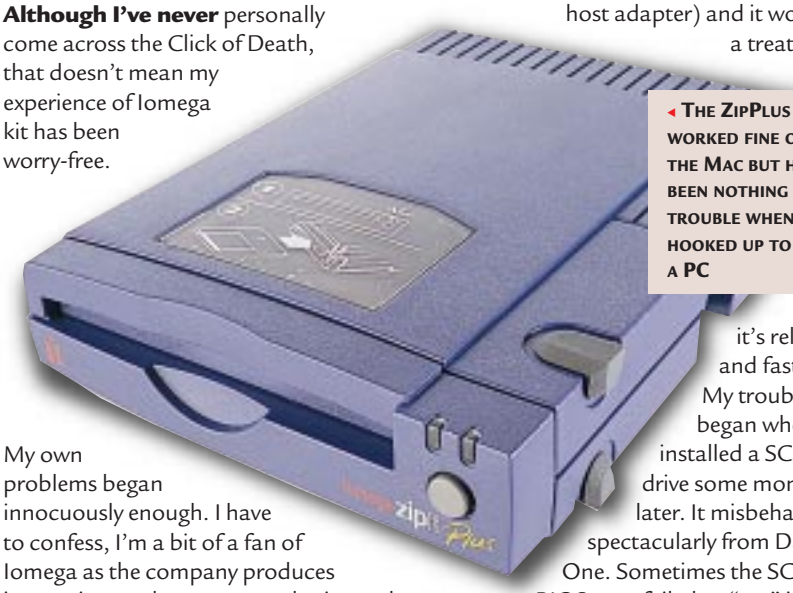
As this is a hardware problem, the only real solution is to replace the faulty drive and disks, which Iomega seems "willing" to do. Can anything be done to prevent it? Not really. All you can do in the first instance is to run the Diagnose option that comes with the Zip Tools utility. A more thorough health check can be had by running TIP.EXE [Fig 1]. Short for Trouble in Paradise, this essential utility for Zip and Jaz drive owners was written by hard-disk guru Steve Gibson (author of the excellent SpinRite), one of the few people to have spent some time definitively analysing the problem. This tiny (60Kb) utility is freeware and will conduct a thorough test on your Zip or Jaz drive to check for early evidence of impending doom. Based on SpinRite technology, TIP is a non-destructive data pattern media surface checker that tests every sector on the disk, leaving any data intact. As well as performing the tests, the program contains much information about the problem. The only caveat is that TIP doesn't work on ATAPI/IDE Zip drives. To use it, you simply run the program. It then ejects all Zip and Jaz disks. You then reinsert a disk and click on the "Press to begin" button. A thermometer charts the progress of the test and any errors found are listed. An "Explain Results" tab helps you interpret the results. TIP can be downloaded from http://grc.com.

Anecdotal evidence suggests that the problem is most common in recently-made drives

Although I've never personally come across the Click of Death, that doesn't mean my experience of Iomega kit has been worry-free.



◂ THE JAZ DRIVE IS WELL SPECIFIED AND FAST, BUT HAS NOT BEEN IMMUNE TO THE DREADED CLICK OF DEATH



◂ THE ZIPPLUS HAS WORKED FINE ON THE MAC BUT HAS BEEN NOTHING BUT TROUBLE WHEN HOOKED UP TO A PC

My own problems began innocuously enough. I have to confess, I'm a bit of a fan of Iomega as the company produces innovative products at a good price and its marketing is slick enough to generate in me the "I want" response. By and large, its hardware has not let me down in any major way. I confess that I have never been particularly impressed with its bundled software which, while appearing slick enough, always gave me some sort of trouble: it would hang big-time during installation or do silly things like failing to link an icon to a program. But I've come to accept these shortcomings. My Iomega hardware has been as good as gold — until recently, that is.

I don't want to brag or anything but I'm blessed with shed-loads of Iomega kit: a pair of 1Gb SCSI Jaz drives, an internal SCSI Zip drive, an external SCSI Zip drive and an external SCSI/Parallel Zip*Plus* drive. I'm pretty comprehensively sorted for removable storage, you might think. Anyway, let's start my tale of woe with my home PC. I originally installed the internal SCSI Zip drive here (hung off an Adaptec AHA-2940 SCSI host adapter) and it worked a treat — it's reliable and fast. My troubles began when I installed a SCSI Jaz drive some months later. It misbehaved spectacularly from Day One. Sometimes the SCSI BIOS scan failed to "see" it at boot time. And, when it was detected, the drive would spin up and down continuously. Accessing the drive from

Windows 95 typically caused the system to hang for minutes at a time. Swapping the cartridge made no difference — if you could get it out, that is. Most times, the cartridge refused to eject.

Thinking the drive faulty, I got Iomega to replace it, which, to its credit, it did immediately. Iomega sends you a new (or rather, a "re-manufactured") drive and you return the old one, carriage free, which is a good system. But horror of horrors, the replacement unit behaved in precisely the same way. So, it wasn't the Jaz that was at fault at all.

I then kicked in to "logical deduction" mode to solve this mystery. I swapped the SCSI card and cable with an identical one but still the Jaz misbehaved. So it wasn't the host adapter, either. I then ran the Jaz on its own, removing the Zip from the chain (the Zip and the Jaz being the only SCSI devices in this PC). Surprise, surprise, it worked perfectly!

The finger of blame began to point Zip-wards. I fiddled with its rather limited SCSI settings: all you can do is select one of two SCSI IDs, 5 or 6, and whether or not it is terminated. In this case, the SCSI chain looked like [Fig 2]. Now, while it's possible to set the ID on the Jaz, you can't set termination, via a jumper or DIP switch, on the drive. You have to use the supplied clunky external terminator instead, which plugs into a spare (if you've got one) connector on the 50-way data cable. The way I had it arranged, with the termination being provided by the Zip, was an entirely "legal" configuration. It was an arrangement that should have worked, but didn't. But when I disabled termination on the Zip and relied on the terminating plug instead, everything worked as it should have done.

[FIG2]

The SCSI chain

```
Host Adapter      >          Jaz   >
Zip
ID7               ID 2             ID5
                  Terminated
Terminated
```

While I'm happy that the problem has been fixed, I'm somewhat less than happy at the way Iomega's SCSI devices behave. I don't know of any other modern SCSI device that doesn't have a termination option in the form of a switch or jumper, which makes the Jaz a bit of an oddball to say the least. Having to use a terminating plug is *so* 1990! And then there's the Zip, which does have a termination jumper but which doesn't appear to work properly in conjunction with the Jaz. Now, is that just plain wrong, or what?

I then kicked in to 'logical deduction' mode in order to solve this mystery

My Zip woes weren't over, though. I then decided to move the internal Zip to another PC. No problem, I thought, I'll pressgang the ZipPlus drive back in to active service. It had been idling, attached to my seldom-used Mac Performa 5200. To refresh our collective memories, the ZipPlus is a combo version of the external Zip drive, capable of being plugged in to either a SCSI card or parallel port, automatically detecting which type of port it has been connected to. It has two ports at the rear: an AutoDetect port, and a pass-through port for a printer if you are in parallel mode, or for other devices if you are in SCSI mode. While the ZipPlus has been sweetness and light on the Mac, I've had nothing but trouble when hooking it up to a PC. And I know from checking out the newsgroups that the ZipPlus has given grief to many, many users.

Part of the problem is Iomega's insistence on using the obsolete DB-25 connector for its AutoDetect port. It comes with one SCSI cable and this "one size fits all" solution is designed to fit both Mac and PC. Unfortunately, with the sole exception of the SCSI cards sold by Iomega, I don't know of any current PC SCSI host adapters that feature an external DB-25 connector. Most use either the 50-way or 68-way high-density connector so you either have to use the parallel port or buy a special lead. Big mistake. Iomega appears to have bitten off more than it could chew with the AutoDetect feature, which did not work as consistently as it should have done. The company has since issued a set of rather strict instructions you have to follow if you want the ZipPlus to work properly as a SCSI device. They are:

- **You have to use** the ZipPlus only as a standalone device on a DB-25 SCSI or parallel port connection.
- **Always use** the ZipPlus with the supplied Iomega blue AutoDetect cable.
- **You must never** use any cable converter or gender changer when connecting the drive, either on the connection to the drive or to the computer.
- **Don't use** a ZipPlus with PowerBook or PC notebook SCSI connections.

Rather limiting, don't you think? All this flatly contradicts the manuals shipped with the drive. If you have an old manual, you can download the updated owner's manual in Acrobat format from the Iomega web site.

Strong stuff

Iomega has also issued this stern warning: "If you use ZipPlus with a cable converter, gender changer, in a multiple-device SCSI chain or without the Iomega blue AutoDetect cable included with every drive, you may not receive the results you expect from the drive and you may compromise the integrity of your data". Strong stuff, eh?

In hindsight, it appears to me that the ZipPlus has been a rather painful exercise for Iomega. Just recently the company dropped the model from its range, citing that it was just too expensive to manufacture, given the recent price cut Iomega made across its range. That's as maybe; but I suspect that the ZipPlus, despite having garnered some great reviews, proved to be more trouble than it was worth and therefore had to go.

PCW CONTACTS

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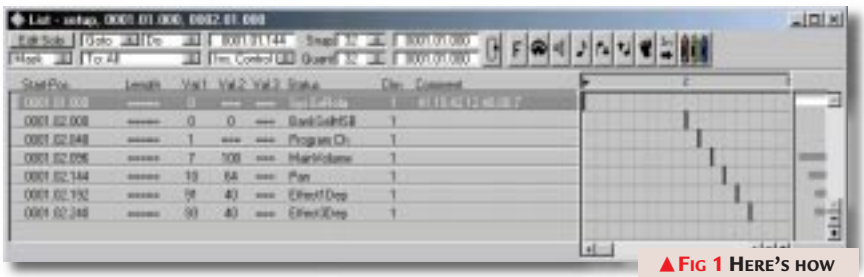
Unofficial Iomega Page
www.juip.com/index.html
Another site *for Iomega fans*
http://fatmac.ee.cornell.edu/~goldwada/zip/iomega.html

The MIDI-Files

The way your MIDI files are structured makes all the difference to the resulting sound. Steven Helstrip shows you how it's done.

Music that's written for General MIDI should sound roughly the same on any GM-compatible device. That is to say, with the right instruments assigned to each part, and with the effects set up in the way the composer intended. You would also expect to maintain the panoramic position and relative balance between instruments. So why is it that songs often come across differently when played back on equipment other than what it was recorded on? Or, a few months down the line, it sounds different again on the very equipment with which it was created?



▲ Fig 1 Here's how your setup bar should look. Not very interesting I know, but it's the best I could do

The bar is open

Judging by the MIDI files I come across, and from my own experience, more often than not it's because the file is not structured correctly. Whether you're writing for General MIDI instruments or a mixed bag of synths in your bedroom, it is essential to have a setup bar in your arrangement [Fig 1] to configure each instrument on every channel. So what should go in this setup bar? Firstly, to ensure you're working with a clean palette, you should insert a GM/GS reset at the start of bar 1. This is a System Exclusive command that effectively initialises the synthesiser chip to its default settings. To do this, create a new part and use the list editor to insert a System Exclusive event with the following settings:

`F0,41,10,42,12,40,00,7F,00,F7`

As System Exclusive events are not (MIDI) channel specific, this can go on any track. If you have an XG-compatible device such as Yamaha's DB50XG, the initialisation command is:

`F0,43,10,4C,00,00,7E,00,F7`

Having to do this each time you start a new song would be a tad tedious, so save the part on its own for use in future arrangements. If you work with Cubasis, which was given away free on our October issue cover CD, you might like to save this part with the default song. The default song (def.all), which can be found in the Cubasis folder, loads automatically each time the program starts. It takes approximately 50ms for these commands to be executed so eave a gap of, say, one beat before sending subsequent messages. These should include a bank number (CC:00), a program number (program change), a volume setting (CC:07) and a panoramic position (CC:10). Equally, if you have changed the effect-send levels for an instrument, controllers should also be present in the setup bar. Controllers 91 and 93 are used to configure reverb and chorus levels respectively.

Reverb on the bass can clutter up the lower end of your mix, so avoid it

To get more out of the default song, why not set up parts containing these settings with standard values for each channel? Then, each time you begin a new song, all you have to do is open the List editor and change the relevant controllers. The standard values, which are the same as those which follow a reset, are as follows: bank and program changes 0, volume 100, pan 64, reverb 40, chorus 40.

Just so you get the general idea about this process, I've carefully crafted a default song with all these settings in place. It can be found on this month's cover CD in the *Hands On* folder. Just copy it to your Cubase or Cubasis folder.

General MIDI tips

1 To create more interesting string textures, try layering two or more patches. Copy your part to a new track in your sequencer and select a new patch. To my ears, String Ensemble 1 (program change 48) works well with Synth Strings 2 (program change 51). For more variation, try transposing one of the parts up or down an octave. Panning the two instruments left and right can also make the part more interesting.

2 To add depth and contrast to your music, vary the amounts of reverb you apply to each instrument. Reverb tends to make instruments sound distant, whereas "dry" instruments sound more up-front. Reverb on the bass can clutter up the lower end of your mix, so try to avoid it.

3 If you're programming an acoustic or electric guitar, add the occasional fret noise (program change 120) on a separate track. *Keep the level to a point where it can just be heard*. If you pan the guitar to one side of the mix, don't forget to do the same for the fret noises.

4 Delay, or echo, can greatly enhance a solo instrument such as a flute. However, most GM synths and sound cards cannot produce delay and reverb simultaneously. To get around the problem, copy your solo instrument to a new track and select an unused MIDI channel. Next, simply move the part on the second track forward by an eighth, a crotchet or even a whole bar, depending

on the style of music. Use either volume or expression (CC:11) to lower the volume of the delayed part and pan it slightly to the left or right.

5 **When you're programming** drum tracks, don't overlook the percussive instruments at the higher end of the main GM set. These include melodic toms, synth drums and a useful reverse cymbal.

Free plug-in for VST

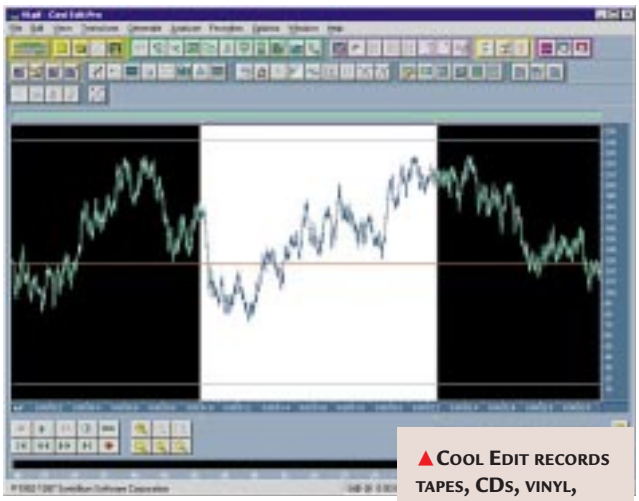
Steinberg is giving away a new VST plug-in in return for your email address. Now you can't say fairer than that, can you? It's effectively an automatic gate, aptly named Chopper. It lets you set the tempo and rhythm of the gate and provides parameters for intensity and wet/dry mix. It's available for download at www.steinberg.net. Go and get it.

▲ CHOP-UP YOUR LOOPS AND VOCALS WITH STEINBERG'S FREE VST PLUG-IN

Questions & answers

Q I recently bought a Philips CDD 3610 CD-ROM writer and am trying to copy old cassette tracks on to CD with it. The only way I can find to do this is by using Windows 95 Sound Recorder. The sound quality is okay but there is one major and one minor problem. The latter is that the recording level has to be set manually. The former is that it records up to about 53 seconds of music and then stops dead. Do you have any advice?

PATRICK MURPHY



▲ COOL EDIT RECORDS TAPES, CDS, VINYL, MINIDISC, DAT... ANYTHING, IN FACT

A *We certainly do. Sound Recorder works by recording audio into main system RAM, which explains why you're only able to record around 53 seconds. A dedicated wave editor such as Cool Edit Pro can record and edit audio files up to 1Gb by recording direct to disc. That translates to around 90 minutes of audio which is just enough to copy an entire cassette.*

Cool Edit also has an adjustable input gain to set the recording level. The shareware release can be downloaded from www.syntrillium.com/cep/.

THE ORCHESTRA GOLD EDITION

The Orchestra is the first in a line-up of new SoundFont discs from Sonido Media. With over 300Mb of strings, woodwind, brass and percussion, it's got all the essentials for writing for a wide range of orchestral styles. The Orchestra is loaded with usable patches: it's not just a bank of redundant orchestral runs, passages and crescendos that don't fit into the music you're trying to write. The instruments have been recorded and put together well, with many patches containing up to 14 samples split over as many keyboard regions. Individual SoundFonts are provided in two sizes: up to 2Mb and up to 4Mb. And for those who want to replace their GM soundset altogether,

there are 8Mb and 12Mb orchestral banks. The string sections comprise bass, cello, viola and violin all played in piano, forte, marcarto and pizzicato styles, and there are solo and ensemble patches for all sections. The quality is not consistent throughout, but given the asking price of just £29.95, you won't be disappointed. On the disc there are an additional 21 free patches from Sonido's SoundFont range, including a 4Mb grand piano, guitars, and a mixed bag of analogue patches.

★★★★

Price *£29.95*
Contact *Time + Space 01837 841100*
www.sonidomedia.com

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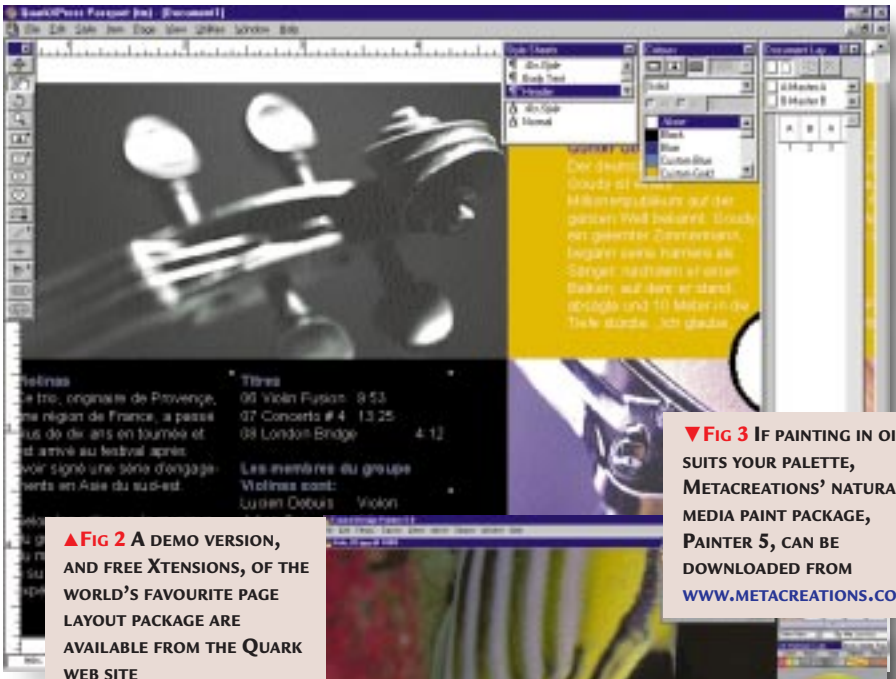
Do the site thing

Ken McMahon takes you on a trawl of some of the best free software on the web.

Now is a good time to think about getting your hands on lots of lovely software to keep you occupied between Christmas and the last New Year's Eve we'll be able to enjoy without the threat of "millennium armageddon" hanging over our heads. As you will be completely skint, having spent all your money on presents for relatives and bottles of Baileys, I have trawled the web searching out free demo applications, beta versions, plug-ins, extensions, fonts and other graphics-related free stuff for you to enjoy.



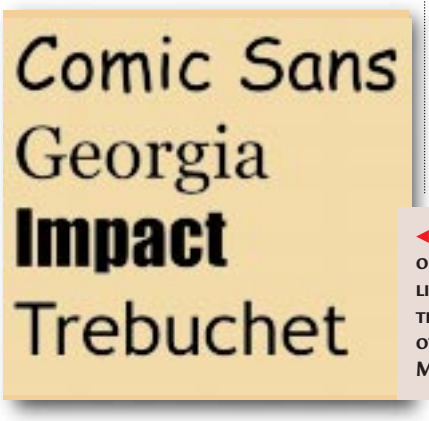
▲Fig 2 A demo version, and free Xtensions, of the world's favourite page layout package are available from the Quark web site

▼Fig 3 If painting in oils suits your palette, Metacreations' natural media paint package, Painter 5, can be downloaded from www.metacreations.com

Check 'em out

☛ **www.microsoft.com/typography/ fontpack/default.htm**
Microsoft is encouraging developers to use these fonts on their web sites. You install these, and when you visit web sites that incorporate them, you will see them exactly as they were meant to look. They are a nice collection to have along with typefaces such as Impact, webdings, Monotype.com, Trebuchet, Georgia, Verdana and comic Sans. And, check out Microsoft's links at www.microsoft.com/typography/links/ to people who give fonts away. You will find font foundries as well as shareware fonts [Fig 1].

☛ **www.microsoft.com/typography/grayscal/smoother.htm**
Still at the MS web site, if you have not yet upgraded to Windows 98 and cannot afford a copy of Adobe Type Manager Deluxe, download the Windows 95 font-smoother which will anti-alias your screen fonts making their jaggy edges appear oh-so-smooth. You can, of course, achieve the same effect by drinking an entire bottle of that Baileys!



◄Fig 1 As well as plenty of typography news and links, you can download these free typefaces and others from the Microsoft web site

☛ **www.mindworkshop.com/alchemy/gifcon.html**
That's enough Microsoft. Time to head to a shareware demo version of Alchemy's excellent gif construction set. It allows you to create and manipulate transparent gifs and animated gifs using animation wizard.

☛ **www.equilibrium.com/ProductInfo/DBLite/DBLite.html**
Here you will discover a free download of Debabelizer Lite LE. DeBabelizer Lite is good for simple image translation and slideshow functions. For RGB, bitmap, scan or paint files it offers a translation capability which is similar to DeBabelizer 3 but without the CMYK capabilities, internal scripting, image processing or palette manipulation. Slideshows can be used to create and translate on-screen thumbnails of images in a folder.

☛ **www.adobe.com/newsfeatures/tryadobe/main.html**
This is the place where you can try out most of Adobe's products including Photoshop, Illustrator, PageMaker, Pagemill, Premier, Streamline and After Effects. All these versions are "save disabled" which is not as good as a 30-day trial, but I guess that's why they're called tryouts. Who knows? You might like the software so much you'll want to pay for it.

☛ **www.livepix.com/download/index.htm**
Pick up a 30-day trial version of Livepix 2.0, the image-editing package that uses the flashPix file format to keep things fairly zipping along. This version has the same features as the fully-licensed version of LivePix 2.0 Deluxe but without the

Questions & answers

Q I have a P133 with 16Mb of RAM, with MagnaRam installed taking me up to 20Mb. I was trying to piece together a picture taken from two shots using a camcorder. First, I fired up Adobe PhotoDeluxe, which crashed and burned after the splash screen. Then I tried Adobe Photoshop, which broke down trying to paste a picture. I tried this with all my graphics programs and they all died on me. In the end, I managed to piece together the photo using Microsoft Paint. Why is this happening? And would the result be any better in Photoshop or PhotoDeluxe?

(NAME NOT SUPPLIED)

A *The problem is almost certainly that you do not have enough RAM – real RAM that is, as opposed to the virtual kind provided by MagnaRam. The 4Mb additional virtual RAM you are getting with MagnaRam is hardly worth the bother. You do not say which version of Photoshop you are using, but as 4.0 needs a minimum of 16Mb RAM and 3.05 needs 10Mb, you're sailing pretty close to the wind anyhow. With the price of RAM now at around £1 per megabyte, there is really no excuse not to upgrade. So go out and buy a couple of 32Mb modules and you will enjoy faster, more reliable performance with all your applications. In answer to your second question, yes, it would look better and the job would be far easier in Photoshop or PhotoDeluxe, both of which have a much wider range of more sophisticated tools than Paint. The tricky part of joining two halves of a picture is first to get the halves aligned (by using rotate, and then nudging one half of a pixel at a time with the arrow keys) and then make the join invisible by selective use of the clone and smudge tools.*

Q I have a TV card which will only save captured single frames in the Microsoft Windows DIB format. I can't find an application that will allow me to view this. Is it possible to convert the file to a different format?

DAVID SMITH

A *It's Paintshop Pro 5.01 to the rescue once again. It will open and convert your DIB file to pretty much any other format. It's on our cover CD, or you can get it from www.jasc.com.*

In September's Q&A, reader Alex Pounds was looking for a way to get a GIF out of Internet Explorer in another format. Ben Curthoys suggests setting the GIF as wallpaper: right-click the GIF and select "set as wallpaper". This creates a file called "Internet Explorer walpaper.bmp" in the Windows folder. You can open this in MS Paint or any other image-editing package that supports the bmp file format.

Novita LiveLetter email application or the Xaos Tools special effects filters, and with only two sample templates. If you have LivePix SOHO, you can also download a new SOHO project every month.

☛ **www.macromedia.com/software/downloads/**

Stop off at Macromedia to download Shockwave and Flash players so that you can view "shocked" sites which include interactive animations. While you're here you can also pick up demo versions of Macromedia heavyweights Director and Freehand (both are save disabled) as well as Authorware, Dreamweaver, Fireworks, Flash and Generator (these are mostly 30-day trial versions).

☛ **www.quark.com/ftp001.htm**

At the Quark XPress web site [Fig 2] you can take the opportunity to play with the page layout software that is used by so many people, for the simple reason that it's really quite good. The bad news? Files cannot be saved, new libraries cannot be created and printing is limited.

☛ **www.quark.com/xtensions/**

Here you will find a whole barrowload of filters and extensions for Quark XPress versions 3.3x and 4.0. Most are available for MacOS and Windows and many are beta versions. Here are some of the more interesting ones available for XPress 4.0:

- **MS-Word 8 Filter** (Beta2) works for documents imported from (or exported to) the release of Microsoft Word 8.0, which is called Word97 for Windows and Word98 for MacOS. And if you have seen the mess when you try to import these files without it, you'll know just how useful that is.
- **PDF Import/Export XT** (Beta) allows you to save a page or range of pages from a Quark XPress document as a PDF file. The filter saves the pages in PostScript format and uses Adobe Acrobat Distiller (which you need to have installed) to create the PDF file. The filter also allows you to import a page of a PDF document into a Quark XPress picture box. It only works with Quark XPress or Quark XPress Passport 4.02 or later.
- **TypeTricks 1.01** features include Make Fraction, Make Price, Remove Manual Kerning, Word Space Tracking and Line Check. This one requires Quark XPress 4.0 or Quark XPress Passport 4.0.
- **Jabberwocky** (which is MacOS only) enables you to fill a text box with random text for testing and placement purposes.

☛ **If you want** more Xtensions, you should head for www.extensis.com/products/download.html. Xtensis products include Preflight Pro, QX-Tools and QX-Effects for XPress, and Photoshop plug-ins Intellihance, Mask Pro and Phototools, to name but a few. Thirty-day trial versions of each can be downloaded free of charge. Additionally, there are free, fully-working tools available for download, among which are PhotoBevel, QX-Drag&Drop and VectorFrame.

Christmas crackers

No Christmas shopping expedition would be complete without a trip to www.metacreations.com/downloads/ [Fig 3] where, among other things, you can pick up demo versions of Bryce 3D Convolver, Dabbler, KPT, Painter 5 and Ray Dream 3D. Have fun!

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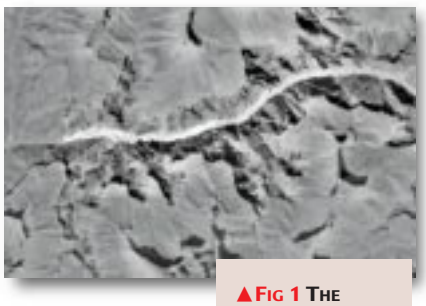
Space odyssey

There's a wealth of stunning 3D images on the web. Benjamin Woolley tells you where to find them.

Nothing in life is free – except on the internet. It remains (though probably for not much longer) an important resource for the 3D enthusiast with more imagination than money. Web sites offer not only free clip libraries but, perhaps more precious still, a range of textures and in particular displacement maps.

Black and white

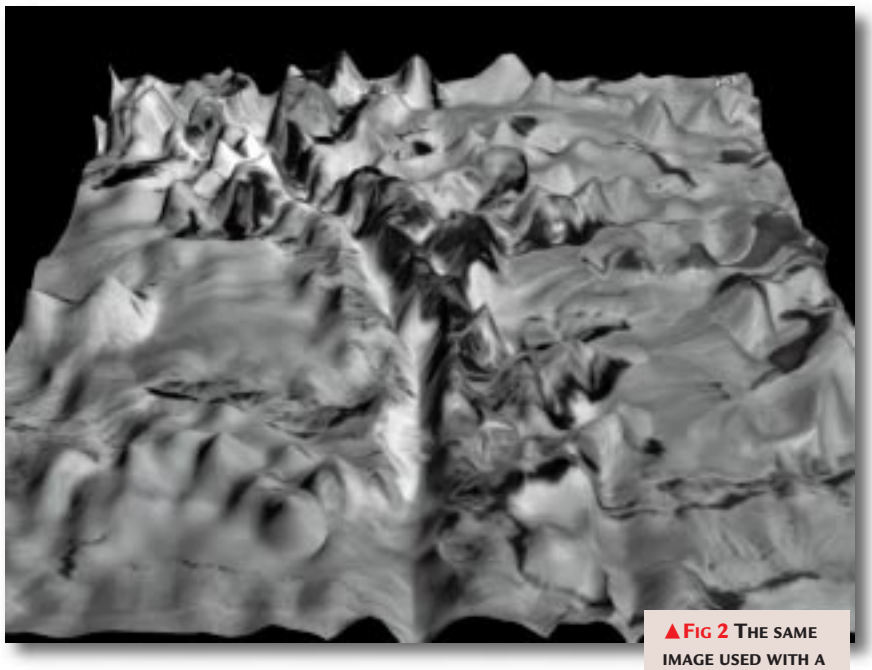
These are images, usually in greyscale, that 3D authoring software can use to calculate the degree to which a flat plane should be displaced. This is done by mapping the image onto the plane and then calculating the height of each vertex by looking at the luminosity of the corresponding pixel on the image: white means it is displaced (that is, elevated, assuming the orientation of the plane is flat and the displacement is upwards); black means it stays where it is.



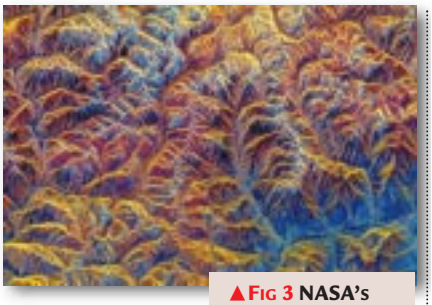
▲ FIG 1 THE SATELLITE IMAGE OF THE GRAND CANYON AS IT APPEARS ON THE TERRASERVER

Displacement maps are ideal for creating terrains. The problem is finding ones that are detailed enough and have contours that produce a natural-looking result. Fortunately, there are a few sites on the internet with an extraordinary range of images that are ideal for this sort of job. One of them, called the TerraServer, is at www.terraserver.microsoft.com. It is currently hosted by Microsoft, which is using it to show off its database software. The TerraServer is described as the largest online database in the world. amounting to an astronomical 3.5 terabytes, a terabyte being a thousand gigabytes. It contains satellite and other remote sensing images of Earth, many from the US Geological Survey (USGS). Since this is a public body, it cannot profit from its work, so the enormous array of images it has produced and which are now finding their way onto the TerraServer, are available for free. There are also images supplied by SPIN-2, a joint venture between American and Russian space agencies, which boasts the highest resolution of any commercially available satellite images in the world, down to just two meters. The SPIN-2 images are not free, although you can download low-resolution copies for just a few dollars and pay for them with a credit card via a secure server. The TerraServer has some great black-and-white images. It also has a useful set of search tools for finding particular spots, either using a map or by name. I used USGS's picture of the Grand Canyon [Fig 1] to create the terrain in Fig 2. The result is not, it has to be said, an accurate 3D model of the Canyon, as the way the original terrain was lit by the sun produces anomalies. Shadows, for example, are translated by the displacement software as hollows. Furthermore, I had to invert the image because the sun had illuminated one wall of the canyon, producing a bright peak at the point where the canyon plunges down. These are problems you are bound to find in images lit from a single source, but with patient work using your 2D graphics package you should be able to overcome many of them.

The TerraServer contains satellite and other remote sensing images of Earth



▲ FIG 2 THE SAME IMAGE USED WITH A DISPLACEMENT MAP TO RECREATE A 3D MODEL OF THE CANYON. THE IMAGE HAS ALSO BEEN USED AS A TEXTURE MAP



▲ Fig 3 NASA's image of Tibet's mountainous landscape

An even better source of satellite imagery than the TerraServer, at least from a 3D artist's perspective, is NASA. Its Multimedia Gallery at www.nasa.gov/gallery/index.html has a huge array of images, many of them in colour. For example, there are various pictures of the planets, perfect astronomical material for creating texture maps for spheres. There is also a wide choice of images of the Earth's surface, such as the one in Fig 3 which shows the uplands of Tibet. As you can see in Fig 4, you need not use such images merely to create displacement maps and terrain textures. They can be used for stunning textures for other objects too. Here I have used a greyscale version of the same image to create an opacity map, giving a glassy look to the material.

All the images on the NASA web site are free. You will no doubt find other images elsewhere that seem to be just as freely available, but remember that unless it is explicitly stated that images can be used without charge, they are likely to be copyrighted. If you use them as part of a texture, there is a remote chance of litigation if the resulting image is widely distributed. To be on the safe side, it is best to stick to public institutions. The US government boasts plenty of them, many offering interesting material that is yours for the taking. God Bless America.

New wave

This summer, 4th Wave www.fourthwave.com, which publishes a regular newsletter for the graphics industry, announced the passing of a milestone in the history of 3D graphics. A large majority of PCs now being sold — the company estimates as many as 60 percent — are 3D enabled. In other words, they have some sort of hardware acceleration. Just a couple of years ago, it was just a tiny minority of workstations that could boast this capability. Now, it comes as standard with even the cheapest home PC.

▲ Fig 4 Tibet's landscape mapped on to a vase

Among the many developments that have helped achieve this, the chief one must be the emergence of a new industry standard. In the old days, each game that used 3D hardware had to be written for a particular chip's instruction set. If you did not have that chip in your graphics card, tough luck; the game could not run, or even manage a brisk walk. Direct3D, Microsoft's 3D API for Windows 95 and NT, has changed all that. It comes as standard with Windows 98 and will have found its way onto just about every Windows 95 that has run a popular game. Direct3D means there is a single, standard interface between the software — not just games, but also 3D authoring software — and whatever hardware acceleration is installed in the system.

All the images on the NASA web site are free

The other main component to open up 3D to a wider audience is of course the proliferation of 3D chips. These chips often cost less than $30 and are all but standard components in modern graphics cards. The infrastructure is in place for 3D to become as commonplace as 2D graphics. An extra dimension has been added to the desktop. Unfortunately, no one yet seems to know what to do with it other than to play Quake-style action games.

About a year ago, Caligari and Yahoo! announced an ambitious project to develop a 3D interface for the Yahoo! web site. The idea was that, using your browser, you would enter a VRML version of Yahoo!, with buildings representing each Yahoo! category (arts, sciences, recreation, sports) and objects within those buildings representing subcategories: a ballerina for dance, a storm cloud for weather, and so on. The site contained a total of 450 such objects and promised to provide a new means of navigating the information it contained. But since the initial test period, the scheme seems to have disappeared. The URL advertised in the original press release, 3d.yahoo.com/3d/, is no longer valid, and there is no mention of it on the main Yahoo! site. Clearly, this was an idea ahead of its time. Perhaps with Direct3D-accelerated systems opening up a new space on people's PCs, time is about to catch up.

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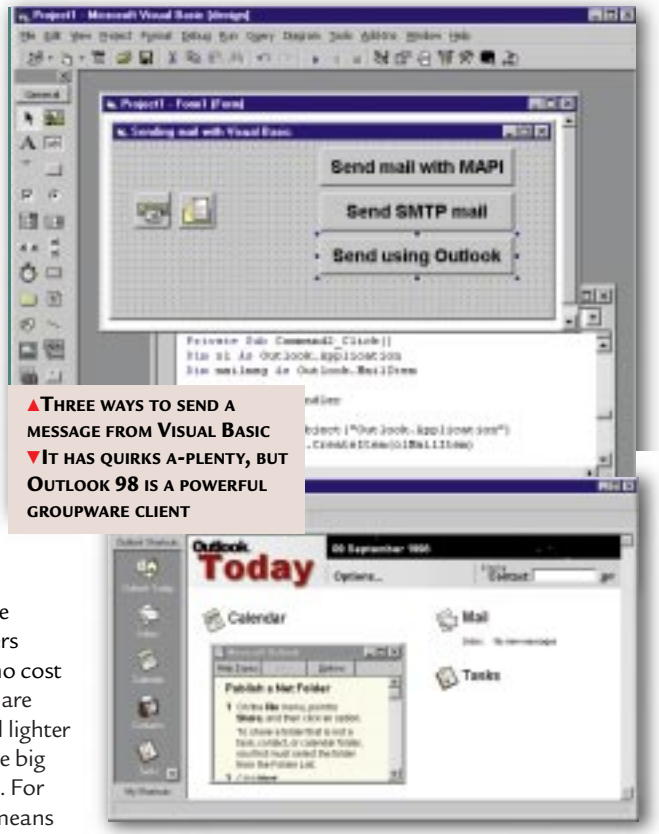
Mail message

Get mail-enabled fast, says Tim Anderson. Also, choosing between VB, Delphi and Access.

When you hear the word groupware, you probably think of monstrous applications like Lotus Notes or Microsoft Exchange, with hefty licence fees and heavy training needed before you can get up and running. These huge applications have their place, but a lot can be done with simple email using standard internet protocols.

Out and about

If you have Outlook 98, which was freely available for a time and is still a no-cost upgrade for Microsoft Office users, then you have in your hands an instant groupware client, able to share calendars, contacts and tasks, as well as standard messaging. Whether or not you use Outlook, most applications can benefit from some mail features. Applications that deal with documents or manage addresses should have a Send command, and business applications might automatically mail reports to appropriate contacts. The one component that does not come bundled with Windows or Office is a mail server, although you can send internet mail though a dial-up service provider. Windows does provide the workgroup post office, but in reality this is little more than a shared directory. Fortunately, there are numerous mail servers available at little or no cost (*see page 298*). These are cheaper, simpler and lighter on resources than the big groupware products. For Outlook users, this means you should use the Internet rather than the Workgroup version. In any case, this is a better choice if you do not need support for Exchange.



▲THREE WAYS TO SEND A MESSAGE FROM VISUAL BASIC
▼IT HAS QUIRKS A-PLENTY, BUT OUTLOOK 98 IS A POWERFUL GROUPWARE CLIENT

[FIG 1]

Minimal code for a MAPI session in Visual Basic

```
Private Sub Command1_Click()

MAPISession1.SignOn
If MAPISession1.SessionID <> 0 Then

With MAPIMessages1
.SessionID = MAPISession1.SessionID
.Compose ' start a new message
.RecipDisplayName = "Me old hearty"
.RecipAddress = →
"richard@myipdomain.com"
.MsgSubject = "Message from VB App"
.MsgNoteText = "We did it"
.Send False ' don't display a dialog
End With

MAPISession1.SignOff
End If
End Sub                    (→ continues on next line)
```

● How to send a message from Visual Basic

Once mail is installed successfully, you can build mail-enabled apps. There are many different approaches, and here are some possibilities.

☛ **First**, you can use MAPI (Mail API). MAPI is a horribly complex interface to the Windows messaging subsystem. The good news is that for most applications you can think of MAPI simply as a standard way of programming your mail client. Most email clients are MAPI-compliant. Visual Basic comes with two MAPI controls, MAPISession and MAPIMessages. Here's how you might send an email message with them:

1 **Place** the two MAPI controls on a form.

2 **Set** MAPISession's UserName and password properties to values that are valid on your system.

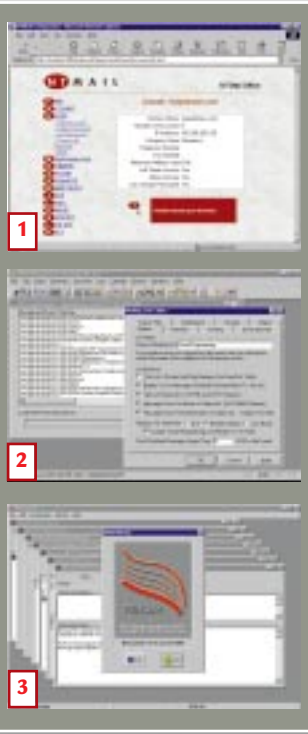
3 **Write** code like that in Fig 1. This first opens a MAPI session, and then makes use of it by calling the methods of MAPIMessages.

☛ **Second**, there are other ways to use MAPI. In the WINAPI directory of a VB installation you will find MAPI32.TXT which contains declarations for Simple MAPI, the essential API mail functions. There are also COM interfaces to MAPI. One is the CDO (Collaboration Data Objects) library which you can find through VB's Project -References dialog. Simple code for CDO looks similar to that using the MAPI controls. CDO used to be called Active Messaging.

FINDING A MAIL SERVER

It makes sense to run a mail server on a network of almost any size. There are numerous excellent products around, most of which let you download working evaluation versions. If you have a dial-up web connection, look for strong support for automatic sending, collection and distribution of mail. On Windows NT a popular choice is **NT Mail** from **Internet Shopper** (1). The new version 4.0 includes a built-in web proxy, so that you can browse the web from anywhere on the network. There is also a list server, anti-spam filter, dial-up support, and flexible configuration options. The interface for administration is entirely browser-based, which is good if you need access anywhere on the network, but performs poorly compared to a conventional Windows interface.

Despite its modest starting price I feel NT Mail is best suited to large networks. Another possibility is **mDaemon** from **Alt-N Technologies** (2). This is a great choice for small networks and runs on Windows 95, 98 or NT. The dial-up support is especially well thought-out, with a multi-POP option that lets you collect mail from several POP3 mailboxes on each connection. The administration interface is over-busy, but flexible and responsive. Remote configuration is also possible. A list server is built-in, but not a proxy server, although the Wingate proxy comes from the same stable. For those on a tight budget, **Mercury/32** (3) is a solid mail server whose author permits unlimited use without fee. Its only real disadvantage is that advanced configuration is by means of editing text files rather than through a graphical interface. With Mercury/32 plus Outlook 98 ,you have all you need for some clever groupware at minimal cost.



[FIG 2]

Minimal code to send SMTP mail from Visual Basic

```
Private Sub Command1_Click()
Dim sText As String

With SMTP1
If .State <> prcDisconnected Then
Exit Sub
.RemoteHost = "192.168.255.126"
.DocInput.headers.Add "From", ➔
      "tima@myipdomain.com"
.DocInput.headers.Add "To", ➔
      "richard@myipdomain.com"
.DocInput.headers.Add "Subject", ➔
      "Straight from VB"
sText = "Look - no MAPI!"
.SendDoc , , sText
End With

End Sub
```

(➔ continues on next line)

Third, you can use standard internet functions. This is a great way to add simple messaging to an application, if you are not using Exchange. One approach is to use the Netmanage ActiveX controls. Of course, you can send mail via SMTP (Simple Mail Transfer Protocol) using MAPI or CDO, but in that case you are programming an external mail client as opposed to connecting directly. Fig 2 shows how to send a message using the Netmanage SMTP control.

Note that this example code is only a start. The secret of success with the Netmanage controls is to monitor the State property along with normal error-checking. The best approach is to use a timer control and/or make use of the StateChanged event in order to avoid calling methods that are invalid in the current state, for example if you are not yet connected. It is not as easy as it should be, because Microsoft has concentrated on promoting Exchange and CDO. Incidentally, the same controls come with Delphi, unless you get hold of a high-end edition of Delphi 4.0 that has the much better NetMasters SMTP control.

Fourth, you can automate Outlook using its automation object model. Fig 3 shows how to send a message using this technique. First, you need to open Project-References and check the Microsoft Outlook 98 object model. The advantage of using Outlook is that you get more than just mail. If you have installed a mail server along with Outlook's Net folders option, you get the ability to share contacts and calendars, for example, through email-based replication.

[FIG 3]

Automating Outlook 98

```
Private Sub Command1_Click()
Dim ol As Outlook.Application
Dim mailmsg As Outlook.MailItem

On Error GoTo handler

Set ol =
CreateObject("Outlook.Application")
Set mailmsg =
ol.CreateItem(olMailItem)

With mailmsg
.Subject = "Outlook at your
fingertips"
.Body = "This is send automatically
from VB"
.To = "Richard"
' name must exist in address book
.Send
End With
Exit Sub
handler:
MsgBox Err.Description
End Sub
```

Questions & answers

Q My main development tool is Access. How would you summarise the differences between a database development tool like Access and other packages like VB and Delphi? I don't use the latter and would like to know what advantages they can offer over Access.

PHILIP LOPORTO

a The short answer is that if you have a good route to creating applications that work, there is no reason to change. Many typical business applications can be done either way. If you are undecided, the main advantage of applications like Access is the large amount of built-in functionality they provide, such as query builders, report writers and mail-merge. These require extra work in Visual Basic or Delphi. On the other hand, if you want to lock-down the application so that users are presented with a simple interface and few options, then these extra features can get in the way and you will be working to disable or hide them. By contrast, if you use a language product you start with a blank sheet. It is more work, but you have full control. Some other advantages are:

- **Language products** are more flexible if you want a highly customised user interface.
- **Royalty-free deployment** comes automatically with VB or Delphi, whereas Access require you to purchase an expensive developer version, or to have the full version installed on each user's machine.
- **You can create** smaller apps, particularly with Delphi or C++.
- **A language product** will scale better if you want to move to a distributed or web-based application.

Q How do you pass variables to and from a form? Some of my applications have options that are password protected. I have a form which displays the appropriate message and password, gets input from a user and returns a flag acording to validation. Currently I am declaring three public variables: strPUBMessage_To_User, strPUBPassword_Expected, and intPUBResult. This seems clumsy. Is there a way of calling a form such as:

```
PasswordCorrect =
frm
GETPASSWORD
("YOU NEED A
PASSWORD","LETMEIN",Result)
```

NIGEL THOMAS

a There is nothing to stop you writing code to show the form but forgetting to set the password variable first. Good programming protects you to some extent from your own mistakes. By the way, VB has a wizard-generated log-in dialog but it's poor. Wrapping the dialog display in a function is a start, but here is what I consider the best technique.

- **First**, use property procedures. That means using Visual Basic 4.0 or higher, where forms are a kind of class module. Make the necessary variables private to the form, by declaring them with the Private keyword. Then add property procedures, using the Tools - Add Procedure option and checking Property. Think about whether a property should be read-only or write-only. If you wanted to make the password property write-only, for example, delete the Property Get procedure. You need to add code linking the property procedure with the private variable.
- **Second**, initialise the variables in the form's Initialise event. For example, you might set m_password and m_username to the empty string.
- **Third**, add validation to the form's Load event. You could check for an empty password and raise an error or unload the form in response.
- **Fourth**, when you use the dialog, do not use the pre-declared form object. Instead, use the New keyword to create a new instance. That way, you can be sure that the Initialise event will fire. The only disadvantage is a longer load-time for a complex form, but this is not an issue for a simple dialog.

[FIG 4]

A possible login routine in Visual Basic

```
Function frmGETPASSWORD(sMessage
As String, sUserName as string,
sPassword As String) As Boolean
Dim dlg As frmLogin ' or the name →
of your login form
On Error GoTo handler
Set dlg = New frmLogin
dlg.Message = sMessage
dlg.username = sUserName
dlg.Password = sPassword
dlg.Show vbModal
 If dlg.bLoginSucceeded Then
 frmGETPASSWORD = True
 Else
 frmGETPASSWORD = False
 End If
Unload dlg
Set dlg = Nothing
Exit Function
handler:
MsgBox Err.Description
Resume Next
End Function
```

(→ continues on next line)

PCW CONTACTS

Tim Anderson *welcomes your questions and tips. He can be contacted c/o the PCW editorial office (address, p10) or at* **visual@pcw.co.uk.**

To explore what mail servers are available, a good place to start is the Tucows site, for example **http://tucows.cix.co.uk.**

For NTMail contact Internet Shopper 01275 340333 or visit **www.ntmail.co.uk.**

Prices start from £49.00 (£57.58 inc VAT) for five mail accounts.

For mDaemon contact Grey Matter 01364 654100 or visit **www.mDaemon.com.**

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Mercury/32 is at **www.pegasus.usa.com.** *It is free to use but detailed manuals must be purchased. Information on programming Outlook can be found in Building Applications with Outlook 98(ISBN 1-57231-718-3), Microsoft Press, £37.49 with CD. Contact Computer Manuals 0121 706 6000.*

Domain and simple

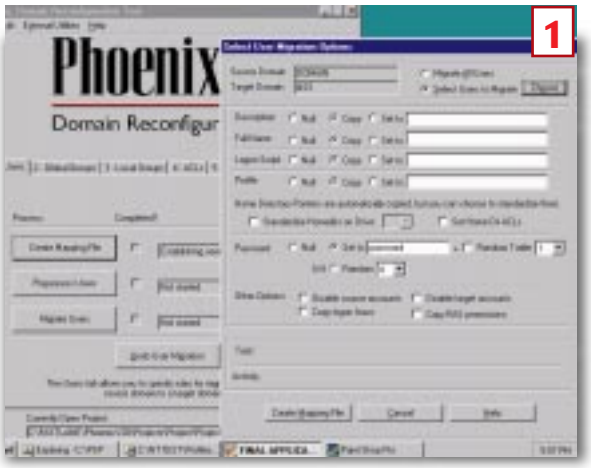
Companies often end up with a proliferation of domains, and trying to rationalise the structure can be a daunting task. Bob Walder has ways of making it easier.

Much has been written about the lack of a true directory service in NT and the problems inherent in managing multiple domains in an NT network. But if domains are that complex to administer, why do organisations so often finish up with tens or hundreds of the things spread about the place?

History lesson

There are a couple of historic reasons for this. One is that no matter what people tell you, size does matter. In Windows NT Server 3.1, domain controllers were limited to storing 10,000 objects in the security accounts manager (SAM) database. Many larger companies found this to be insufficient as the network grew and were forced into using multiple domains. With the release of Windows NT Server 4.0, the limit was increased to 40,000 users and the maximum recommended size of the database was 40Mb. But for some it was too late since the domain structure was already fixed, and for others even this number remained too small.

There are other reasons, too, of course. Sometimes a network's communications infrastructure dictates the domain structure to minimise replication across slow WAN links. Large organisations might also want to delegate administrative tasks to a number of people and the only true security boundary in an NT network is the domain. Finally, there is simple growth, whether organically within a company or via acquisition of others. Either way, it is possible to finish up with numerous domains which would be better merged together. The problem is that as things change, it is often necessary to collapse the domain structure to something simpler. When two companies are merged, for instance, rationalisation of the domain structure is always desirable. Microsoft recommends collapsing domains in preparation for the move to NT5 and Active Directory. Unfortunately, domain reconfiguration is not that straightforward because of the unique security identifier (SID) associated with each user object.



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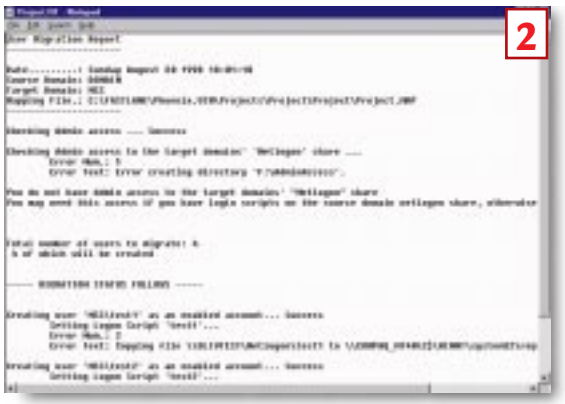
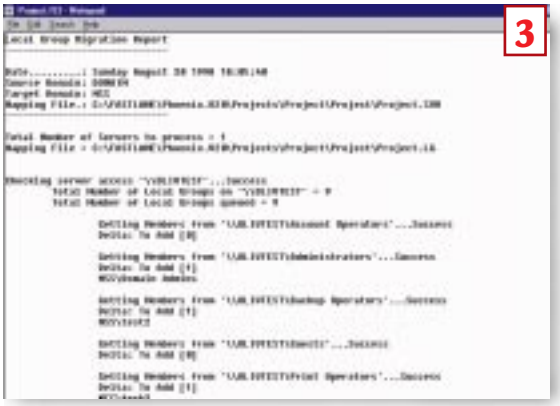

2

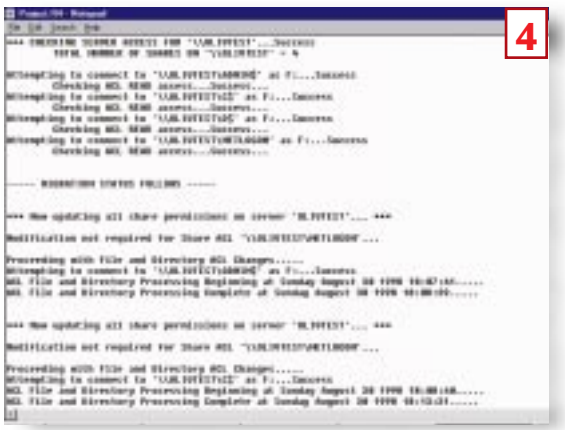
It is an unfortunate fact of life in the NT world that SIDs are not portable across domains. And security is completely dependent on the SID rather than the user name. It is the SID that is a member of a Local Group and ACL and User Rights, *not* the user name, which is there for display purposes and ease-of-management only. To merge two domains into one, therefore, would require manual creation of users and groups in the target domain, and manual adjustment of the various shares and access rights to ensure that these users could continue to access resources in the source domain until the migration was completed.

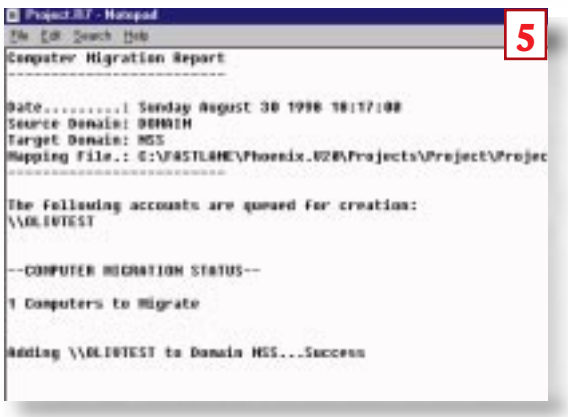
Rationalisation of the domain structure is always desirable

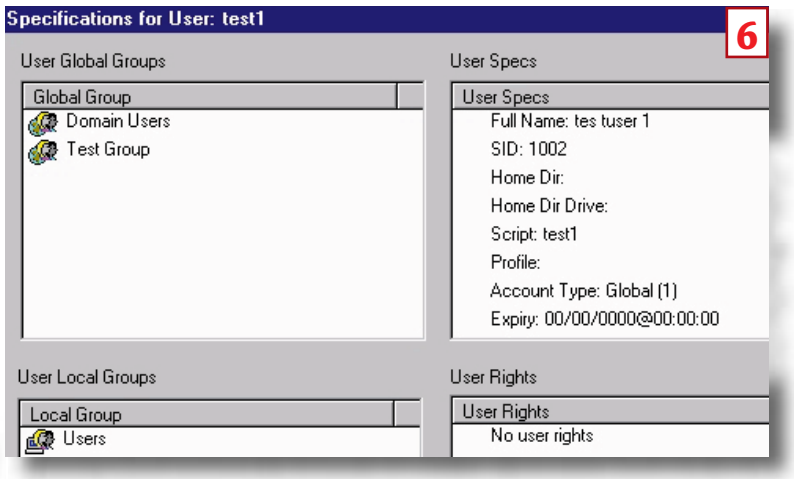
Domain reconfiguration in a large enterprise cannot be accomplished overnight, so you have to ensure that as users are moved to the new domain, they still have access to all their original shares, mailboxes, printers and other resources until the migration is finished. I recently came across a product called Phoenix, from FastLane Technologies, which helps with the whole reconfiguration process. Going through the various stages step by step I will highlight the problems and show where Phoenix may be useful. In a large network with many domains, these stages represent a huge manual effort which is not only tedious but prone to errors. Tools like Phoenix, which should probably have been included as part of the base operating system, certainly take much of the pain out of the process.

1 **Users** [Fig 1]. Assuming we already have NT Server installed on a primary domain controller in our new domain, the first task is to create the user objects that will be members of the new domain. Where we are consolidating a number of domains into one, this can be a huge task. Phoenix allows the administrator to perform this creation automatically, selecting the users from a list of those









already on the existing domains. User names to be migrated can be chosen individually from a pick list, or can all be migrated in one go with the appropriate user objects duplicated (with new SIDs) in the target domain. The remaining stages focus on finding an objects source SID and inserting the SID of the destination object so that the new users maintain the same access as the original account.

2 Global Groups [Fig 2]. Like users, global groups cannot be copied across domains so new objects need to be created in the target domain to mirror the source groups, and the appropriate users must be added to the new groups. Once again, this is a tedious manual process that can be automated using Phoenix. If multiple domains are merged to one target, groups with the same name can be merged or created as separate groups. For example, you probably wouldn't want to merge all the "Domain Admin" groups into a single object in the target domain. As the new global group objects are created, they are populated with the same members that were in the source groups, using the new user objects created in the target domain in stage 1.

3 Local Groups [Fig 3]. In order that a newly-created user object has the same access to resources as the original account, Phoenix searches all local groups for the original users' SIDs and appends the SID of the target user account. Global groups in the source domain are processed in the same way, since local groups can include both users *and* global groups. As this process can be resource intensive, you can run the external application locally on each server throughout the enterprise. This can be done using the DR Distributor, which distributes a secure scheduler and an automated updater down to local computer level. The administrator can then push the updating of local group migration, ACLs and user rights to the computer itself to minimise the load on the network. The local computer spawns the update application and updates its own data locally, as a central console maintains and reports all updates.

If an organisation is implementing a staggered migration, it is possible to schedule the automated updater on the remote computers to run every day, which allows the network to quickly adapt to massive changes in stages.

4 ACLs [Fig 4]. Like local groups, all ACLs must be searched for SIDs of the original account. As each is located, the SID of the target account is appended, therefore ensuring that the target user object retains the same access rights as the original.

5 Rights [Fig 5]. Although the previous stages give the destination user access to the same global groups, local groups, shares, files and directories, the user still may be unable to log on. Such computer-specific access is determined by user rights and advanced user rights, and this stage ensures that once again destination SIDs are appended wherever source SIDs are found, to ensure that the new account has equal access to the same physical computers as the old account.

6 Computers [Fig 6]. The final stage of domain reconfiguration creates computer accounts on the target domain for all computers in the source domain. Other tools in the Phoenix package make light work of moving Domain Controllers and Exchange mailboxes between domains, too. Once the initial migration phase has been completed, Phoenix can also be used as a day-to-day domain management tool.

PCW CONTACTS

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FastLane's Phoenix *is available from Peapod Distribution on 0181 606 9990*

Folders of fortune

Don't be scared to use AppleScript. With its new 'folder actions' it's easy, even for novices, to automate tasks. Cliff Joseph takes five.

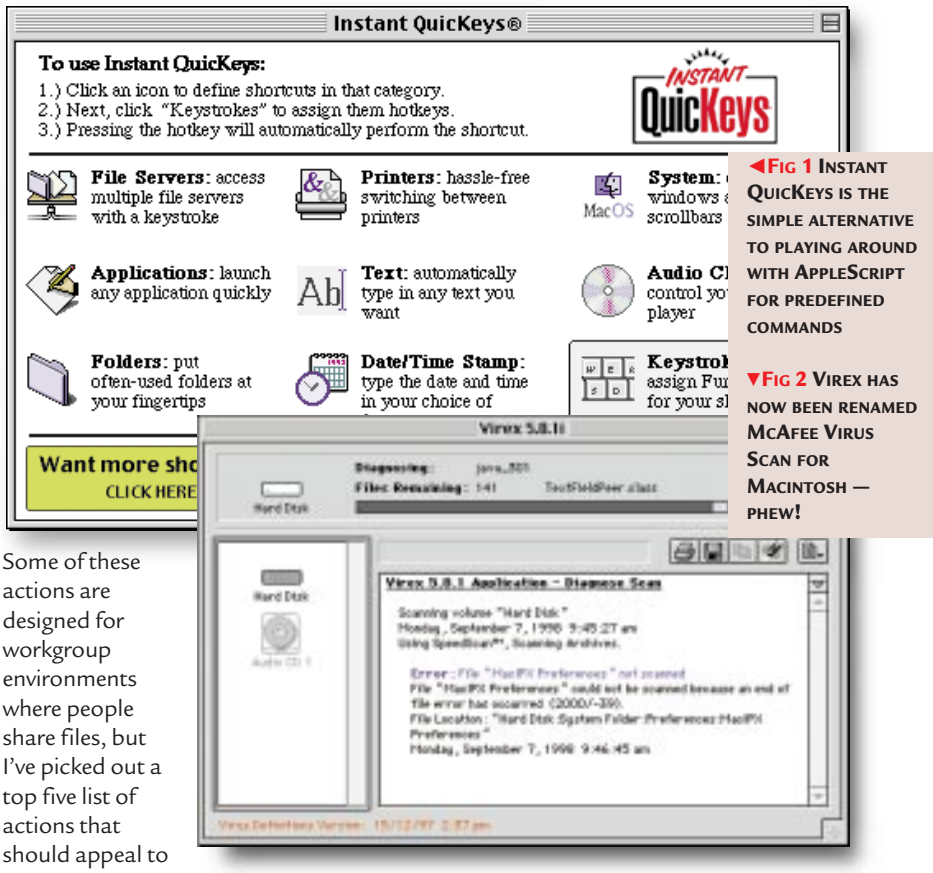
AppleScript is one of the less well known features of the MacOS but it can be incredibly useful for automating those routine, everyday tasks. Steve Jobs recently highlighted the importance of AppleScript to the design industry during his speech at the Seybold publishing conference.

But writing scripts is a little too close to programming for many Mac users, so AppleScript tends to be overlooked much of the time. It is mainly used by publishing professionals who are prepared to take the time to master the scripting process. Many use it to automate tasks such as squirting text files into page layout templates or performing regular file backups.

MacOS 8.5 may soon change that. AppleScript is much faster in OS 8.5, as it is now entirely based on native PowerPC code and includes many new features. Some of these improvements still require some knowledge of scripting, but there's one particular feature that will appeal even to Mac novices.

Piece of the actions

AppleScript now includes a new type of script called "folder actions". These are scripted commands that are executed automatically whenever you perform certain tasks relating to the contents of a folder. Folder actions can be triggered whenever you open or close a folder, add or remove items from it, or when you move or resize a folder window that is open on-screen. You can use folder actions to handle many standard housekeeping tasks such as performing backups, opening your current work files or simply tidying up your Mac's desktop. Apple includes a selection of ready-made folder actions with OS 8.5, so you don't have to learn scripting to use them.



◀FIG 1 INSTANT QUICKEYS IS THE SIMPLE ALTERNATIVE TO PLAYING AROUND WITH APPLESCRIPT FOR PREDEFINED COMMANDS

▼FIG 2 VIREX HAS NOW BEEN RENAMED MCAFEE VIRUS SCAN FOR MACINTOSH — PHEW!

Some of these actions are designed for workgroup environments where people share files, but I've picked out a top five list of actions that should appeal to individual users and workgroups:

1 Close Sub-folders. When you close a folder window, this action will also close the windows of any other sub-folder within the main folder. This is a good way of quickly clearing a lot of open windows off your desktop.

2 Keep Folder Open. This will keep a particular window open all the time. I use this one on the folder where I keep all my current work projects (*see p308*).

3 Open Labelled Items. The MacOS allows you to attach coloured labels to any file. Attach this action to a folder, and any files carrying the "Essential" label will automatically be opened whenever you open the folder.

4 Set View Preferences To Match. When you set the view preferences for a folder, such as the icon size or list order, those preferences are applied to any other folder that you place inside it.

5 Copy Items To Folder. Whenever you add an item to a folder, this action will also add a copy of that item to a second, specified folder.

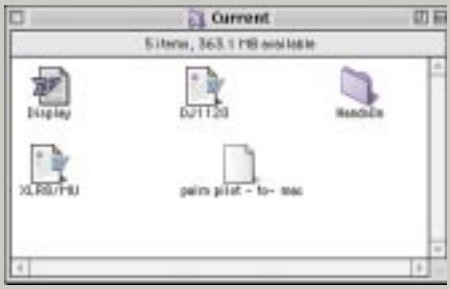
If you just don't fancy playing around with AppleScript, there's a simpler alternative. CE Software has released a cut-down version of its Quick Keys macro program, called Instant QuicKeys [Fig 1]. This provides a variety of predefined commands that you can assign to the function keys on your keyboard. Commands are grouped into categories; there are commands for opening frequently used files and folders, selecting printers or file servers on a network, rearranging windows on your desktop, and printing standard pieces of text such as your name and address.

Graphic detail

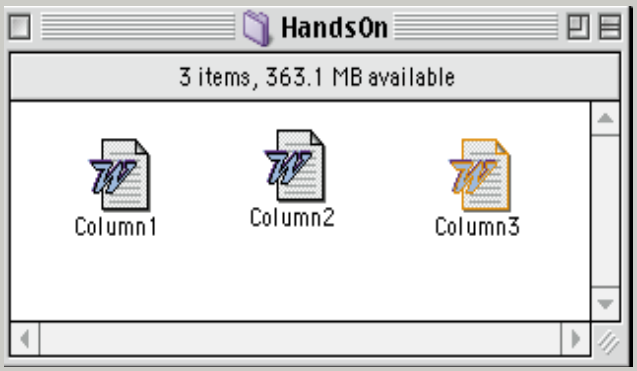
The program's interface is completely graphical and no programming is involved. It presents you with a graphical view of your keyboard and a list of the available commands. To assign a command to a key, you just use the mouse to drag the command from the list onto the appropriate key. The thing to remember is that you really

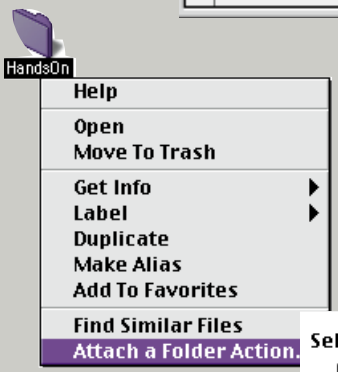
How to add an action to a folder. It's simple — just follow these steps:

1 Here's the folder where I keep all my current work files. I'm going to attach a folder action to the Hands On folder where I keep the files for this column



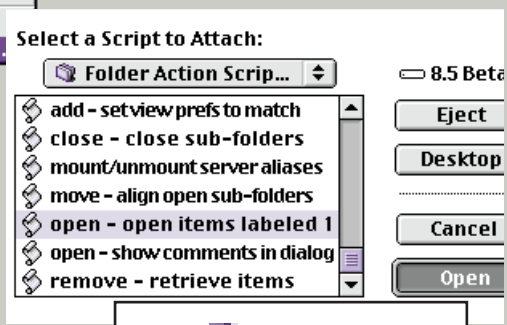
2 This article is "column number three", so I've used the coloured "Essential" label to mark that particular file icon inside the Hands On folder





3 Go back to the Hands On folder. Select it and then press the Control key to activate the contextual menu. Then select the Attach a Folder Action command

4 Choose the action you want from the Attach dialog. I'm going to use the action that opens labelled items



5 The Hands On folder now has a little script icon attached to it, to indicate the use of a folder action. From now on, the Column3 file will automatically be opened whenever I open this folder

need a keyboard with a separate set of function keys. Apart from that, Instant QuickKeys is quite simple to use.

Virus update

There has been a fair amount of Mac-related virus activity since we looked at the Autostart worm a couple of months ago. Autostart has been cropping up all over the place, and there are rumours of a Trojan Horse program similar to the Windows-based Back Orifice (a program that allows other users to hack into your computer across the internet). So, this seemed like a good time to catch up on the current state of anti-virus software. One long-time favourite, the shareware Disinfectant program, seems to have bitten the dust. The developers no longer have time to keep Disinfectant up to date, and there's no news of an update that can tackle Autostart.

That just leaves the two mainstream commercial programs, **Virex** [Fig 2] and **SAM** (Symantec Anti-Virus for Macintosh). Both have seen some changes. Virex was bought by Dr Solomon's, which was then bought by Network Associates, the company that also owns the McAfee label. Virex has now been renamed **McAfee Virus Scan for Mac**, in line with the PC version of Virus Scan. There have been no major changes to the program, though. SAM has changed its name and had a minor upgrade. It's now at version 5.0 and has been renamed **Norton AntiVirus for Mac**, or NAM. Both programs provide the same basic set of features, with the ability to scan disks and remove all currently known viruses. They also allow you to download virus updates from the internet to combat new viruses as they come along. There are scheduling options so you can perform regular scans at specific times. Both programs will automatically scan files sent to you via email or floppy disk or those downloaded from the internet.

PCW CONTACTS

Cliff Joseph *can be contacted via the PCW editorial office (address page 10) or email* mac@pcw.co.uk

Instant QuicKeys *£29 (ex VAT) from Computers Unlimited 0181 358-5857.*

Norton AntiVirus for Macintosh *£69 (ex VAT) from Symantec 0171-616-5600*

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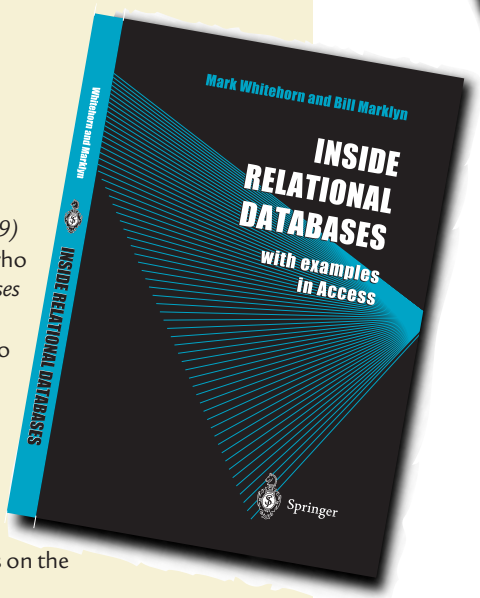

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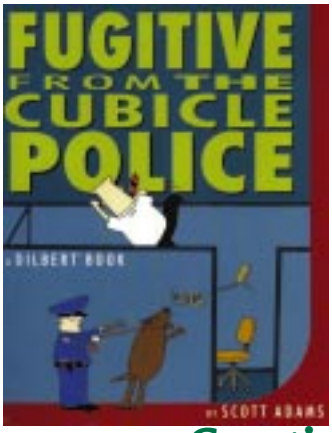
leisure lines

It's too chilly at this time of year for fishnet tights and suspenders, but never mind: all you **Rocky Horror fans** can enjoy your favourite show on the PC. Check out our review in *Screenplay*. Other games featured are **Colin McRae Rally**, **MotoCross Madness,** the **Apollo 18** space simulation, **Emergency**, and the cute **Creatures 2**. The best time to think about your garden is when it's too cold to be out there. Penny Murphy rounds up the best software to help you design and create your perfect garden. Other CDs reviewed this month are **The British Library's Hidden Treasures** and FastTrack's **Hip Hop eJay**. How about software for your children this Christmas? Check out our *Kids* section. There's **Grossology**, a celebration of all the horrible stuff kids love, **Bananas in Pyjamas**, Tivola's beautifully illustrated **Floating, Fluttering, Flying Machines,** and **Mulan**, the latest title from Disney. Dilbert graces our *Books* pages once again in his latest incarnation as a **Fugitive From the Cubicle Police**. And if you're a bit of a twit and would like to build your own web site, check out **Creating Web Pages for Dummies**. In *Retro*, Simon Collin remembers the **Jupiter Ace**. You can puzzle out some *Brainteasers,* and in this month's *Competition*, Hewlett-Packard is giving away a PC, a printer and two digital cameras. Plus, solve our *Prize Crossword* and you could win a **Chambers** dictionary. Good luck!



ETELKA CLARK, LEISURE LINES EDITOR
ETELKAC@VNU.CO.UK

Contents

Creatures 2

A game that finds your protective side, if you have such a thing.

So, your Mum won't let you have a hamster? Who needs one? Get a Norn instead. It won't need walking or cleaning, but you will have to nurture it, feed it and teach it. Let it get bored, let it starve or let it drown and it will be gone for good. But teach it well, and it will have offspring that will learn from their parents and take on many of the characteristics of their forebears. Since the original Creatures was launched, over 25 million Norns have hatched — more than the combined human populations of Finland, New Zealand and Australia. On the surface, the new Creatures 2 hardly differs from the original production, but the underlying structure has been fundamentally altered. The artificial intelligence engine driving your Norns (the "creatures") has been rebuilt so that they now learn faster, and their characteristics have been enhanced to produce cuter, clearer faces.

◀ TAKE A BREAK WITH THE NORNS. THEY'RE CUDDLY, THEY'RE CUTE AND THEY'RE ALL YOURS

Each Norn has a unique personality and way of doing things that his or her offspring will learn as they grow. Creatures 2 is not a space adventure, strategy or simulation. It is, instead, a totally unique game guaranteed to bring out the soppy side of all of us.

NIK RAWLINSON

PCW DETAILS

★★★★★

RECOMMENDED PERSONAL COMPUTER WORLD

Price *£39.99*
Contact *Hallmark 01664 481563*
www.creatures 2.com
System Requirements *Windows 95, 98 or NT4.0 with SP3, Pentium 166 or faster, 4X CD-ROM, 16-bit sound card, 2Mb 16-bit colour SVGA display adapter (800x600 resolution minimum), 16 Mb RAM (32Mb recommended), 300Mb of free hard-disk space*

Emergency

The challenge is saving lives in this game for the civic minded.

Having watched too many episodes of "CHiPs" when growing up, I was eager to try my hand at saving the world from earthquakes, floods, and overturned tankers on the "freeway". The idea and execution of Emergency is pretty simple: you have a set amount of resources and money, and must follow the Mission Orders to save people and property from an increasingly complex set of disasters. You learn your craft with the first mission, rescuing a few farmers when a tanker hits a tractor. More Casualty than Towering Inferno, admittedly, but it does get more exciting. If you do well, saving lives, tractors and all the rest of it, you progress as a Red Adair wannabe and eventually could find yourself in charge of massive missions that are spread across hundreds of miles.

▲ GET THE INJURED OUT OF THE VEHICLE AND THEN GIVE THEM A PARKING TICKET

◀ THE CHALLENGE IS DEALING WITH DISASTER. CAN YOU HANDLE IT?

You must first assess the situation: your orders are quite specific about what to do and what order to do it in. It is how you do it that's the tricky part — and it's entirely up to you.

As well as having to co-ordinate rescue efforts, you have to pay for everything out of your finite budget. This is another interesting layer to the game; is it worth bankrupting yourself to save a couple of buildings? All in all, Emergency is well worth a look.

PAUL TRUEMAN

PCW DETAILS

★★★

Price *£34.99*
Contact *Asci 01923 202097*
www.asciient.com
System Requirements *Windows 95, P133, 8X CD-ROM, 16Mb RAM (32Mb recommended)*

Colin McRae Rally

Great gameplay and realistic features make this *the* rally game.

If you're into driving games, the name Codemasters won't need any introduction. Codemasters is the development house that was responsible for the superb TOCA Touring Car Championship last year. Its new game, Colin McRae Rally, uses an enhanced version of the TOCA game engine to take the action from track to trail. It's been a massive hit on the PlayStation and looks set to make the same impact on the PC.

Colin McRae Rally is endorsed by the great Scottish driver, but he also acts as your co-driver in the game, giving stage instructions when competing and guiding you through the Rally School tuition section, a unique feature. The feel of the game itself is truly superb. The physics and car handling easily beats previous rally simulations such as RAC Rally Championship, Sega Rally and Screamer Rally. There's dynamic damage, with each section of the car modelled separately so the wing will crumple realistically if you clip a tree. Graphically, the game isn't as impressive as TOCA. But the important thing in a driving game is the frame rate, and with a Voodoo or Voodoo2 card, this is silky. We'd recommend a Pentium II 266 if you want the highest levels of detail, though. If you're a fan of rally simulations, Colin McRae Rally must be bought.

DAVID FEARON

▲ BEST GET TO THE CARWASH BEFORE RETURNING MUM'S CAR

◀ VROOM, VROOM, VROOOOMM!!

PCW DETAILS

★★★★★

Price *Price £34.99*
Contact *Codemasters 01926 816044*
www.codemasters.com
System Requirements *Windows 95/98, P166 (P200 recommended), 16Mb RAM (32Mb recommended), 20Mb hard-disk space, DirectX 6-compatible graphics card, 4X CD-ROM (8X recommended)*

Rocky Horror Show

There's plenty to occupy the mind in this familiar brainteaser.

◀ A DEATH WORSE THAN FATE AWAITS YOU AT FRANK'S PLACE

It hardly seems twenty five years since the release of the Rocky Horror Show, but even today its stage and screen incarnations are attracting audiences in their thousands. To celebrate the show's silver anniversary, this interactive CD-ROM version promises to provide you with over 20 hours of gameplay as you assume the role of either Brad or Janet. After suffering a car breakdown it is your task to save your partner from a "fate worse than death" in the creepy surroundings of Frank 'n' Furter's mansion. Throughout the 65 locations in which this game is based, you will be faced with over 80 puzzles guaranteed to set your mind ticking and put your logic cells to the test. Collect items as you go round, remembering that everything, no matter how unlikely it may seem at the time, could be essential later in the game.

Movement is controlled by keyboard, joystick or mouse but I found the fact that you are unlikely to face consecutive rooms from the same angle confusing. This means the key that enabled you to walk forwards in one location might send you to the left in the next. Richard O'Brien and Christopher Lee make guest appearances, but beware — the sexual undertones in this game mean it's probably not suitable for kids.

NIK RAWLINSON

PCW DETAILS

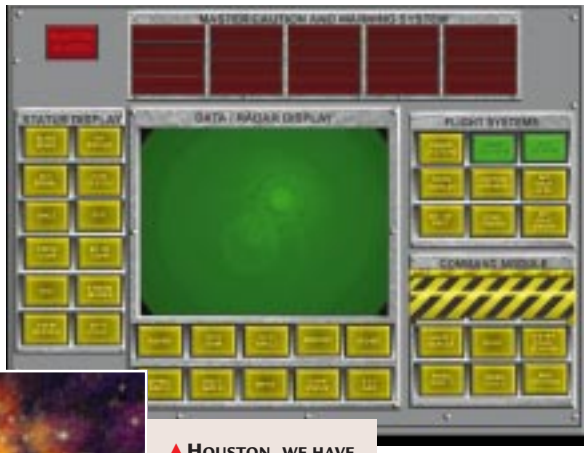
★★★★

Price *Price £34.99*
Contact *Black Friar 0500 600191 (No URL)*
System Requirements *Windows 95, Pentium 133MHz processor, 16Mb RAM, DirectX-compatible sound card, DirectX-compatible video card, 8X CD-ROM drive*

Apollo 18

One small step for man and a bit of a snore for mankind.

These days you don't need to be a rocket scientist to install and play many of the games around. With Apollo 18, however, the first challenge was this very task. Following all the instructions, the game was installed along with its associated videoclip player; but when the Apollo 18 icon was clicked, nothing happened. The technical support provided, although shamefully not by NASA, was very polite in admitting some hardware compatibility problems and supplied me with an updated AVI player via email which appeared to rectify the main problems although some graphical glitches were still very much apparent.



▲ HOUSTON, WE HAVE A PROBLEM
◀ WHOOPS!

Hitches aside, the game itself has obviously had a lot of research and effort put into authenticating the actual technicalities. To enjoy this requires a lot of effort on the player's part because, as in a real space capsule, there is very little to view apart from a sea of buttons.

AIM Software tried to spice the action up with some video clips, but unless you want to be an astronaut, I can't see you wading through the 200-page manual. The next six hours is then spent training, using a graphical interface possibly designed on a ZX Spectrum. If you fall asleep, though, you could end up fumbling through panels of buttons, only to explode by choosing to scratch your nose at the precise moment you were meant to enter some gimbals. I would avoid Apollo 18 at all costs.

IAN ROBSON

PCW DETAILS

★

Price *£44.99*
Contact *Black Friar 0500 600191 (No URL)*
System Requirements *Pentium 90 or equivalent, 16Mb RAM (Pentium 133, 24Mb RAM recommended), 2Mb video card, 4X CD-ROM, 60Mb free hard-disk space*

MotoCross Madness

All the excitement of riding in the dirt, on stunt or race tracks.

MotoCross Madness 3D attempts to recreate the daredevil spirit of world-class supercross racing across a variety of racing and stunt environments, including 20 indoor and outdoor stadiums, a quarry and long-distance courses. For absolute realism, control of the bike and biker can be separated for that all-important shift of weight capability to help you through the really tight stunts. You will not get the full potential of this game if you play through the PC controls.

The game has been designed to be used with Microsoft's new Freestyle Pro gamepad, a joystick that uses motion-sensing technology to control the game. Fortunately, you can get a great deal on both the game and the pad: buy the pad, and get the game free! The tracks themselves recreate the promised realism, from the barren landscapes of the Aussie outback to indoor stadium stunt tracks. The challenge initially is to stay on the bike for the duration of just one lap, but once you get the hang of it, you get caught up in the fast-paced excitement generated by the action.

◀ WHETHER IN A QUARRY, THE OUTBACK OR A STADIUM, THERE'S NO SUCH THING AS AN EASY RIDE

Once your skill and confidence has been built up, you can challenge your friends via LAN or internet on the pre-designed tracks or even some of your own, using the MotoCross track editor. MotoCross Madness has the promise of an all-consuming game. If only a few more positional animations had been used.

IAN ROBSON

PCW DETAILS

★★★

Price *£34.99 inc VAT*
Contact *Microsoft 0345 002000*
www.microsoft.com/games/motocross
System Requirements *Windows 95/98, Pentium 133or equivalent, 16Mb RAM, 4X CD-ROM,30Mb hard-disk space, sound card, 3D graphics accelerator recommended*

Hip Hop eJay

Chuck out those chewns, but it's a bit cheesy.

▼CREATE YOUR MASTERPIECE OVER EIGHT TRACKS
►THEN SCRATCH IT UP!

Have you got the skillz to pay the billz? Do you think hip hop began with Jason Nevins? Hip Hop eJay is not going to win you street cred, but if you love kitsch it may be right up your street. The software itself will be familiar to anyone who has laid down a tune with previous releases Dance eJay and Rave eJay. The music itself is fantastically easy to produce and the interface lets you drag-and-drop rhythm and melody sections on to the eight-track synthesiser. All the samples are recorded at 96bpm (beats per minute) so your tune hangs together perfectly.

There's only one problem with the music, really: it's not hip hop. Funk eJay would have been a better name, as this software lets you produce some sleazy cod George Clinton tracks. But because it remains at 96bpm you won't be challenging Run DMC in the charts. The real reason the program has the hip hop moniker is because there is a cheesy toy included — your very own turntable with which to scratch up a storm. Place the mouse over the LP and run it back and forth against the trackball — hey! You're a DJ. It really is that easy. This is an instantly appealing toy, although sadly it remains appealing only for an instant.

PAUL TRUEMAN

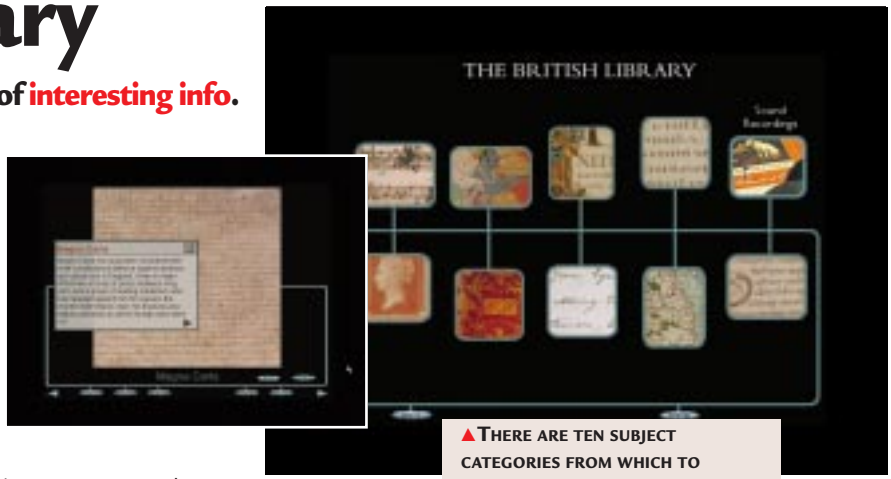
PCW DETAILS

★★★

Price *£34.99*
Contact *01923 495496*
www.fasttrak.co.uk
System Requirements *P66, 16Mb RAM, Windows 95/Windows NT, SVGA display, 2X CD-ROM, 16-bit sound card, 50Mb free hard-disk space*

One Hundred Treasures from the British Library

Just a little dusty but packed full of interesting info.



▲THERE ARE TEN SUBJECT CATEGORIES FROM WHICH TO CHOOSE
◄A PIECE OF THE MAGNA CARTA WITH AN EXPLANATION

The British Library is home to one of the finest collections of books and manuscripts in the world. It holds the earliest-dated printed book, the *Diamond Sutra*, the first Western book printed with movable type, as well as the *Guttenberg Bible*, the *Magna Carta* and others.

One hundred treasures from the library are highlighted. These are divided into ten categories: Music, Illuminated Manuscripts, Sacred Texts, Sound Recordings, Newspapers, Stamps, Printing and Bookbinding, English Literary Manuscripts, Maps and Views, and Historical Documents. Each category features ten items of some considerable variety from all periods, ranging from the *Lindisfarne Gospels* through a wartime forgery of the London *Evening Standard* newspaper, to Paul McCartney's scribbled song lyrics. Each is accompanied by an audio introduction, explanatory text and an image you can enlarge to gain a better view of the detail. There are musical extracts, too, and a history of the British Library. Presented in the form of a slideshow, it takes you back to the three individual collections on which the library was built.

Treasures is all rather basic to look at and even the slideshow is a bit dull. Neither is there much information about each item. But, the CD is a nice souvenir.

PAUL BEGG

PCW DETAILS

★★★

Price *£14.95*
Contact *The British Library 0171 412 7704*
System Requirements *Windows 3.1 or later, 486DX-66 minimum, 8Mb RAM, SVGA graphics mouse, 4X CD-ROM drive.*

Glorious gardens

No longer does 'the answer lie in the soil': design your garden and plan your planting on-screen.

◀PUT AWAY THAT DIBBER FOR THE WINTER, PUT YOUR FEET UP AND PLAN FOR NEXT YEAR. GEOFF HAMILTON'S CD-ROM IS EASY TO USE AND HOLDS INFORMATION ON 2,200 PLANTS ▼LANDSCAPE 2 HAS THE GARDEN DESIGNER IN MIND

Inspiration is at hand in the form of a number of software packages to help you design the ideal garden. A virtual garden can be viewed in 3D from any angle to visualise how a finished design would appear at various times of the day and throughout the seasons.

☛ 3D Garden Designer 3

With this CD you can design, plan and view your virtual garden in 3D as it would appear at certain times of the day, month or year. The database of 1,500 plants includes 1,200 full-colour photographs as well as cultural notes. The structures and hard features seem more limited and more difficult to customise accurately than in the other packages reviewed here. Its strength lies in its special effects, from birdsong to moving clouds, providing a visually interesting screen. Although the backdrops provide some perspective, it is not possible to customise them. The 3D visualisations are good, and the movie-camera feature allows you to film a virtual tour of your garden.

☛ Geoff Hamilton's 3D Garden Designer

A horticultural delight, with 2,200 plants listed and a comprehensive guide to correct planting and care. There are helpful, animated video demonstrations for gardeners of all levels of expertise, which show some of the most commonly-used gardening techniques. Most of the physical features usually present in a garden are incorporated in the program to help you customise your design. The program is straightforward to use and provides good 3D visualisations of what your virtual garden would look like throughout the year. The strength of Garden Designer lies in its excellent information and ease of use.

☛ 3D Landscape 2 Deluxe and Garden Encyclopaedia 2 Deluxe

This program has been produced with the garden *designer* in mind. It covers all aspects of creating your garden, taking you from the initial design process through to the various stages involved in its implementation. The program originated in the US so some of the terminology and plants may be unfamiliar to the British gardener, but it compensates for this by including local garden-centre phone numbers. The 2,200 plants on Landscape 2 Deluxe, combined with the extra 1,500 in the Garden Encyclopaedia, provides an extensive database. The plant selection guide is design-orientated in that it looks at a plant's shape as well as its cultural requirements as part of the design process. It is also possible to view how your garden would look throughout the year, and its likely growth pattern. Garden Encyclopaedia 2 Deluxe is easy to use and its features are extensive and easy to customise. The 3D representations are good and the virtual tour of the garden is a bonus.

☛ Complete Home Gardener

This program has no design function. It is purely a horticultural guide to the garden so it may be useful for those who just need to select plants and vegetables suited to their own garden conditions. It contains over 900 plants with cultural notes, but some are more familiar to the North American market. The video demonstrations of gardening techniques were helpful but some of the notes did not correspond to the adjacent pictures. A potentially interesting feature was the recipe section using garden fruits and vegetables. Unfortunately, though, it was marred by the use of canned vegetables in some of the recipes!

PENNY MURPHY

PCW DETAILS

★★★★

3D Landscape 2 Deluxe and Garden Encyclopaedia 2
Price *£44.95*
Contact *Fast Trak Software Publishing 01923 495496* **www.fasttrak.co.uk**
System Requirements *Windows 95/3.1, 486DX-66 (Pentium recommended), 8Mb RAM, SoundBlaster-compatible sound card*

★★★★

Geoff Hamilton's 3D Garden Designer
Price *£19.95*
Contact *Global Software Publishing 01480 496666* **www.gspltd.co.uk**
System Requirements *Windows 95, P166 or higher, 16Mb RAM, SoundBlaster-compatible sound card*

★★★

3D Garden Designer
Price *£29.99*
Contact *Europress 01625 85933* **www.europress.co.uk**
System Requirements *Windows 95, 486DX-100 or higher (P100 recommended), 8Mb RAM, 2X CD-ROM (4X recommended), SoundBlaster-compatible sound card*

★★

Complete Home Gardener
Price *US$14.99*
Contact *Expert Software* **www.expertsoftware.com**
System Requirements *Windows 95/3.1, 386DX or higher, 4Mb RAM (8Mb recommended), 2X CD-ROM, SoundBlaster-compatible sound card*

Disney's Mulan

Fun and educational. Younger children will love the activities and learn from this old Chinese legend.

Based on an ancient Chinese legend, Mulan is a free-spirited girl who disguises herself as a soldier to save her ailing father from having to go to war. Disney will soon be releasing the animated film in the UK and is launching this CD-ROM to coincide with it.

The story is that Mushu, Mulan's feisty guardian dragon, has lost some important magical scrolls which tell the story of Mulan. The player's task is to find them and reveal the legend. During the quest, the player will encounter ten activities, including designing new costumes for Mulan and Mushu which can be printed and then dressed on the paper dolls which come with the package, playing mah-jong, and singing along to songs "karaoke" style. Once all the scrolls have been found, the Emperor crowns the player "Imperial Story Maker" and you then have the freedom to create new stories of your own, choosing from the characters and colourful backgrounds on the CD-ROM.

▼MULAN IS THE HEROINE WHO SAVES HER FATHER FROM THE WAR (INSET) THE FIRST MAGICAL SCROLL, WHICH TELLS PART OF HER STORY

Mulan is beautifully animated and is aimed at children between five and nine years old. The story, word explanations and thesaurus will all help strengthen reading skills and improve vocabulary. Simple maths skills are also encouraged. As an adult I thoroughly enjoyed playing with this CD-ROM and I am sure any Disney-loving child would like it, too.

ETELKA CLARK

PCW DETAILS

★★★★

Price *£34.99*
Contact *Disney Interactive 0181 222 1571*
www.disney.co.uk/disney interactive
System Requirements *Windows 95, P90 or faster, 16Mb RAM, 20Mb free hard-disk space, 4X CD-ROM drive, 16-bit sound card. Mac: PowerPC 75MHz or faster, System 7.5 or later, 24Mb RAM*

Grossology

It's grotty, it's gruesome... it's a great biology lesson for kids.

Farts, snot and diarrhoea forms the core subject matter of Grossology — Gross Science That Kids Want to Learn. Based on the book series by Sylvia Branzei which aims to make biology fun, this product really lives up to its name — it's absolutely foul. But eight- to 12-year-old children are fascinated with all things smelly and nasty, especially if they make a noise or ooze gunk.

▼THERE IS EVEN A VERSION FOR KIDS WITH SPECIAL NEEDS

Guided by your host, Ginger Vitis, you can visit nine labs where various gross truths about the human body are revealed. Burps, barf, scabs or other unfortunate facts of life can all be found here. Characters include "Ripped Apart" who fronts the wounds and scabs theme, and "Rocky Isedafaceio" teaches you about skin, or more specifically, acne. These study sessions get quite tedious, though. For example, you have to keep punching Ripped Apart to get a new fact out of him. There are games to complement the subjects covered, such as "Don't Pee Your Pants". Other entertaining features include singalongs and the letter writer, where you can write a letter and use clipart of various characters and depictions of grossness to make it "pretty".

Equipped with stickers, Gross Factoids and peel-off Barf, Grossology is a truly offensive production which young children will no doubt love.

HELEN FORTGANG

PCW DETAILS

★★★★

Price *£29.99*
Contact *Sega Soft 001 650 654 2310*
www.grossologygames.com
System Requirements *IBM or compatible PC, 486DX-66, Windows 3.1 or later, 16Mb RAM, 256 SVGA display, 2X CD-ROM drive, 15Mb hard-disk space. Mac: 68040 or PowerPC, 16Mb RAM, System 7.1 or higher*

Bananas in Pyjamas

As seen on TV: the very young will enjoy some fun and games with the Bananas and their friends.

Are you thinking what I'm thinking? You will be if you've watched the children's TV series, Bananas in Pyjamas. The programme features B1 and B2, a pair of bananas who exchange thoughts and play with assorted friends in Cuddles Avenue. Now B1 and B2 have followed Barney the dinosaur on to CD-ROM (*reviewed here last month*).

We asked some devoted banana fans, aged three to five, to try out this CD-ROM. All the familiar bits are there, including the teddy bear friends and the theme tune "Bananas in Pyjamas are coming down the stairs".

Ballet-dancing Lulu stars in a game where you try to make the flowers grow, and Rat in the Hat hosts a sandwich-making game.

The publishers claim that the program is designed to react differently each time to the user's commands, but our testers found the interactive sequences repetitive. The program is not as colourful as some other kids games, and the animated figures are small on-screen so they lose some of their impact. Perhaps the program is showing its age? Bananas in Pyjamas is an Australian import and it was No. 1 there *last* Christmas.

Our testers had plenty of fun nevertheless, but after a while they asked: "Is that all the games we can play?" Still, I suppose when you have your own B1 and B2, you can play anything you like.

DEBBIE DAVIES

▶B1 AND B2 SLIP OFF TO THE BEACH TO MEET A FRIEND

PCW DETAILS

★★★

Price *£19.99*
Contact *Dorling Kindersley 0171 753 3488* **www.dk.com**
System Requirements *Windows 3.x or 95, 486/33 processor, 12Mb RAM, 2X CD-ROM drive, SVGA monitor, mouse*

Floating, Fluttering, Flying Machines

Any child with their head in the clouds can get up, up, and away with this informative presentation.

I'm sure that most of us, when a child, have at least once dreamt of being able to fly. But reality can be very harsh at times, so it's comforting to have a second option. Tivola has attempted to address this unfulfilled fantasy.

◀CHOOSE A TOPIC AND FIND OUT ABOUT FLYING, OR GO FOR THE GAMES

◀EVERYTHING YOU WANTED TO KNOW ABOUT WINGS

With enchanting illustrations, this lovely production gives you a chance to gain real insight into the intricacies of the amazing phenomenon of flight. Through the eyes of Nick and Charly, you click your way around the hangar with virtually everything having some information to reveal. Together you explore the database, build your own paper plane, catch the Dachshunds and navigate in the Flying Chart Game. You can also travel in a hot-air balloon and talk to the birds.

Video footage and photographs can be unearthed in this exploring adventure, expanding on initial interests and providing real pictures to illustrate, rather than just cartoons. Whether or not you are interested in aeroplanes, there is information to fuel curiosity in other areas, too, such as Bumble Bees and Boomerangs.

Throughout the adventure you must collect the parts for building your own flying machine, with the ultimate goal to take part in the flying race finale. When you have collected enough pieces, you can to move on to Hangar 2 for the construction stage. Although this CD-ROM is informative and stays in tune with Tivola's colourful and beautifully presented style, this subject would have benefited from more information about aerodynamics.

HELEN FORTGANG

PCW DETAILS

★★★★

Price *£24.99*
Contact *Tivola 0181 563 9091*
System Requirements *Windows 3.1/95, VGA graphics card, sound card, 2X CD-ROM, 486 PC, 8Mb RAM*

WIN Hewlett-Packard hardware!

◀THE HP PAVILION 6000 PC

▼THE HP PHOTOSMART C20 DIGITAL CAMERA

HEWLETT® PACKARD

Expanding Possibilities

Christmas is a time for giving. And that is what Hewlett-Packard (HP) is doing this month. *PCW* readers have the chance to win a PC from HP's new Pavilion 6000 series, a DeskJet 710C printer *and* a PhotoSmart C20 digital camera. HP will award a further PhotoSmart camera to the runner-up, too.

RULES OF ENTRY

This competition is open to readers of *Personal Computer World*, except for employees (and their families) of VNU Business Publications and Hewlett-Packard. The Editor of *Personal Computer World* is the sole judge of the competition 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 answer, name, address and daytime telephone number on a postcard, or on the back of a sealed envelope. Mark your card "PCW/HP Competition" and send it to: P.O. Box 191, Woking, Surrey GU21 1FT, by Friday 3rd December 1998.

Please state clearly on your competition entry if you do not wish to receive promotional material from other companies.

PCs in the Pavilion 6000 series claim to deliver all that consumers need to work, play and learn at home. They feature a 350MHz PII processor, ATI Rage Pro AGP 2X graphics card, up to 2X DVD CD-ROM, 56K data/fax modem with telephony, and Polk audio stereo speakers with PowerPort technology to deliver a rich, high-quality sound. You get **three months' free full net access and email**, plus a selection of leading software to satisfy your computing needs, including MS Windows 98, Works, Money 98, and more.

The DeskJet 710C printer has been designed to enable users to create brilliant, image-rich projects at home and in the office. With its compact design and quiet operation, it offers great photo-quality printing on any media, including plain and recycled paper, HP paper, transparencies, banners, iron-on transfers and greetings cards. It can print 4ppm (average) and can hold up to 100 sheets of paper.

The HP PhotoSmart C20 digital camera was launched at the beginning of September. This exciting new camera has a high-capacity, removable CompactFlash memory card which acts like re-usable digital film, giving users unlimited photo-taking capabilities. The C20 incorporates **great software features**, making it simple to use. When you connect the camera, the PC will automatically detect its presence and upload the images. The user can then select the photos they wish to print and, using the Photo Finishing software, can adjust the page layout. There is also the option of using Microsoft Picture It! v2.0 to edit and enhance photographs.

● To have a go at winning, send us your answer to the following question:

Does the removable CompactFlash memory card act as:

A. a re-usable bin liner?
B. a re-usable digital film?
C. a re-usable pair of tights?

See the box (left) for entry details.

▼HP DESKJET 710C PRINTER

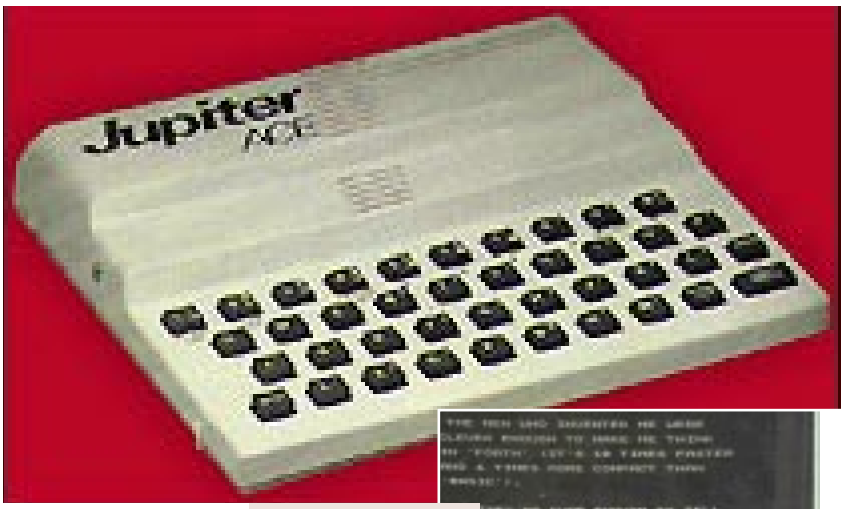
Go Forth and program

The Jupiter Ace boasted a radical choice of programming language. Simon Collin pays homage.

Thanks to the Y2K (Year 2000) problems, there seems to be a shortage of programmers who can update ancient legacy software written in languages like Fortran, Cobol and Forth. If you are keen to join this select band, you had better learn one of these idiosyncratic languages.

The first two are easy: just buy and install one of the many development tools. Forth is the tricky one, but you can breath a sigh of relief as I tell you that there are a couple of ways of getting to grips with it. The best route is to use a neat little home computer that was produced by the Jupiter Cantab company and developed by Richard Altwasser and Steven Vickers, two ex-Sinclair designers who had worked on the original ZX80 and ZX81 ground-breaking products. Although aimed squarely at the home enthusiast market, with a low entry-level price of just £89.95, Jupiter's computer had one feature that set it apart from the crowd: every other home computer of the time provided a Basic interpreter to get users started on programming; but Jupiter threw out Basic and provided Forth.

In June 1983 this tiny home computer sneaked onto the market. The Ace looked similar to the ZX80 but included a keyboard with 40 raised rubber keys — rather better than the touch-sensitive pad used on the early Sinclair machines. The heart of the Ace was a standard Z80A processor, one of the most popular microprocessors of the time and used in many computers including the early Sinclair range and the Sharp MZ-80K of the same period. The Z80A chip was driven at 3.25MHz (one hundredth of today's clock speeds) and needed only a few ancillary support components to provide a working computer. Hardwired onto the motherboard was 3Kb of main memory and an 8Kb ROM which contained the operating system and development language. Customers were able to add an extra 16 or 32Kb of RAM, giving the machine the rather odd specification of 3, 19 or 35Kb fitted RAM. The usual cassette interface (only a modified serial port working at 300/1500bps) provided a convenient way of storing your programs. The display system supported 32x24 characters on-screen but, to provide "high-resolution" images, each of the 128 characters could be redefined to produce a pseudo bitmap image for graphs (or space-invader characters!). Multimedia functions were limited, with just a simple buzzer providing the only feedback in the system.



▲ THE FORTH INTERPRETER WAS FASTER THAN BASIC, GIVING ACE AN EDGE OVER ITS COMPETITORS
▶ £89.95-WORTH OF WEDGY WONDER

Although the Ace was a neat design, it sadly never achieved the mega-sales of its Sinclair rivals. Perhaps there was a resistance to Forth, an almost impenetrable language to first-time programmers brought up on Basic. Whatever the reason, production of the Ace lasted just a few months and apparently stopped in November 1983. What is rather unusual these days is that although the original computer is long gone, if you hanker after your very own Ace you can build one yourself. Thanks to Grant Searle at www.babytalk.demon.co.uk you can download full and simple instructions which show you how to construct your own Ace and program the main ROM — brilliant! The component list is straightforward, and everything can be bought relatively cheaply from any electronics supplier. If this doesn't prompt you to dig out your soldering iron, then you've a tough heart. Once you've built your repro-Ace, you can download the ROM image which includes the original Forth interpreter and polish up your programming skills.

If you hanker after your very own Ace, you can build one yourself

Although far less fun, I ought really to mention the simpler and less time-consuming alternative: download the ACE-32 emulator for MS-DOS www.alcavia.net/atalaska/emula/ace.htm which provides every quirk and feature of the early original Ace operating system and Forth interpreter. It's the perfect way to turn your Pentium box into a super-charged retro home computer from the early eighties!

books

Building Better Web Pages

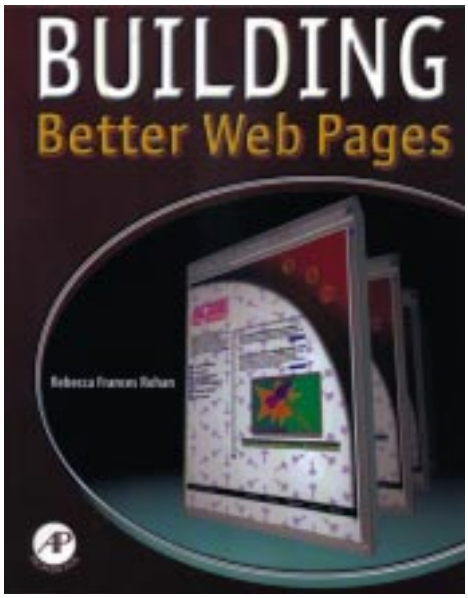
One of the most coveted IT job titles around today has to be web master (or mistress). Who wouldn't want that blazoned across their business card? *Building Better Web Pages* is aimed at those intermediate web designers who already know what they're doing but just need a little help to create a site that has "the sparkle of the top one percent of all web sites". It also helps them to do this without having to learn DGI, JavaScript, Perl, "or anything that requires a pocket protector!"

The book is written in a clear, personable style and has a thorough contents section. It provides a brief background of HTML standards, and demonstrates the best way to navigate the browser wars and make your site accessible to as many people as possible. It also has a handy "not-to-do list" which details common design bugbears such as violently coloured backgrounds, unnecessary effects and rampant hotlinks. The book is very strong on showing how to make everything on your site go together, such as the colour, shape and overall feel of the site. Importantly, it also shows where you can go to pick up free web bullets, icons, backgrounds and so on.

The book doesn't devote a huge amount of time to Java, mainly because a lot of internet users are not yet able to use it.

This book will help you to do exactly what it says on the cover

Rohan thinks it can be a good thing when used in moderation, however, and she shows you where to go to download some fun little applets. She also has a large section on how to find the right image and image format for the job, showing how to crop and downsize to reduce download times. There's also a great section that shows how to publicise your site in a professional manner.



If I have one complaint, it is that the web page examples are not exactly cutting-edge design. Then again, you can probably find your way around them without psychic powers, too. It may not be fancy, but this book will help you to do exactly what it says on the cover.

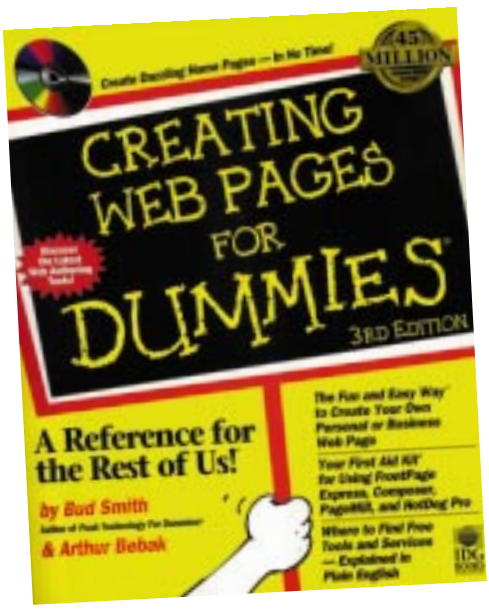
SUSAN PEDERSON

PCW DETAILS

★★★

BUILDING BETTER WEB PAGES
Author *Rebecca Frances Rohan*
Publisher *AP Professional*
ISBN *0-12-593185-9*
Price *£21.95*

Creating Web Pages for Dummies – 3rd Edition



I shouldn't really have liked this book, aimed squarely as it is at the home user who wants to publish their own web pages, probably full of utterly meaningless pictures of themselves and their girlfriends on graduation day or something. The *ability* to publish one's personal web page should not be confused with the *obligation* to publish. Anyway, this is categorically not the book for you if you want to become a certified, heavy-duty, 24-carat web master.

If, though, you want a brief introduction to HTML (hypertext mark-up language) but are keener on using web-authoring software to get your own web site up and running over a weekend, then this is the book for you. Creating Web Pages for Dummies skips the hardcore programming code but gives you enough of a taste for hyper text mark-up language so that you realise how ineffably dull it is to program with. While HTML is undoubtedly the best option for small-scale personal pages on the web, the book also gives the publishing

Aimed squarely at the home user who wants to publish their own web pages

PCW DETAILS

★★★★

CREATING WEB PAGES FOR DUMMIES
Author *Bud Smith and Arthur Bebak*
Publisher *IDG Books*
ISBN *0-7645-0357-X*
Price *£23.99*

newcomer a guide to the best web-authoring tools. One of the best features of this sort of book is that a CD-ROM is included, with sawn-off versions of all the software you need to get your own site online. Along with 359 pages of wittily instructive prose you get the PageMill HTML page editor as well as full versions of the HotDog HTML editor and the HTML page creation utility, HotDog Express, as well as some handy art software. Authors Bud Smith and Arthur Bebak hold the reader's hand through an introduction to the concept of the net, while walking them promptly and assuredly through the basics until they are able to display their lives on the web. We can't wait to read all about you... honest.

PAUL TRUEMAN

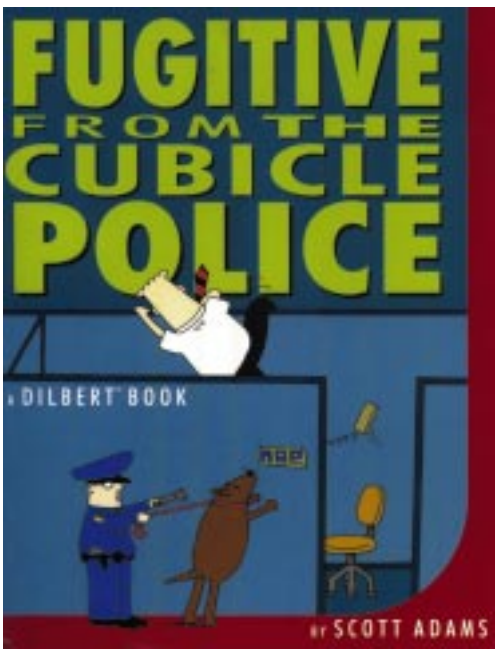
Fugitive from the Cubicle Police — a Dilbert Book

Bored with your job? Sick of working in a coffin-sized cubicle? Scott Adams felt just like this when he worked for Pacific Bell, before quitting to mock corporate life with his Dilbert comic strip. But then, he's a cartoonist genius and you're not. Never mind, you can still laugh at his cartoons even if you will never be able to write anything this funny yourself. Do what all Dilbert fans do and edge towards rebellion by sticking your favourite cartoon strips around your desk. Don't actually quit your job, though, as that might lead to a better one and then you'd no longer have something in common with Dilbert.

...how Charlie Brown would have grown up had he gone to work for Microsoft

For those unacquainted with Adams' office world, Dilbert is a software engineer who is constantly up against his pointy-haired boss, or his Snoopy-like pet, Dogbert. The strip bears more than a passing resemblance to Peanuts, with Dilbert a fair estimation of how Charlie Brown would have grown up had he gone to work for Microsoft. Thwarted by women, Dilbert had a girlfriend, Liz, for a while but neither Adams nor his readers felt it was right and now female contact is restricted to Tina the tech writer, a fearsomely unpredictable hack, all too brittle to criticism. Here, all Adams' favourite characters feature in strips taken from the past few years, rather too randomly for my liking; there is no explanation for Liz appearing and disappearing, for example. Still, minor quibbles from a fan aside, if you have never read Dilbert, go out and buy this book now.

PAUL TRUEMAN



PCW DETAILS

★★★★

FUGITIVE FROM THE CUBICLE POLICE
Author *Scott Adams*
Publisher *Boxtree Publishing*
ISBN *0-7522-2431-X*
Price *£8.99*

TOP 10 books

1. **MCSE: The Core Exams in a Nutshell**
   O'Reilly
   £14.95
2. **Perl Cookbook**
   O'Reilly
   £29.50
3. **MCSE Exam Cram Exchange Server 5.5**
   Coriolis
   £24.49
4. **Cisco CCIE Exam Guide**
   McGraw-Hill
   £49.99
5. **Outlook 97/98 Annoyances**
   O'Reilly
   £18.50
6. **Beginning Visual C++6**
   Wrox
   £45.99
7. **UML Distilled: Applying the Standard Object Modelling Language**
   Addison-Wesley
   £24.99
8. **C++ Programming Language, 3rd edition**
   Addison-Wesley
   £27.95
9. **Java in a Nutshell: 2nd edition**
   O'Reilly
   £14.95
10. **The Internet & World Wide Web: the Rough Guide 1998**
    Rough Guides
    £5.00

Prices include VAT on discs and CD-ROMs. List supplied by The PC Bookshop, 21 Sicilian Avenue, London WC1A 2QH Telephone: 0171 831 0022 Fax: 0171 831 0443

brainteasers

Quickie
My light switch is at the side of the door. My bed is at the other side of the bedroom. How can I turn off the light and get into bed before the room gets dark?

This Month's Prize Puzzle
This one isn't too difficult. It can be solved analytically as well as by number crunching, but you'll probably need O-level maths (or a good sense of direction!).

☛ The annual village 10,000 metre cross-country race took place last week. The course comprised three legs. The first was an uphill climb along a bearing of 11°. Then the runners turned on to a bearing of 168° for a relatively flat section. The final leg was a straight downhill run at a bearing of 304° back to the starting point.

Assuming all three legs were straight, how long, to the nearest metre, was the flat section? (*For the uninitiated, a bearing is a clockwise angle measured from due North.*)

Send your answer on a postcard, or on the back of an empty, sealed envelope, to: PCW Prize Puzzle - December 1998, P.O. Box 99, Harrogate HG2 0XJ. Entries should arrive no later than 20th December 1998. Please do not send solutions on floppy disks, emails, or in envelopes — they will be invalid.

Winner of September Prize Puzzle
Certainly more entries than we had expected for the rather difficult September problem. Seventy-nine were received and almost all had the correct solution, which was:

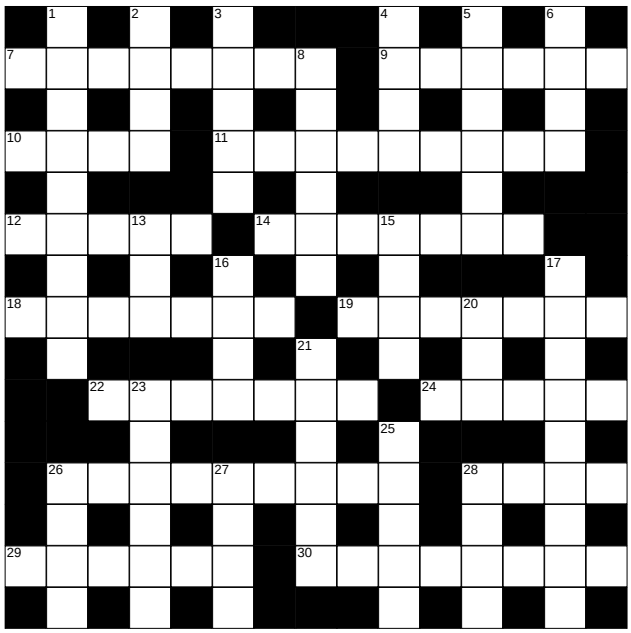
29	41	67
61	89	53
47	25	83

The winning card, drawn at random, was from Mr John Stephenson of Bolton, who gets our congratulations now and, shortly, his prize.

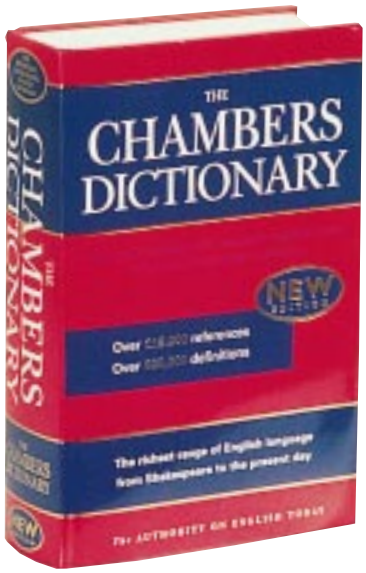
We send our usual condolences to the also-rans — keep trying, you could be the next winner.

JJ Clessa

prize crossword



It's only words — and there are 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* November Prize Crossword", VNU House, 32-34 Broadwick Street, London W1A 2HG, to arrive not later than 3rd December, 1998. *Please state clearly if you do not wish to receive promotional material from other companies.*



ACROSS

7 Local area network system (8)
9 Track down on the internet (6)
10 Software's handy tips and vital assistance (4)
11 Letter, digit or other font item (9)
12 Old-fashioned boost for a 486 or below (5)
14 Image digitiser (7)
18 Begin, according to Microsoft (5, 2)
19 The Li of a 29 Across's Li-ion battery (7)
22 Screen's pixel-change speed (7)
24 Internet communication (5)
26 Closed or local high-speed networks (9)
28 Printer's paper carrier (4)
29 Portable computer (6)
30 The P of ISP (8)

DOWN

1 Stretch, weaken (9)
2 Retain (4)
3 Quick meal (5)
4 Largest continent (4)
5 Conflict (6)
6 Wound's mark (4)
8 Stupor (6)
13 Counter (3)
15 Metal spike (4)
16 Cat's noise (4)
17 Disfigured (9)
20 Garment's edge (3)
21 Slumbering (6)
23 Landed property (6)
25 Royal racecourse (5)
26 Tehran's country (4)
27 European range (4)
28 Journey (4)

November solutions

ACROSS
7 Cyberspace 8 BIOS
9 Chipsets 10 Design 11 Clicks
13 Imports 15 Platten
17 Standby 19 Process
21 Mosaic 24 Screen
26 Portable 28 Bits
29 Technology

DOWN
1 Mythical 2 Delphi 3 Isle
4 Passe 5 Weld 6 Sought
8 Bassoon 12 Keeps 14 Motto
16 Tickets 18 Backlogs
20 Recoil 22 Arable 23 Speck
25 Note 27 Ring

PERSONAL COMPUTER WORLD

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..... POSTCODE .....

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DISPATCH REFERENCE NUMBER .....

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CARRIAGE

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VAT

TOTAL

METHOD OF PAYMENT

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❑ C.O.D ❑ DEBIT CARD ❑ OTHER (SPECIFY) .....

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ISSUE NUMBER (debit cards only) ..... EXPIRY DATE ..... / ..... / .....

CARD NUMBER (below)

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❑ COST OF EXTENDED WARRANTY ❑ HELPLINE

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DIRECT BUYERS WORLD

Contents

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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 (including 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 the *PCW* Reader Offers on pages 310 and 311 for further details.

GORDON LAING
Editor

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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While limited protection still exists when Internet purchases are made from companies based in the UK, no such protection exists — other than that afforded by certain major credit card companies — relative to goods ordered from overseas organisations' web sites. We would strongly urge all readers to consider the following before purchasing via the Internet:
Advertised prices invariably exclude transportation charges, do not account for currency fluctuations, Customs & Excise duties, VAT, documentation and/or importation restrictions. Statutory rights are virtually non-existent, guarantees — if any — impossible to enforce, replacement of faulty goods and/or refunds difficult to obtain, no official regulatory organisation to call upon for assistance when things go wrong, and no protection under the "Buyers Charter".

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 '98, 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)

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 '98, 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 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 '98, 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)

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 '98, 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)

HIGH-END PC

Atlantic
Proteus 450LVD

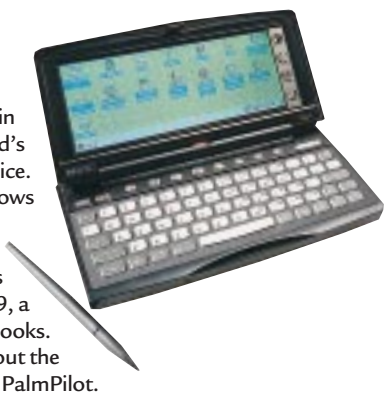
A true high-end PC, the Proteus is equipped with a 450MHz Pentium II processor, plus the lightning-fast LVL SCSI Cheetah hard drive from Seagate. It's also stuffed with extra peripherals including CD-RW and DVD-ROM drives. A real dream machine.

PCW Nov '98, p163

Price £2,499 **Contact** Atlantic 0990 134725 **Also Recommended** Armari MB-450 Workstation **Price** £2,899 **Contact** Armari 0181 810 7441 • Dell Precision Workstation 410 **Price** £3,390 **Contact** Dell 0870 9073335 (both in this issue)

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 '98 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)

Colour inkjet:

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 '98 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)*

Colour photo printer:

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 '98, p188.

Price *£273* **Contact** *Epson 01442 261144* **Also Recommended** *Lexmark 5700* **Price** *£229* **Contact** *Lexmark 01628 481500 (PCW September 1998)*

Budget laser printer

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 '98, 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)*

Business laser printer

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 '98 p77

Price *£1662.63* **Contact** *HP 0990 474747* **Also Recommended** *QMS DeskLaser 1400P* **Price** *£938.83* **Contact** *QMS 01784 442255 (PCW March 1998)*

Multifunction device

Hewlett-Packard
LaserJet 3100

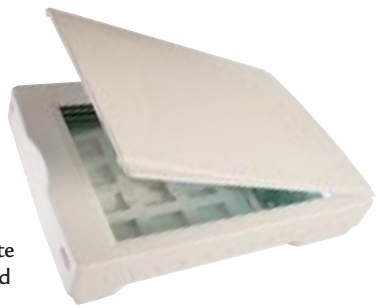
Good laser-print quality from this quiet machine. It's intelligent enough to detect a document dropped into its feeder and it will launch an idiot-proof menu for scanning, copying and emailing. Fast, accurate OCR and 2Mb memory for incoming faxes when the paper supply is exhausted, makes the 3100 an ideal multifunction device.

PCW June '98, p83

Price *£629* **Contact** *HP 0990 474747* **Also Recommended** *Canon MultiPASS MPC20* **Price** *£370.13* **Contact** *Canon 0181 773 3173 (PCW January 1998)*

Flatbed scanner

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 '98, 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)*

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 '98, 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 '98 p204.*

Price £440.63 **Contact** Nokia 01793 512809 **Also Recommended** Mitsubishi DiamondPro 700 **Price** £569.88 **Contact** Mitsubishi 01707 276100 (PCW April 1998)

Modem

Diamond SupraExpress 56e Pro

With ever-shifting goalposts, it makes sense to go for a modem which supports all the current standards, as well as simultaneous voice and data. Combine this with a roaring speed, superb ease of use and a low price and you have the best value modem around.

➠ PCW Dec '98 p211

Price £75 **Contact** Diamond Multimedia 0118 9444401 **Also Recommended** Zoom FaxModem 56Kx **Price** £89 **Contact** SCS Data Communications 01494 748904 (PCW December 1998)

Removable storage

SyQuest SparQ

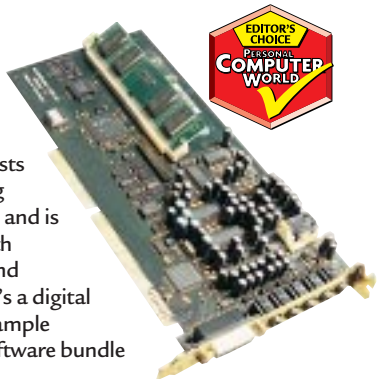
With such differing capacities, interfaces and prices, there's no one removable storage device to satisfy all needs. As an overflow for your existing hard disk, the SyQuest SparQ is a clear winner, boasting excellent performance and low price. The external Iomega Zip Plus offers a good combination of ease of use and portability.

➠ *PCW May '98 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 '98 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

Diamond Viper V550

Sporting Riva's latest TNT chipset, the Viper V550 gives absolutely storming 3D performance, with a full 3D feature set and good image quality to boot. Its 16Mb of RAM also spells ultra-high 2D desktop resolutions for standard Windows apps.

➠ *PCW November '98, p198*

Price Approx £150 **Contact** Diamond Multimedia 0118 944 4400 **Also Recommended** MetaByte Wicked 3D **Price** £211.50 **Contact** Watford Electronics 01582 745555 (PCW November 1998)

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 '98 p198

Price £229.13 **Contact** Bestware 01752 201901
Also Recommended TAS Books **Price** £116.33 **Contact** Megatech 01372 727274 (PCW June 1998)

Personal Finance

Microsoft
Money Financial Suite 98

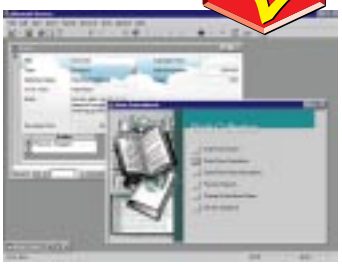
Microsoft Money Financial Suite 98 is our choice for personal finance. It offers online banking and updating facilities, plus Sage compatibility, all at a bargain price.

PCW May '98 p196

Price £49.99 **Contact** Microsoft 0345 002000
Also Recommended Quicken 98 **Price** £39.99 **Contact** Intuit 0181 990 5500 (PCW June 1998)

Database

Microsoft
Access 97



The industry-standard database application is also the best. With its wizards, infamous Office Assistants and standard Windows interface, Access 97 is relatively easy for the novice. And its powerful relational features and VBA integration make it suitable for developers, too.

PCW November '98 p220

Price £299 **Contact** Microsoft 0345 002000
Also Recommended FileMaker Pro 4 **Price** £169
Contact FileMaker 0845 603 9100 (PCW November 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 '98 p132

Price £99.95 Contact Serif 0800 376 7070
Also Recommended Quark XPress 4 **Price** £1,169 **Contact** Quark 01483 454397 (PCW June 1998)

Image Editing

Adobe
Photoshop 5

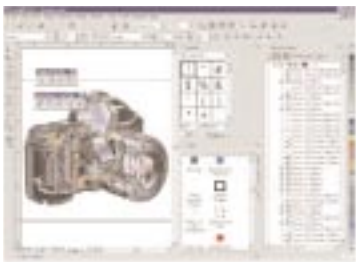
With version 5, Photoshop is better than ever, although some web designers will want a little more. The legendary Paint Shop Pro and fun PhotoDeluxe cater at entry level.

PCW June '98 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)

Drawing

Corel
CorelDraw 8



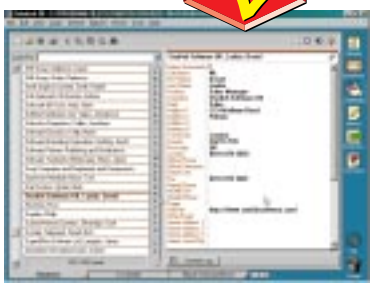
Not one of Corel's classic years but this is still the Windows drawing package to own. Version 8 of the giant suite boasts better drawing and new interactive tools. Budget drawers should check out the Micrografx Windows Draw 6.

PCW October '98, 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)

Information Managers

Starfish
Sidekick 98



The best personal information manager boasts wide customisability as its greatest strength. For heavyweight contact management, look no further than Goldmine 4 (details below).

PCW August 1998 p204.

Price £39.99 **Contact** Starfish 0181 875 4455
Also Recommended Goldmine 4 PCW August '98 p173.
Price £229 **Contact** AVG 0171 335 2222

Presentation Graphics

Lotus
Freelance 97

Our choice for electronic presentations. It may also come down to which office suite you own or are considering. As part of Microsoft Office 97, PowerPoint won't let you down.

PCW March 1998 p200.

Price £49.35 **Contact** Lotus 01784 445808
Also Recommended MS PowerPoint 97, PCW March 1998 p202.
Price £325.47 **Contact** Microsoft 0345 002000

Remote Access

Traveling Software
LapLink Tech

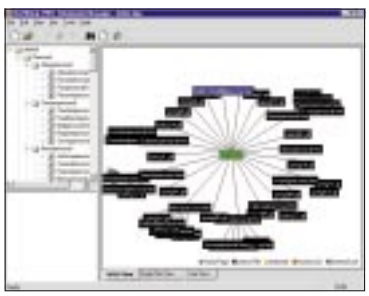
The high-end version of this extremely versatile product, LapLink Tech, has all the features of the standard version but also lets you print from the host machine on to a remote printer, or vice-versa, and talk to whoever is using the host machine. It also includes anti-virus and hard-disk cloning utilities.

PCW December 1998 p233.

Price £169.95 **Contact** Traveling Software 10344 383232
Also Recommended Symantec pcAnywhere PCW Dec 1998 p235.
Price £75.08 **Contact** Symantec 1071 616 5600

Web Design

SoftQuad
HotMetal Pro 4.0



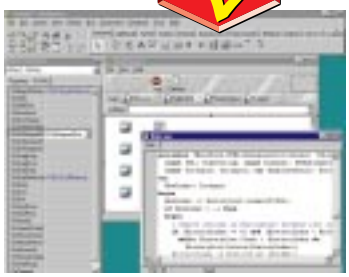
An excellent all-rounder, HotMetal Pro 4 gets our thumbs up for web design. For a slick interface and Office 97 integration, Microsoft's FrontPage 98 is worth a look.

PCW January 1998 p196.

Price £123.38 **Contact** SoftQuad 0181 387 4110.
Also Recommended FrontPage 98, PCW January 1998 p195.
Price £116.30 **Contact** Microsoft 0345 002000 • Adobe PageMill 3.0 PCW May 1998 p158 **Price** £92.83 **Contact** Adobe 0181 606 4001

Programming Tool

Symantec
Visual Café 2



Visual Café 2 is the most productive visual Java tool and has the option of native-code compilation for Windows. Windows developers should go for Borland Delphi 3 which, although more complex, comes into its own on larger applications.

PCW April 1998 p177.

Price from £79 **Contact** Symantec 0171 616 5600
Also Recommended Borland Delphi 3, PCW April 1998 p183.
Price £95.18 **Contact** Borland 01734 320022

Anti-Virus

Norton
AntiVirus 4.0

AntiVirus 4.0 is our choice for protecting your PC. It offers the best combination of features, ease of use and performance. Its virus detection rate is first class and there are free online updates for the life of the product.

PCW April 1998 p124

Price £49 **Contact** Symantec 0171 616 5600
Also Recommended Dr Solomon's HomeGuard, PCW April 1998 p122.
Price £29 **Contact** Dr Solomons 01296 318700 • F-Secure 4.0 AntiVirus, PCW April 1998 p122. **Price** £109.27 **Contact** Portcullis 0181 868 0098

chipchat

Space invaders

Have you just moved into a big, empty house full of shelves just screaming to be filled? You have? Then why not give Keith Fitchett of London Guildhall University a call on 0171 320 1710 or email **fitchett@lgu.ac.uk**. He has an almost complete set of issues of *PCW* stretching back to the early eighties and he needs to get rid of them!

Strictly business

On her travels in the former Soviet Union, our east European correspondent popped into an internet café to check on her email, where she picked up this card (*above*). We're told it translates roughly as, "The internet is not just for recreation and sex, it's for business too." We cannot help but wonder just what sort of business they mean...

Caption competition

Congratulations to M J Clare, who walks off with a whopping £40-worth of book tokens in return for this winning entry in our October caption competition: "...and I said just a trim, please. Don't go for the full chandelier."
The caption competition is now, sadly, no more... gone... deceased... so for your chance to win a £20 book token, write us an original three-line haiku or five-line limerick on the subject of *PCW*. Send your entries to "Captions" at the usual *PCW* address (p10) or email your entry to **captions@pcw.co.uk**.

Oops!

☛ In our November issue graphics card group test: the Matrox Millennium G200 should have received a four-star rating; the STB Velocity graphics card based on the Riva 128ZX chipset was given a five-star rating and although a good performer it should have received only three stars; and on a couple of occasions, *Metabyte* was mis-spelt as *Megabyte*.

☛ In our November issue PC group test we said that the Viglen BizPro 450KS contained a SCSI T4000 drive when, in fact, the interface was IDE. We also stated that the hard drive was Ultra2; it is actually Ultrawide SCSI 2. In the same group test, we stated that users would be able to increase the memory on Dan's machine to 512Mb without replacing what was already there. As it uses a GX motherboard, it is possible to take this to a maximum of 2Gb.

☛ In October's *Hands On* we gave out the wrong contact number for obtaining more information on the Cubasis Audio Lite. The correct number for Arbiter Music Tech Sales is 0181 970 1909.

next month

Christmas PC group test

The machines you most want to find under the Christmas tree. We look at four high-end games machines, four mid-range family PCs and four budget PCs.

Digital video

We have seen the future and it's digital. We look at DVD, digital camcorders, video capture and videoconferencing.

Image editing

Want to take the demon eyes off your best friend's picture, or paint a moustache on Auntie? We have the 10 best image-editing packages under £100.

Plus: *PCW*'s Christmas wish-lists and the ultimate festive techno quiz.