MARCH 1998

Personal Computer World

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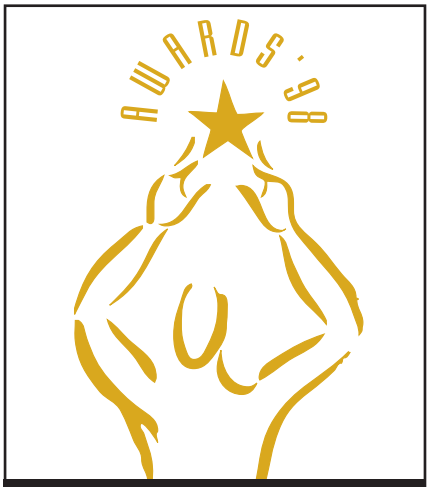

PCW Awards 1998 p116
Your chance to vote in the eighth annual *PCW* Awards and win £1,000-worth of computer equipment of your choice. There are 100 runner-up prizes of *PCW* on CD.

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Personal Computer World

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VNU BUSINESS PUBLICATIONS

Editorial

Intel's chairman and CEO, Andy Grove, recently spoke of the "battle for the eyeballs". This rather sinister-sounding phrase refers to the limited leisure time of individuals and the fact that the PC is in constant conflict with the TV, vying for your precious attention. Clearly, the box which wins this battle will sell in vast numbers, hence Intel's particular interest in making sure it makes the chips which go inside.

It is not just Intel that is desperate to sell huge numbers of PCs and their components. Everyone's at it. The current buzzword in the IT industry is "convergence", with the humble PC being forced into new clothes to make it more palatable in the home. If, or indeed when, the PC (or a similar device) is accepted as genuine consumer electronics, it could eventually become as ubiquitous as the TV or the VCR, resulting in big bucks for all involved.

If you think about it, there's never been a better time for this to happen. The television is about the only analogue device we're still buying new. Compact disc started the consumer digital ball rolling and this can only grow with DVD's digital video and forthcoming digital broadcasting. And we all know one device that's particularly at home with digital information, don't we? The PC is being set up for a role that's more intimate with your home electrical goods than ever before.

Web browsing on your TV and movies with surround sound from your PC is only the beginning of convergence, with brand-new services on the way to make our leisure time more productive and enjoyable. It must start somewhere, though, and sadly the first wave of home entertainment PCs have so far been less than inspirational. IT companies need to learn that there's more to consumer electronics than fun advertising and colourful packaging.

Our first in-depth report on convergence, and the issues involved in integrating your PC with your TV and hi-fi, appears on p120. Convergence is a big subject, currently going through plenty of change. We will, of course, be keeping you updated in future issues of *PCW*.

Finally, don't miss your last chance to vote in our *PCW* 1998 Awards (p116) and win £1,000-worth of computer equipment. Remember, your votes count!

Gordon Laing

Managing Editor

Next Month

Budget PCs £1,000

What kind of PC can you get for exactly £1,000 — neither a penny more nor a penny less? We'll tell you exactly, including VAT and delivery, when Paul Trueman puts ten budget PCs to the test.

Monitors

Thinking of ditching your old 14in or 15in monitor? Don't do it until you see next month's definitive 17in monitor group test.

Anti-virus software

Protect your PC and network from the latest nasty bugs. We look at ten anti-virus packages that will keep your PC healthy.

Visual Basic and Java Tools

Serious programs for serious programmers. Tim Anderson digs deep into the programmer's world to give you expert advice on the latest products.

April '98 issue
On sale Thursday 26th February

** Next month's contents subject to change.*

Personal Computer World

March Cover disc

Technical Helpline 0891 715929

Calls cost 50p per minute

Welcome to the March 1998 *Personal Computer World* CD-ROM.

Featured applications

Serif PagePlus 3.0 (full version) Packed with powerful but easy-to-use features for all your publications. You can create eye-grabbing ads, flyers, newsletters and more. The disc carries the full version and includes powerful layout tools, precision typographical control and hi-res full-colour or spot-colour separations. PagePlus is perfect for beginners, experts and everyone in-between.

HotMetal Pro 4 Ever since someone said it was not easy using text editors to program for the web, HotMetal Pro has been the name in HTML editors. And now everybody should be happy with three different views from which to choose: the word processor-like WYSIWYG view, the structured Tags On view and the text-based HTML Source view. Amongst the Power Tools included are a personal web server, a project management tool and a JavaScript authoring tool.

Taxi A great name for something that helps you get around — and it's free! Let Taxi sit on your desktop and just click to select the sites of your choice, instead of trying to remember www dot slash slish slash… etc. With the ability to update from the web itself, the version on the CD comes with a large database of links waiting to be customised into your own easy-access buttons.

Post-it® Notes: Those familiar yellow pieces of paper have gone all electronic and have come to take over your desktop! Instead of sticking Post-it® Notes around your computer, you can now keep them organised right on your computer screen. Post-it® Notes is simple and convenient to use: click the dispenser and a new note

Left **With three different views, your HTML editing will be hot stuff**
Below **"…I picked up that Taxi application from my *PCW* CD the other day an' gor blimey what a cracker! Got me around the web it did…"**

Here's the full version of punchy PagePlus 3.0 to help you with your DTP projects

How to use the CD-ROM

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

System Requirements
You need a PC with Windows 3.1 or later and a colour VGA display. For best results run it on a Pentium PC with at least 16Mb of memory.

CD-ROM Problems
The technical helpline is open weekdays from 10:30am-12:30pm, and from1.30pm-4:30pm, on 0891 715929. Calls cost 50p per minute.

If you experience problems with the CD-ROM, such as a message like "Cannot read from drive D:", please return the disc and a covering note with your name and address and marked "PCW CD March '98" to:
TIB plc
TIB House
11 Edward Street
Bradford
BD4 7BH
A replacement disc will be sent to you by post.

pops onto your screen. The virtual notes are an ideal way to keep track of meetings, errands, to-do lists and more. You can even set alarms to your notes or print them out. And, for the truly disorganised, the software allows you to perform quick keyword searches, saving you time and grief when you need to *find that note* — try doing that with paper!

Featured games

Youngblood (Win 95 only): The cartoon heroes of Youngblood come to the PC to fight the mutant forces of the evil Dr. Leviticus. In this demo, three of the Youngblood team have to thwart Dr. Leviticus' plans by reaching Drachma Codex, the secret to world domination.

Strategy and roleplaying are key elements as you guide the Youngblood team through the exciting action. Their mutant enemies grow more bizarre and violent with each mission as you battle through dense jungles, parched deserts, and smouldering volcanoes, to the very pits of hell itself. Get right into your character with the role-playing elements and

p16 ➢

Above and right **Guide the Youngblood team and mash those mutants**

Below **Rules, rules, rules… so what? Break them as much as you like and show those truckers some real PC road rage**

Getting software on to the CD

Personal Computer World is keen to promote quality software and would like to hear from you if you are interested in having your product included on a future cover disc. For cover-mount enquiries, please telephone Afshan Nasim on 0171 316 9761
or email **afshan_nasim@vnu.co.uk**

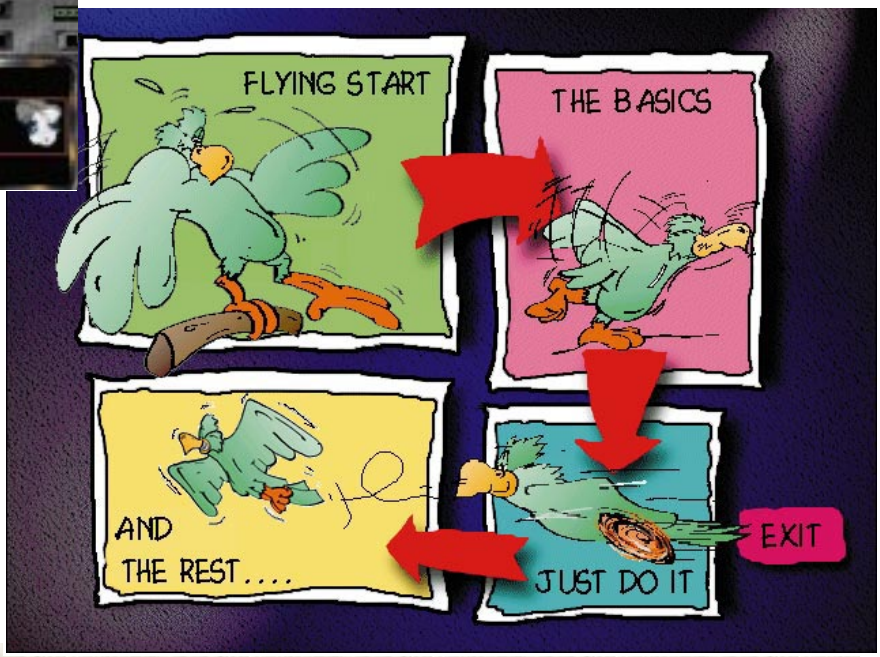
IMPORTANT NOTICE

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 to your data or 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 make regular backup copies of all your important data.

Unless otherwise stated, all the software contained on the CD is for demonstration only. This means that it may be restricted in some way — for example, it may be time-limited or have certain functions disabled.

conversational clues. Other characters take on their own personalities as the game progresses.

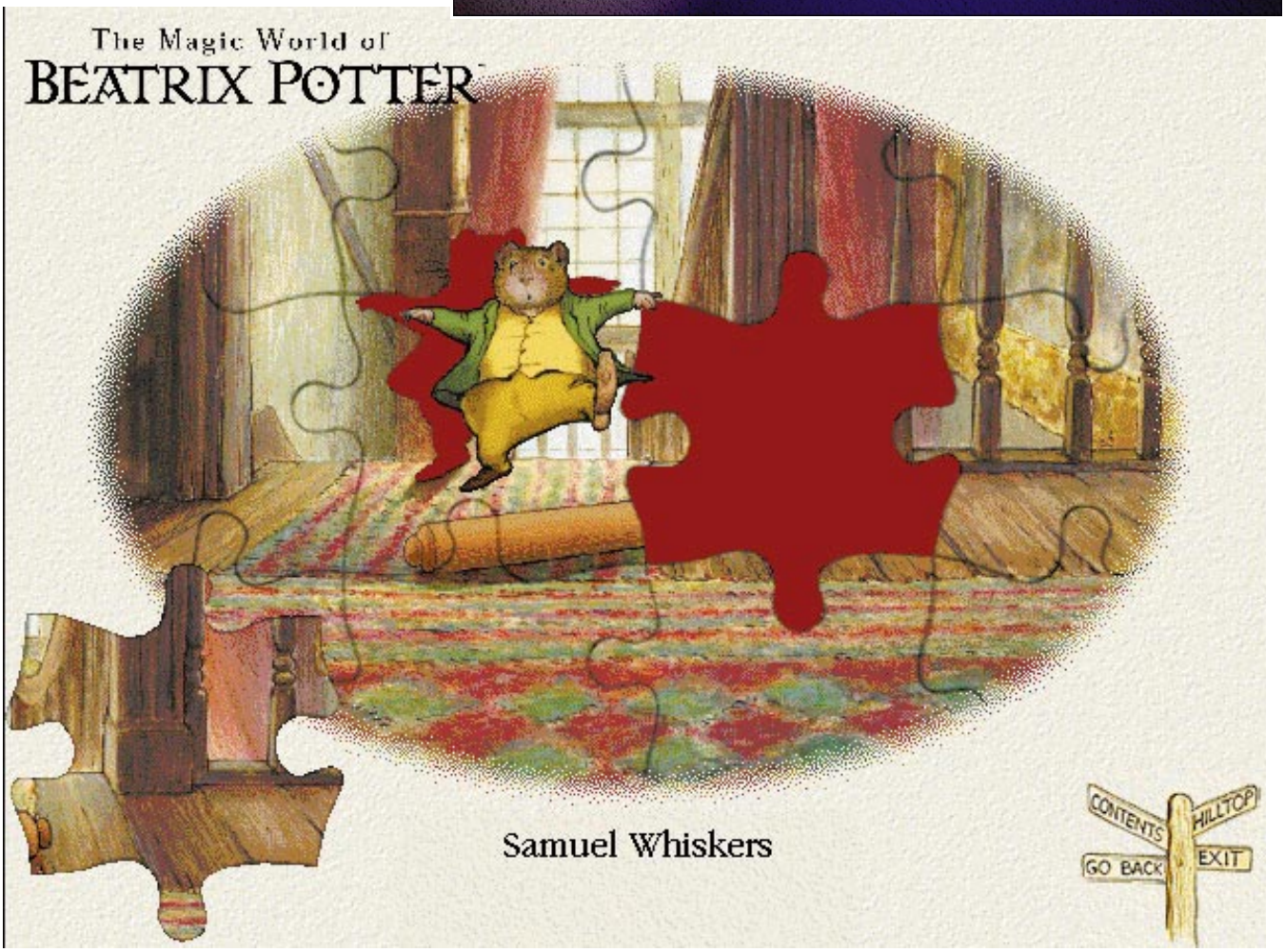
Ignition (Win95 only) Rules are made to be broken, so how you decide to drive is the crucial element in this no-holds-barred auto-racing game — this is life in the really fast lane! How you play is up to you: play fair and you might get nudged into the nearest river; but if you know the tracks and your vehicle, and drive deviously, you might just win.



Above In the 27th century, water is more precious than gold when you play Dark Reign: Battle, to preserve the regime or become a freedom fighter instead... Oh well, another hosepipe ban on its way, then

Right You'll soon have those fingers flying with the Kaz keyboard tutor

Below Aaah — nice, gentle Beatrix Potter: absorbing stories, games, leaf-rubbing and greetings-cards production



Dark Reign (Win95 only) In the 27th century, water is more precious than gold — so things are pretty dark! And even in the future, war is fought over basic values. In Dark Reign you control the troops of either the Imperium or the rebellious Freedom Guard. Fight to avoid chaos and preserve order or fight for freedom and equality. And you can even design your own arena using the Dark Reign Construction Kit.

Featured multimedia

Kaz Keyboard A-Z Don't you just dread it when you have to let go of the mouse and search instead for those elusive keys?

Don't worry, though — help is at hand with the KAZ keyboard tutor. This is a fun and quick way to learn to type and it will allow you to work at your own pace — hopefully this means completing the entire course in only four hours. You had better go and load it up now and get started!

The Magic World of Beatrix Potter The characters from Beatrix Potter come alive, perhaps more than at any time in their 100-year history. In the Magic World of Beatrix Potter you not only delve into the stories, but play games, learn about the Potter family in a biography, and are shown nature activities such as leaf rubbing. And, you get to create and print greetings cards for all occasions, too.

Special notes

■ Installing Internet Explorer 3.02 on Windows 3.x machines

If you are prompted to install Internet Explorer 3.02 after having clicked the link to the Personal Computer World web site, and you select to run the installation, the file will not be found. To run the installation manually, click on CD Drive>:\software\library\internet\ie311\setup.exe

This will affect Win3.x users only.

Missing Icons

■ After installing Ignition or Beatrix Potter from the Featured Software section you may have difficulty finding the icons that are created. You will find them in the menu or program group called "WhatPC" — simply run the icons from here.

March 1998

PCW INTERACTIVE

Complete Contents List

FEATURED SOFTWARE:

APPLICATIONS
PagePlus 3.0 FULL VERSION
HotMetal Pro 4
Taxi
3M Post-it® Notes

GAMES
Youngblood
Ignition
Dark Reign

MULTIMEDIA
Kaz Keyboard A-Z
The Magic World of Beatrix Potter

Personal Computer World

F O L D H E R E

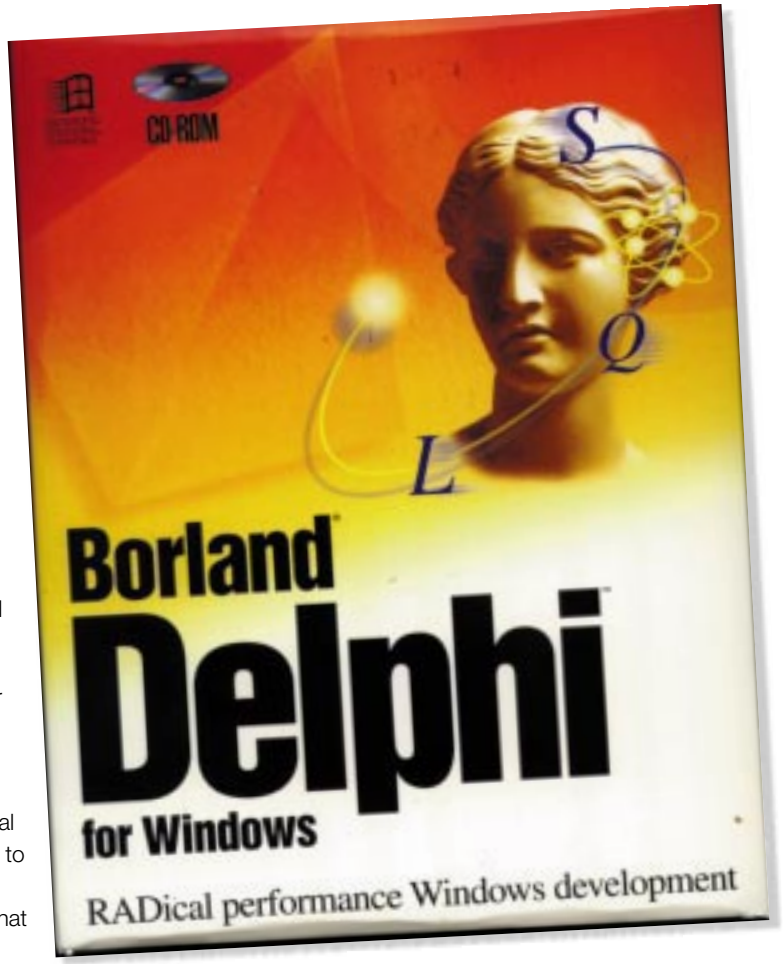
Software Library

Acrobat 3	—	PDF file reader
Amazeing	—	Windows maze game
Arrrggh	—	Pirate RPG game
Cabrio	—	Customizable conversion calculator
Cachechk	—	Analyse your cache
Crazy Gravity	—	Gravity-based arcade action
DipStick	—	Keep an eye on intenet traffic
Direct X 5	—	Microsoft video driver
Do You Comply?	—	Workstation ISO standard checking software
Fandango	—	Make your own windows screensavers
Image Robot	—	Image batch processing utility
Internet Explorer 3.03	—	Internet suite for Win3.1
Internet Explorer 4	—	Internet suite for Win95
Mailing Abroad	—	International postage utility
Millenium Bug	—	Year 2000 check software
Net Timer	—	Constant readout of internet log-on time
NACDraw	—	Multimedia creator and interactive illustrator
Norton Anti Virus	—	For Windows 3.1/95/NT
Paintshop Pro 3.11	—	Image editing package
Paintshop Pro 4.14	—	Latest version
Pixel 3D	—	Create and convert 3D logos and objects
Pastel Tax	—	Tax return application
Skymap	—	Windows planetarium program
Target Index	—	Replacement cardfile management system
Trugg	—	Guide Trugg through the caverns
TZ Minigolf 2	—	Windows golfing
Vet Anti virus	—	Network/workstation anti-virus solution
Visual BASIC	—	Runtime library
WinDelete 97	—	Comprehensive uninstall utility
Winzip 6.3	—	Latest windows archiver
Xara 3D	—	3D text heading and animated GIF creator
Yahtzee	—	Classic dice game

Borland Delphi

Special PCW reader offers

If you want to create software that is fast to develop and speedy to run, Delphi is the best solution. We've got together with Borland to offer *PCW* readers exclusive opportunities to buy the latest versions of Delphi at savings up to 75 percent off! Delphi 2 Developer and the latest Delphi 3 Professional edition, complete with rights to deploy applications, are available at very special discounted prices. See opposite page for full details.



Delphi's visual design environment lets you create sophisticated Windows applications faster than any other development tool. Because Delphi is built around an optimising native code compiler, Delphi applications are between ten to 20 times faster than interpreted code.

Delphi delivers three of the key features most sought-after by today's developers:

1. Rapid development: On the surface, Delphi looks a lot like Visual Basic. Add a form, pop on a control or two, double-click a button to add a few lines of code, click Run and away it goes.
2. Native code compilation: Delphi compiles to true executables that potentially run as fast as applications created in C or C++.
3. Object orientation: Delphi supports classes with constructors and destructors, inheritance, encapsulation and polymorphism — all the essential characteristics of an object-orientated language.

You can also program procedurally in Delphi. You get the best of both worlds: Delphi is easy to learn if you are familiar with Visual Basic or xBase, but all the benefits of objects are available, too.

Delphi integrates the Borland Database Engine, so you have instant support for dBase, Paradox, and ODBC local databases. It includes the Local InterBase Server so you can create standalone client/server applications with a high-performance ANSI SQL-92 compatible database server.

Also included is Borland's award-winning ReportSmith report writing tool, which allows programmers to prepare innovative reports using live data in all popular database formats.

For more information, browse the Delphi web site at www.borland.com

System requirements for Delphi 1 on Dec 97's *PCW* cover CD

- Delphi requires Windows 95, 3.1 or a 100 percent compatible operating system, an 80386 or newer processor (486 recommended) and 6Mb of system memory. A minimum installation requires approximately 30Mb of disk space.
- DCC.EXE, the DOS command-line compiler, requires at least 1Mb of extended memory.
- Delphi has been tested under Windows 95, Windows 3.1, Windows for Workgroups 3.11, Windows NT 3.5 and OS/2 Warp.

Limited licence offered through *PCW* on Dec 97's free Delphi CD

- This software can only be installed onto a PC once. It is not shareware.
- Applications developed using the software may not be deployed.
- The software is for personal use only by software developers and may not be used for development or teaching in a commercial or educational establishment.
- Programs and applications that have been constructed with the software may not be distributed. The software is provided only with the aim of allowing the owner to learn the use of this software.

For distribution rights of owner-generated applications, the owner will have to purchase a copy of additional software or a package designed for this purpose.

- No resale of the CD is permitted. No free support is available with this CD. Full licence details on the CD.

EXCLUSIVE OFFER

Special offers

Learn to program with **Delphi: £29.95** + VAT (normally £42.51 + VAT)

Includes limited edition of Delphi 1.0 (full software, but no option to deploy applications) and includes a full online curriculum and tutorial as well as the acclaimed book, *Learn Delphi in 21 Days*.

Delphi 2.0 Developer: **£99.95** + VAT (was £399 + VAT)

Lowest price ever! Includes full Delphi 2.0 Professional for Windows 95 and Windows NT, with full printed manuals and rights to deploy applications. Also includes Delphi 1.0 with rights to deploy applications.

Delphi 3.0 Professional: **£249** + VAT (normally £399 + VAT)

The very latest in Delphi technology, along with the rights to distribute applications. Delphi code can be used anywhere that ActiveX is supported, including Microsoft Office and Internet Explorer. The Delphi 3.0 environment is much improved, too, with handy auto-coding features and an impressive set of wizards. Database connectivity now includes Access MDB data and FoxPro's style of memo and index files, in both cases without requiring ODBC. Overall, Delphi is the best Windows development tool.

Order Hotline 0800 454065

Call our telephone hotline and quote reference **PCW4**, or complete the coupon and send it to:
PCW Offer, Borland Information Centre, PO Box 527, London EC2B 2ZA

Description	Item	Price per item	Quantity	Total price
PCW02	Learn to program with Delphi	£ 35.19 (inc VAT)		
PCW03	Delphi 2 Developer	£117.44 (inc VAT)		
PCW04	Delphi 3 Professional	£292.58 (inc VAT)		

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Newsprint

New Cyrix chip heralds sub-£500 PC

■ The sub-£500 home PC is a step closer with the release of a new version of Cyrix's MediaGX chip, which integrates graphics and memory-control functions normally housed in costly peripheral chips or add-ons.

The new version is carefully described as MMX-enhanced, presumably to avoid legal problems with Intel. But it obeys the MMX intruction set for speedy graphics.

The new 200MHz processor is designed for mobile use — in the first instance specifically for Compaq's Presario notebooks. This will let Compaq offer what it says is the first 200MHz MMX-class notebook for under $2,000.

Compaq has been working closely with Cyrix to use the earlier GX chips in sub-$1,000 desktop PCs. Brendan Sherry, md of Cyrix UK, said the new MMX version could start to appear in desktop machines as early as this month.

He does not see GX-style chips ousting high-end rivals. "If you want a 3D graphics workstation you are going to need a very fast chip and probably a 3D graphics card. Highly-integrated chips are not going to give you that kind of performance. But they will provide enough for a home machine, at £500 or £600."

Some GX machines may be set-top boxes which can be built up into what are effectively PC/TVs. They could also be used in digital appliances.

● HP has released the cheapest Pentium MMX PC in the US. The 200MHz Pavilion 3260 will sell for US$799 (£500) without a monitor.

Windows 98 pickle as judge isolates browser

Windows 98, which was due to ship soon, looked to be on hold as we went to press and Microsoft fought a legal battle with the US Justice Department.

Microsoft won an early hearing on its appeal against an injunction banning the "uncompetitive" bundling of Internet Explorer with Win95. But as Explorer is fully integrated into Win98, the case could hinge as much on the definition of an operating system as on points of law.

The hearing could be as early as 9th March. But Microsoft was also fighting off a claim that it had already broken the injunction. Judge Jackson wanted to know why it claimed Explorer cannot be separated from Windows without damage, when he and a technician were apparently able to do so in less than 90 seconds.

Microsoft retorted that Jackson had merely deleted the portion which was visible — only three percent of the Explorer code. Microsoft also protested that a "special master" appointed by the court was biased. It alleged that Harvard law professor Lawrence Lessig had urged rival Netscape to sue Microsoft. Lessig refused to step down.

A beta of Win98, promised in December, had still not been released at press time. A Microsoft spokesperson said he had "no idea" if this has anything to do with the court case but that the release was "imminent".

Microsoft has warned that "significant segments of the US economy may be affected by doubt surrounding the release of Windows 98" and that there could be serious repercussions for the stock market at large.

Susan Pederson

● *See also News Analysis pp46 & 47*

Win98 channels … part of the OS?

Double whammy for Netscape

Rumours are flying that Netscape will begin to give away its Navigator browser and offer free email after a three-month loss of $85m. Netscape stocks fell to an all-time low after it announced staff layoffs. A second blow came from a Positive Support Review report which for the first time put Microsoft's Explorer ahead of Navigator, estimating that two out of three site accesses use it; other estimates still put Navigator ahead. Netscape CEO Jim Barksdale said the company did not grow its enterprise business as much as planned, and European and Asian sales were poor.

333MHz and rising for 0.25µ PII

■ Intel has released a ramped-up and vamped-up version of its Pentium II. The new processor, codenamed Deschutes, runs at 333MHz and has the same 32Kb of L1 cache and 512Kb of L2 cache on the Slot 1card as its predecessors.

But it is made using a 0.25 micron process, producing a smaller die than the old 0.35 micron PIIs. The change gives more chips per wafer, cuts power consumption and increases speeds — up to 450MHz this year, Intel believes. But Intel will produce the processor in various form factors. There will be two for notebooks in the summer: on an MMO and on a new cartridge (see our *Notebooks group test,* p170).

There will also be a PII replacement for the Pentium Pro which will be in a new Slot 2. Intel has already produced a 0.25 micron process chip for mobiles, the Tillamook, running at 233MHz and 266MHz, and plans to swap over much of its fab facilities to the new process.

AMD is also producing 0.25 micron versions of its K-6 processors running at 233MHz and 266MHz.

Adele Dyer

● *See also: "Cloners unite" p26 & First Impressions p72*

Also in Newsprint

News edited by Clive Akass; news@vnu.co.uk Internenet News edited by Adam Evans; adam_evans@vnu.co.uk

£180 Adaptec card could kick PC users into digital TV future

Data-link specialist Adaptec is trying to kickstart PC/TV technology with an adapter card costing less than $300 (£180) capable of receiving scores and even hundreds of digital channels.

I first saw the card at Comdex late last year when I was unclear what role it would have in Europe.

Now Adaptec has done a deal to provide cards for services from major operator Eutelsat, which has two finance data services lined up in addition to its TV channels.

Eutelsat's Hot Bird satellite also hosts the DirecPC turbo internet service, which offers 400Kbit/sec downloads.

Adaptec is talking to other European operators, including Rupert Murdoch's BSkyB which is due to begin digital services this summer.

Only the tuning circuits on the Adpatec card need to be changed to enable it to receive BSkyB channels. A plug-in smart-card reader lets it be used for pay services.

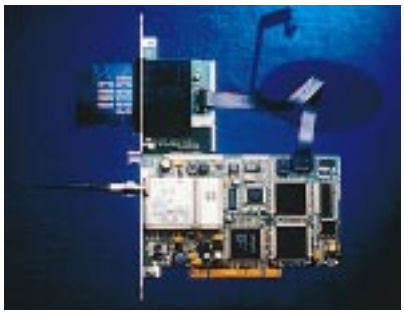
The card could also be adapted for services from British Digital Broadcasting, owned by Granada and Carlton, which will launch land-based digital services in the autumn.

BSkyB and BDB each plan to sell set-top boxes at less than £200 (about half cost price) to seed the market.

But neither seems to have an eye on the millions of PC owners who could provide a pool of technically-literate users, well equipped to push the medium to its limits.

BSkyB's press office seemed surprised even at the mention of the PC in connection with digital services. Yet, initially, PCs will offer more power and flexibility than a set-top box.

Eutelsat, which is better established on mainland



Adaptec's Satellite Express receiver card

Europe, could ride Murdoch's coat-tails in the UK by subsidising so-called dual-LNB dish aerials capable of receiving both services. But as yet there is no word that it will do so.

Clive Akass

● *See News Analysis p46*

Short stories

■ Microsoft and Lotus are both packing more web features into their new office suites. Lotus SmartSuite will include Odyssey (*above*) which allows you to publish basic documents on an intranet or the internet. The new version will have improved HTML rendering, integrated FTP setup, Active Links, eSuite integration and an extra pop-up type browser.

Microsoft is going the whole hog by making HTML its global document format.

● *See News Analysis p38*

Toshiba price cuts

■ Toshiba has slashed the prices of its desktop PCs and notebooks. The 5160D, which normally sells for £949, is now only £750, while the price of the 6230D fell by 27 percent. Toshiba has also announced a new Libretto and several ultra-slim notebook models.

● *See also p49*

Triumph of the nerds as IT aces are promoted

■ The revenge of the nerds continues — and it's reaching into offices, says a report from US analysts, Forrester.

The success of arch-nerd Bill Gates will be repeated in companies as keen computer users get promoted, it believes.

It claims staff who are keen to download the latest sales database or develop their own web sites are the corporate stars of the future. Forrester calls them "Technology Tigers", as opposed to the "sheep" who outnumber them by two to one. Tigers will raise profits and be highly sought after in what the study terms an "information democracy".

The report says tigers learn mostly through trial and error and are outpacing what little IT training is given to them. But a downside of the great IT leap forward could be that workers will get distracted by more complex applications.

"Just because someone can master an advanced application or download a Powerpoint presentation, they are not necessarily adding to company profits," said a former Nissan IT manager.

Nick Huber, *VNU Newswire*

"But sweetie, they are de rigeur for the new executive"

p26 ➢

Short stories

■ Remember those stick-on plastic labels bearing words embossed by a device looking like something from a kid's printing set? Now they are computerised into something more versatile. The £395 (ex-VAT) Dymo PC-10 labelmaker prints in 24 colours on five widths.
Dymo 0181 282 1000
www.esselte.com

■ Get set to annoy the neighbours with one of a new range of Samsung speakers from SpectraVideo. Seven models range from the 40W SMS 100D to the ear-shattering 200W GNT5000 sub-woofer system. The SMS7750 (*pictured*) has 3D stereo enhancement and retails for £99.99.
SpectraVideo 0181 900 0024
www.spectravideo.com

RealHelp tackles Win95 problems

■ Problem Preventor, Crash Defender and Smart Disk Agent are not B-grade comic book heroes but part of RealHelp, the "smart PC problem solving software" from Quarterdeck. RealHelp continually monitors the standalone or networked hardware and software, combats Win95 crashes, combs the net for updates and offers an anti-virus facility, all for £40.
Quarterdeck 0645 123 521
www.quarterdeck.com

TurboCAD 4.1

■ IMSI has released TurboCAD 4.1 Professional with support for AutoCAD R14 and 3D studio files. It costs £270 inc VAT.
IMSI 0181 581 2108

Cloners unite to save Socket 7

Three major chip cloners are set to form a united front against Intel.

Cyrix, AMD and Centaur-IDT have been working on a standard specification for the classic Pentium's Socket 7 (*right*), which Intel plans to kill off in favour of the slots used by Pentium II chips.

David Frink, vice-president of communications at AMD US, said the specification was likely to be set early this year. He also said that AMD will continue its policy of undercutting Intel by ten percent, even if the chip giant reduces its own prices early this year as expected.

Joe D'Elia, senior semi-conductor analyst at Dataquest UK, confirmed that the next few months will be crunch time for Socket Seven. He said its future depended on the ability of AMD, Cyrix and IDT to work towards a common goal.

"AMD is extending the performance of Socket 7 and all of the others have to sign up to that. They have all been talking but it appears no-one has yet made the final commitment." D'Elia also said AMD had to start producing K6s in volume during 1998.

"The biggest issue with AMD is that they haven't been able to deliver the product."

Mike Magee

Intel denies 'secret' design flaw

■ Intel has denied a claim that an undisclosed flaw slows data flow to many of its processors by as much as a third. The alleged flaw affects all 486 and Pentium chips, says Intelligent Firmware, which specialises in assembler programming.

Director William Krech says MMX and older chips are affected reading from cache or main memory, and Pentium Pro and Pentium II chips when reading from cache.

Intel documents how processing pauses when a read request is made to a line of data which is already being burst-read.

But Krech claims there is an undisclosed extra time penalty. With a Pentium reading from EDO RAM, this reduces the transfer rate from about 185Mb/sec to 119Mb/sec. He points out that the famous Div 2 Pentium bug, which cost Intel hundreds of millions of dollars, affected very few users. But he said: "This bug affects every user."

Krech also claims that the penalty can be avoided by a trick involving a non-sequential read. Intel says the effects Krech describes are documented and have been known about for years. A spokeswoman said: "It is a design decision, not a flaw."

Details of the alleged flaw are at www.intelligentfirm.com/membench/index.html

Iomega Maximises its tape back-up range

Iomega will release its Ditto Max range of multi-capacity tape drives early this year with cartridges that can back up 5Gb uncompressed.

The Ditto Max, which starts at £169, can back up 3.5Gb; the £229 Professional version can back up 5Gb. Verbatim's newest line of tape cartridges can also be used in the Ditto Max tape drives. DM-EXtra cartridges use Iomega's Flash!File facility, which gives fast access to up to 125Mb of selected smaller files as well as quick and reliable backup.

The tapes fit flush into the Ditto Max universal tray platform, Omnitray. Prices start at around £14.

•Verbatim 01784 894 555, www.verbatimcorp.com •Iomega 07000466342, www.iomega.com

ARM sits pretty amid Intel probe and OS war

British chip designer Advanced Risc Machines was riding high last month despite a question mark hanging over a deal by which chip giant Intel would buy into its technology.

The US Federal Trade Commission was scrutinising a $700m deal between Digital and Intel, prompted by a patents dispute between the two. Digital would retain its Alpha-chip design team under the deal but sell its chip fabs to Intel, plus the right to use other non-Intel technology including Strong-ARM, Digital's implementation of ARM's processor core.

FTC interest is not surprising, given that the proposals involve two of Intel's major rival architectures. The net, personal organisers and emerging appliances have unshackled computing from the Intel architecture, creating huge opportunities for the likes of ARM.

ARM president Robin Saxby said the Intel deal would create still more. But he added: "Whatever happens with it in future, we will be in a very strong position."

He said that ARM technology is licensed by over 23 other major companies, including giants like Texas Instruments and Samsung.

Devices using an ARM chip include the Apple Newton running the Newton operating system, and the Psion 5 running Epoc32. These non-Windows operating systems could also benefit from the same free-for-all that has helped ARM. But Windows CE is being ported to ARM, so it has a foot in all camps.

Reference design for a StrongARM-based smart phone

So does Saxby think that CE will sweep all before it? "It's too early to say. The market will decide," he said.

ARM 01223 400400

Creative boards for speedy gamers

Creative Technology will launch two new products for gaming fans this quarter. The SoundBlaster AWE64D, a PCI audio board targeted at PC makers, will incorporate the forthcoming EMU8008 digital audio technology.

Combining advanced wavetable synthesis with 64-voice polyphony, true 3D Positional Audio and a predictive cacheing system, it also provides SoundBlaster compatibility on the PCI bus. Also coming soon is the 3D Blaster Voodoo2, which claims to be the fastest 3D accelerator card to use 3Dfx Interactive's new Voodoo 2 chip. Creative promises that it will provide "stunning graphics and incredible textures" at three times the speed of the current Voodoo chipset. The card will be available for £200 inc VAT. **Susan Pederson**

Creative 01245 265265, www.creaf.com

Quicken gets the 'voice of doom'

■ A sneak preview of Quicken 98, released early this month, hints at improved usability and greater web integration.

Intuit has incorporated users' suggestions. Wizards have been added for regular transactions like tracking tax, and report formatting and bank statement organisation has been improved. Invoicing is now integrated into the main application and you are warned when your overdraft or share prices approach proscribed limits.

Intuit also plans to launch a "best of the financial web" site, giving updates on UK unit trusts, currency and share prices. It will also search for the best mortgage, credit card and loan rates published online.

Infotrade is supplying two hours of free net access per month for a year. Intuit says it has also agreed a major partnership for online banking. **Susan Pederson**

Intuit 0800 585058
www.intuit.com

Short stories

■ One in two advanced desktop owners do not plan to upgrade until their systems are between two and five years old, says Dataquest.

Silicon Graphics is trying to hurry them on with a transition programme which allows Unix Workstation users to part-exchange their systems.

Together with recent price cuts, this means that users can pick up an OCTANE power desktop for as little as £6,430.

Silicon Graphics 0700 074 5426
www.sgi.co.uk

■ Hi-Grade's Axionet PCs are designed for those who are short of desk space. They measure only 310mm x 250mm x 75mm.

The £899 (ex VAT) 200MHz MMX-based Pv200 has a 3.5Gb hard disk and a 15in monitor. The £1,199 233MHz Pv233 has 64Mb RAM, a 3.5Gb hard disk and a 17in monitor.

Hi-Grade 0181 532 6119
www.higrade.com

Westronic trade-UPS

■ Westronic now lets you part exchange an old or broken uninterruptible power supply (UPS) for a new one with a two-year warranty — for up to 50 percent off regular prices.

Westronic 0116 247 8488
www.westronic.co.uk

MS sells more OSs

■ Microsoft took 87 percent of the 76.6 million sales of operating systems last year. But the market grew by just 2.3 percent.

Apple and IBM together accounted for only six percent of the market, according to analysts IDC.

p29 ➢

Gates pushes CE with a Palm Pilot killer design

From Tim Bajarin in Silicon Valley

The true meaning of CE, as in Windows CE, was clear last month when Bill Gates introduced it into the Consumer Electronics area.

He used his keynote address at the Consumer Electronics Show in Las Vegas to announce its use in two new hardware platforms: the Palm PC and the Auto PC. The former is based on something that had been codenamed Gryphon.

It cribs from US Robotics' (now 3Com's) highly successful pen-driven Palm Pilot organiser. But it will come in various designs and shapes (all pocketable) from as many as 12 manufacturers during its first year — at least three by mid-1998.

Windows CE will make it more versatile than the Pilot, giving great scope to software developers; especially as the operating system can be used in a host of other information appliances.

And the new design will be able to handle up to 4Mb of memory compared with the Pilot's maximum 1Mb.

You will be able to use it out of the box for email, web access (with the graphics stripped out) and as an alphanumeric pager.

The Auto PC, actually a Windows CE platform for cars, is still more interesting as it breaks new ground. Its reference design can be integrated into a traditional AM/FM stereo radio system, perhaps with a CD drive.

Voice control, CD-based maps and global satellite positioning (GPS) can turn the Auto PC into a navigation system. It could also be used to tie-in local FM traffic.

Gates also showed the use of Windows CE on his web TV platform.

● *See News Analysis p47*

Psions get organised for work, travel and playing Monopoly

■ Psion users can take care of work, travel and play in one fell swoop this month.

Mobile Pages, from Mobile Software, provides access to data on virtually any corporate system, creating a compressed and indexed relational database on a Psion. It is available as a £95 standalone but has also been licensed by Nicholson London Guide and Prudential.

En Route, from Palmtop BV, will keep you on the straight and narrow while you travel in Europe (including Britain) and North America. You can specify the level of map detail and add your own stopovers and landmarks.

En Route will offer you a selection of routes, avoiding highlighted troublespots. Most GPS devices are supported.

Series 3 versions cost £69.96, while the Series 5 goes for £49.95.

Finally, you can rest up with a cosy game of Monopoly. Play with up to five real-live friends or against one of several computer characters, each with its own playing style.

Strangely, the game lets you alter the rules if you want, making it easy for you to recreate my patented "distract the other players and then rob the bank" strategy. Available for Series 3a, 3c and 5, Monopoly costs £29.95.

Susan Pederson

Mobile Software 0181 906 0002, www.mobilepages.com; Psion 0990 143 050, www.psion.co.uk

Short stories

£249 photorealism

■ The Lexmark 7200 claims six-colour photorealism at just £249. Printing at 1,200 x 1,200, the 7200 has more intense colours and greater shadow detail than previous models. The 7200 comes with the LivePix photo editor and a CD-ROM photo collection, as well as three cartridges with black, colour and six-colour photo ink.
Lexmark 01628 481500
www.lexmark.co.uk

Portable scanner

■ The portable1.6kg Mitsubishi Chemical S600C can scan anything from a business card to a poster. The £180 scanner offers adjustable 600dpi optical resolution and scans six colour or mono pages a minute. Xerox's Textbridge text-reading software is bundled.

Verbatim 01784 439781
www.verbatimcorp.com

CD-RW drive

■ Memory Technology claims its £399 Datawise CDRW-Pro is one of the cheapest rewritable CD drives available. It has six-speed read, two-speed write and a parallel interface. It is also CD-R and DVD compatible.
Memory Technology 0118 977 1588, www.memorytech.com

Intel launches three new motherboards

■ Intel has introduced three new boxed motherboards for vendors who put together Pentium II-based systems.

The AGP-enabled AL440LX is for high-performance desktops, the DK440LX supports dual processors for workstations, and the R440LX is for servers.
Intel 01793 431155
www.intel.com

p30 ➢

Comms shorts

■ 3Com claims its £199 (inc VAT) 56K Sportster MessagePlus is the first UK modem to store incoming faxes and voice messages without using a PC. It also has a 100-document fax-on-demand facility, and supports all features of the Sportster Flash.
3Com 0800 225252
www.3com.com

■ Harris Semiconductor is providing wireless LAN network chipsets for use in PC Cards, allowing PCs or peripherals to communicate without hard-wiring. InTalk's InstaWave, for instance, links PCs into a wired LAN. The system transmits at 2Mbit/sec, and has a range of 300 feet indoors and more than a mile outdoors.
Harris 01734 328585
www.smi.harris.com

Laptop commuter link

■ Don't annoy your fellow commuters with your loud, one-sided mobile phone conversations alone – drive them into a frenzy with your incoming emails and faxes as well. NEC's G9D+ has data and fax functionality when used with a Psion Dacom Gold Global PC card. You can get the G9D+ for about £9.99.

NEC 0645 404020; www.nec.com

Digicams get I-R

■ Sharp is partnering BIOS developer Phoenix to develop core technology to provide fast infra-red connectivity for appliances. More than one in two digital cameras are expected to use I-R by 2000. www.phoenix.com

New deal could end schism over 56K modem standard

Manufacturers released a new crop of 56K modem cards in December, while keeping a gleeful eye on the imminent truce in the standards war.

An agreement between the rival Lucent/Rockwell and US Robotics camps was expected to be reached at the International Telecommunications Union conference in Switzerland after we went to press.

The new V.PCM (Pulse Code Modulation) standard used to code the signal is likely to incorporate a slight preponderance of Rockwell's K56Flex technology, and should be finalised by this summer.

The settlement should boost the high-speed modem market. "Manufacturers were slow

to get behind the standard, and so customers were holding off," says David Curl, Psion Dacom's head of marketing.

"Corporate customers don't make purchasing decisions lightly. They don't want to have to replace everything within a year."

He admitted, however, that response to the 56K modem has been "rather muted" in Germany, where ISDN access is cheaper.

Electronic Frontier added two K56Flex fax modems to its Frontier XL range. Both can also be used as handsfree telephones and answering machines, and allow voice and data to be used simultaneously. Prices start at £99.

PPCP has also started shipping the £229 Modem 56, a 56K PC Card optimised for use in nearly 60 countries.

Psion Dacom scored a coup with a contract to supply 56KFlex card modems for Dell notebooks. They can be upgraded to GSM wireless or ISDN.

Susan Pederson

Psion Dacom 01908 261686, www.psiondacom.com; Electronic Frontier 0118 9810600, www.elecfron.com; PPCP 0181 893 2277, www.ppcp.co.uk

Vendors undeterred as cable modems stay off-line in UK

■ Manufacturers pressed forward with cable modem products in December, seemingly undeterred by the fact that UK cable operators still do not offer facilities for their use.

Rockwell Semiconductor Systems announced the first of a family of cable modem chipsets which, it says, will transfer data up to 700 times faster than conventional audio modems. The company plans to release its complete three-chip subscriber-side cable modem later this quarter.

Also released was Motorola's Cyber SURFR Wave Cable modem, which has an upstream data rate of 1.5Mbits/sec — double the 768Kbits/sec currently available.

Motorola also announced a new pricing structure for the CyberSURFR line that will start at US$325.

Both the Rockwell and Motorola products support the interoperability specifications from the Multimedia Cable Network Systems (MCNS) consortium.

Rockwell 01344 422777, www.rockwell.com
Motorola 001 (847) 632 5964, www.mot.com

p32 ➢

Boost for NetWare 3.12 as Novell flags 5.0

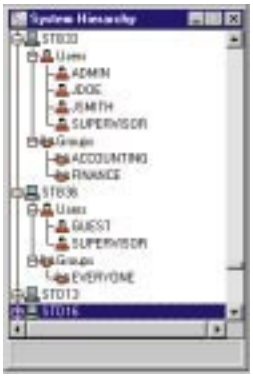
The next version of NetWare, code-named Moab, will ship this summer as NetWare 5.0. It will include enhanced versions of the functionality from Intranet Ware, which was launched last year.

The name Intranet Ware was used to stress how NetWare, still the world's most-used local networking platform, had embraced web technology. But the name will be dropped with NetWare 5.0. Novell technology director Dominic Storey said NetWare 5.0 will deliver next-generation intranet facilities and "provide the benefits of a single protocol, easier management, and increased bandwidth."

Novell has included two user-requested features in NDS for NT, due to ship shortly: a lock-out for people who repeatedly try wrong passwords, and a mailbox manager for MS Exchange. And it has launched an upgrade for NetWare 3.12 called the 3.2 enhancement pack which includes Year 2000 readiness, improved performance, simpler administration and an enhanced Syscon module (*pictured, right*).

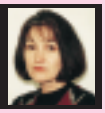
Novell will also sell a NetWare 3.2, including the enhancement, at 3.12 pricing.

www.novell.com



ART makes Pentium Pro look like a slowcoach

Caroline Swift continues her reports from Silicon Fen



Move over Toy Story. A Cambridge firm has just revolutionised photorealistic rendering, speeding it up with what is claimed to be the world's first ray-tracing graphics chip.

"The chip is here and it does what we said it would. It is a world first," claims Adrian Wrigley, who co-founded Advanced Rendering Technology (ART) nearly three years ago.

His new AR250 chip is some 15 times faster than a 200MHz Pentium Pro. The first production run has just arrived back from LSI Logic's fab in the US, coinciding with a funding boost from the Amadeus trust set up with £5m from Microsoft last summer.

ART is the first company to get Amadeus funding. It will now be able to expand, with first products out this spring.

The AR250 will be used in its first end-user product, the RenderDrive accelerator, for the generation of photorealistic images from 3D databases.

Hollywood-standard ray tracing (a way of generating photorealist images by simulating light paths) is currently performed slowly and expensively by large networks of computers. For the special effects in Toy Story, for instance, Pixar had to use 100 or so Sun workstations.

ART's chips have made the whole process very compact. They will be used in a dedicated 3D rendering appliance, a 19in rack-mounted unit targeted at professional animators. The AR250 chips are designed to work together in an array of between four and 64, says marketing manager Craig Wareham. A 64-chip array will be "like having 1,000 PCs networked together to render your pictures."

The company is targeting studios like Disney and Pixar in Hollywood and the Electric Film Factory in London.

The four-chip entry-level Renderdrive, equivalent to about 60 PCs, will be suitable for smaller studios and have a price-tag of £11,500.

The concept of ART occurred when Dr Wrigley was a PhD student in the Rainbow Graphics group at Cambridge University Computer Lab. He set up the company with Dr Daniel Hall and Peter Wynn.

Its technology, announced last August, has been welcomed by the graphics industry. With an interface based on the standard RenderMan language, RenderDrive can be used with leading 3D applications.

Because of the importance of the Californian film studios and technical back-up, ART has opened a US office. A couple of years down the line it expects to see its chip used to produce images for computer games and online shopping.

"Games quality has improved dramatically in past years but now designers are rising to the top end of what is possible," says Wareham.

"People like Nintendo are looking for the next technology. We intend to establish our products as the *de-facto* standard rendering technology in the fields of entertainment, design and visualisation."

Pictured: a teapot, ray-traced using RenderDrive and posted on ART's site at www.art.co.uk

● *Next month: turn your mobile phone into a web browser.*

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Internet shorts

Power crazed at Virgin Net

An insider report that Virgin Net has been suffering power outages has been firmly denied by the company.

According to a contractor who worked for Virgin Net, power systems at a site in London's Soho suffered severe spikes when staff plugged in electric fires and kettles to cope with the cold weather.

But a representative at Virgin Net said systems there were fine. She said: "We've got two sites, both of which are telecommunications environments — the same standard as 999. The UPS has battery backup of 40 minutes plus a diesel generator in case it fails. That's been in place since the start. The servers are distributed and mirrored so there's no danger to end-users."

www.virgin.net

Small businesses could be big business on net

The Department of Trade and Industry has stepped up its campaign to entice small- and medium-sized enterprises (SMEs) into using the internet with the launch of the Enterprise Zone web site.

Currently, two-thirds of the UK's 191,000 SMEs have the capacity to access the internet but less than a quarter actually use it. The Enterprise Zone, set up jointly by the DTI and the Business Links initiative, was launched in late 1997 with a view to making internet use more practical for SMEs. The aim is to make information more accessible by bringing together web sites that are particularly relevant to growing businesses.

The site began with links to 70 approved companies on the web. To date, a further 50 organisations have put forward their sites and of the 22 sites tested by the DTI, five are suitable for inclusion in the Enterprise Zone. Content includes general technology advice, market research guidelines and advice on how to procure or manage finance. Barbara Roche, the minister for small businesses, called for more companies to put their sites forward for inclusion on Enterprise Zone: "We are particularly keen to identify sites with good-quality financial information."

William Comery, spokesperson for Business Links, sees the site providing advice for specialist business too. He said: "The design of the site will be amended to include any number of links, ensuring that the Zone is still easy to use and reaching the largest possible audience."

With 8,000 hits scored within the first few weeks, the business community is enthusiastic about the £200,000 Enterprise Zone initiative but reserving judgement on its effectiveness. Stephen Alambritis, head of parliamentary affairs at the Federation of Small Businesses, sees the move as an important step forward: "Not all of our 100,000 members are on the internet, but we've featured the Enterprise Zone on our newsletter in the hope it will encourage them to get up to speed."

www.open.gov.uk
www.enterprisezone.org.uk
www.businesslink.co.uk

Backweb back for good?

Backweb has announced Infocenter 4.0, its client/server knowledge management software and the first fruit of its purchase of Lanacom's search agent tools last July. Lanacom owned Headliner, widely thought of as the best push client.

Backweb claims that Infocenter obviates the need for surfing, whether on the internet or intranet, for the majority of workers in a corporate environment. It enables the company to assimilate streams of information from a variety of internal or external sources and present them in one convenient place.

"If information isn't targeted, it's superfluous," said Nikki Nasch, Backweb business development director. Channels can be defined from sites, newsgroups and information feeds. Users can then subscribe to the channels and apply filters, alerts and searches to ensure they receive only relevant information.

Backweb claims it has addressed some of the problems that drew criticism of earlier push software (that it clogged up hard disks and hogged network bandwidth) by fitting Infocenter with bandwidth conservation features. Virgin Radio and the Belfast Telegraph are among the first UK users of Infocenter 4.0.

www.backweb.com
www.headliner.com

p36 ➢

Internet shorts

CompuServe firms up company reports

Find out your boss's real birthdate or your competitor's trading history from the comfort of your own desk with CompuServe's new company report service, provided by Infocheck Equifax. The service can be accessed from the Business and Professional Community, which serves up business information, news, travel and interactive business forums to CompuServe's 150,000 business members.

CompuServe has introduced a new variable pricing scheme for the reports. Members can download a basic report for free, which includes information such as contact details, date of incorporation, latest accounts and previous trading names. If they want a company's full, credit or director history, then a charge is levied against their account in US dollars (from $7.50 upwards).

CSI members can also get Business Tracker, which lets them track stock portfolios, look up exchange rates or get a quick market or country overview — for a small charge. There are live newsfeeds and an alert system notifying users with news or stock-price movement about selected companies. **Susan Pederson**

www.compuserve.co.uk

Email to hit the UK masses

Digital Mail wants to bring email to the masses, whether they have a computer or not. The company is launching a range of services under the title "Email for Everyone", including free web-based email, and low-cost email forwarding to mobile and land phones, fax machines and via conventional post.

"Despite the hype, less than one percent of the population have email — this is a service for the other 99 percent," said Digital Mail MD, Robert Darwin. "You shouldn't have to be a technical expert to communicate." Email for Everyone is an expansion of Digital Mail's DigiClub, a web-based email, groupware and forum service which, it is claimed, will connect email to the most ubiquitous communication devices — phones, faxes and surface mail — for nominal costs.

Owners of mobile phones with SMS (short message service) already have access to text messages, and Digital Mail intends to use this to provide email delivery to mobiles at ten pence per message plus the cost to the user of accessing SMS.

Email to fax will be charged at ten pence per minute plus the outgoing call costs. Email to land-based voicemail could be run on a premium-rate line, and email to surface post will be pitched at below £1 per item, said Darwin.

www.digitalmail.co.uk

UK Top Ten web sites

Once more, it's time to list the top ten tremendous new web sites around, courtesy of Yell www.yell.co.uk. Heading the chart is a site dedicated to the new Paul Verhoeven ouvre, Starship Troopers. "I fell in love with a starship trooper," mused our lantern-jawed editor, Gordon Laing, after an exciting trip to the cinema. "But then she was eaten by a giant bug."

1. Starship Troopers	www.starshiptroopers.co.uk
2. Steel Can Recycling Information Bureau	www.scrib.org
3. The Daily Star	www.megastar.co.uk
4. Get into Trouble	www.trouble.co.uk
5. Design It	www.designit.co.uk
6. Radio Times Guide	www.rtguide.beeb.co.uk
7. Sony Music Europe	www.sonymusiceurope.com
8. Edinburgh's Hogmanay	www.hogmanay.com
9. Glasgow's Hogmanay	www.hogmanay.co.uk
10. AmPhot UK	www.airtime.co.uk/amphot

World Cup kicks off

■ Football fans who cannot wait until the summer will be excited by the launch of World Cup Online, the system that will run behind this year's World Cup in France. A mix of database and internet technology will provide both a web site and an intranet information network for the media, running between the ten stadiums in use during the tournament.

The internet site holds a comprehensive history of the World Cup together with up-to-the-minute news on this year's competition. There is also information on the venues, teams and how to buy tickets for the games. Registering with the site gives you the chance to win a number of sweepstake prizes.

www.france98.com

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Net translation in a flash

Alta Vista is to offer a free translation service on its search-engine web site. Users will be able to have web pages translated to and from English, Spanish, French, German, Portuguese and Italian.

Users can simply cut and paste any text to the Alta Vista translation window, and push the Translate button. They can also enter a web address and get a translated version of a web page that maintains the original HTML layout.

The technology behind the service, developed by Systran, has been around for almost 30 years. The company currently offers the technology in a number of different forms, including a number of PC software packages (such as Systran Professional for Windows) and a fee-based online service called Systranet. The Systranet site offers a free demonstration of the translation service.

The free service on Alta Vista provides only rudimentary translation quality. The translation of this simple sentence, from English to French, and then back to English, is as follows: "The translation of this simple sentence, English-French, and then again with English, is as follows".

The system has most difficulty with long texts that contain specialised jargon, doing slightly better with simple email messages.

www.systranet.com
www.altavista.digital.com

EU for barrier-free IT

European single-market commissioner Mario Monti has welcomed a new agreement of EU ministers, which aims to ensure a single market for information services.

The EU's internal market ministers agreed on a directive that would require member states to draft national rules on free movement of information society services and notify the EC of any potential barrier to trade in online services. These drafts would then be subject to a three-month standstill so the Commission, member states and the industry can make comments and amendments.

"The proposed directive would help to ensure a true frontier-free single market for information society services, without which many services would not be viable," Monti said. "It would allow member states to legislate at the national level in accordance with their own traditions and priorities, without the imposition of harmonised rules at the EU," he added. "The notification procedure would encourage an exchange of ideas between member states, reduce the risk of countries adopting diverging measures, and help to avoid

inconsistencies which could undermine the effectiveness of national measures." The directive extends rules, requiring states to notify the EC about potential barriers to trade in traditional goods and services.

Information society services are defined as services provided by electronic means and would cover online professional services, interactive entertainment, online information, virtual shopping malls, and distance learning services. This definition will not cover broadcast services such as video on demand and teletext.

Information services in sectors harmonised by EU legislation would not have to be notified, while products in regulated markets would not be subject to the standstill, the EC added.

europa.eu.int

Internet shorts

Messenger for small firms

UUNET UK is offering an ISDN-based internet access service for small- to medium-sized companies who "run a business, not a network". UUNET claims users with an installed ISDN line will have Messenger ISDN up and running in half an hour. Businesses are given web access, ftp and a choice of domain name when they sign up with Messenger ISDN, which will be available from value-added resellers only. They can also get email services for up to 25 local area network users. The service costs £976 per year.

David Howard-Jones, director of marketing for UUNET, was asked whether he felt that small businesses have been more deterred in the past by the cost of ISDN installation and service than by the lack of products like Messenger. "It's a chicken and egg question," he admitted. "But perhaps services like these will help encourage ISDN takeup."

UUNET UK 0500 606 930; www.uu.net

Susan Pederson

Another electronic banking standard joins the fray

Eight banking companies have backed a standard for electronic banking set up by Hewlett-Packard, its electronic commerce subsidiary Verifone and systems integrator Electronic Data Systems (EDS).

The initiative, First Global Commerce, has been endorsed by a number of institutions including Citibank, Mondex, Royal Bank of Canada, Sumitomo Credit, Visa and Wells Fargo. But the standard will battle with others, one from Intuit and over 40 banks, and another from Microsoft, First Data and Visa. Visa is also working with IBM and Verifone on transactions under SET (Secure Enterprise Transaction) and analysts expect all the electronic banking ideas to be integrated within months.

www.verifone.com/first_global

Ever get that sinking feeling? Then try visiting the Titanic

Still haven't seen *Titanic*? Feeling left out? Then lose that sinking feeling by checking out the site sponsored by the Microsoft Network and Twentieth Century Fox to publicise the UK release of the latest film treatment of the disaster,

You get Titanic trivia, a virtual reality tour and a one-off opportunity to chat online with one of the stars of the film. Find out more about the film by exploring the site's multimedia section, and then learn more about the actual fateful event while you navigate the ship using QuickTime VR technology.

There's also the chance to win life preservers featured in the film (a hot collector's item) and exclusive Titanic merchandise.

www.titanicmovie.co.uk

New deal or missionary zeal?

Microsoft's adoption of HTML as its global document format can be seen both as a step back and forwards. Susan Pederson asks if it will help sell Office 98.

The computer industry is notorious for grand paradigm shifts, but one of the biggest mood swings of recent times has to be Microsoft's attitude to the internet. The Seattle giant sniffily dismissed the notion of the internet as late as 1995, while the rest of the world was already busily gearing up for the age of the web browser. But now, Gates has turned full circle, and in a fit of internet-friendly announcements is declaring HTML to be the platform of the future. Customers could be forgiven for wondering, though, whether Microsoft is actually onto something big or has simply been overcome by missionary zeal.

In December, Microsoft announced its latest convert to the cause — Office 98. The next version of Office, it declared, would support HTML as its default file format. This facility, it says, will allow users to read Office documents, complete with Excel spreadsheets and OfficeArt drawings, on any platform. It also plans to implement Extensible markup Language (XML) technology, which will preserve all the Office-specific formatting in a document.

Bloor: thinks that the office-suite concept is almost finished, with manufacturers just tweaking their products to attract buyers

Guy Swarbrick, product manager for Microsoft Office, says that making HTML the standard document format makes sense. "There's no reason to have any emotional attachment to old file formats," he says. "People migrated to RTF because it provides a good base-level of richness. HTML takes it a stage further."

Anyone who has tried to swap documents between two different word processors — let alone two different operating systems — will realise the advantages of a universal file format. Converting a file into HTML lets you view it on any platform, and it does make it easy to swap documents over an intranet.

But there are some drawbacks. First of all, HTML isn't yet as sophisticated as the current binary file format. Microsoft admits that it will have to phase in HTML and will hang on to its old binary file format for a while at least. You may also ask whatever became of Rich Text Format, which was touted not that long ago as the great universal standard.

The HTML move is justified, according to Mark Ryan, internet application product manager at Lotus, but he thinks that internet standards are driving users back to the lowest common denominator. He compares going from binary to HTML file formats as being "a bit like going from colour TV back to black and white."

"But we're quite happy to move down if it means getting everyone onto a common level. It's more important than dancing paperclips, and it drives costs down," he said.

However, Robin Bloor, head of Bloor Research, says: "They're going to run into problems with functionality. There are things like OLE links that HTML can't hold."

Given the resistance there was to upgrading to Office 95 and 97 (sales with new machines are still enormous) you may wonder whether users really want yet another version — even if it is based on HTML.

Bloor thinks the office suite concept has almost reached the end of the road. "I don't believe there's really been any significant improvement to Word since version 2.1. They're just trying to find new reasons for people to buy these products," he says.

Ryan says that Lotus had the same problem when upgrading its suite. "We ended up refining it instead, trying to make it smaller and lighter. We're kind of conservative when it comes to new standards. But you have to have HTML in there now, otherwise you are in denial."

Microsoft believes the office suite still has life in it yet, although Swarbrick says that future changes will be "less revolution than tweaking". He says that "people are still asking for new and novel features. No analyst has the right to decide what they should receive."

And Ryan believes that the move to HTML may completely change the way we think about documents in the future. "Information will probably be delivered by HTML — or some unknown variant — but it's more an enabling tool than anything else," he says. He believes that it's not the format, but the information that counts.

Fortunately for the manufacturers of office suites, however, it will not be the prospect of new information that will cause the vast majority of people to upgrade, but the need to keep up with a new format. ■

Toshiba, Samsung in bid to set 128Mb Flash standard

Samsung has joined Toshiba in a bid to establish a de-facto standard for 128Mb Flash memory cards, which will be used in mobile phones and digital cameras.

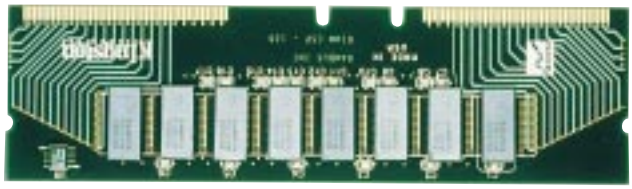
Samsung will support Toshiba's SmartMedia. The firms plan to release a 128Mb SmartMedia card in 2001.

SmartModular Technologies expanded its memory Flash Card line in December. It now includes Type II ATA in densities from 4Mb to 128Mb, Type I Linear from 2Mb to 32Mb, CompactFlash from 4Mb to 32Mb and Miniature Flash from 2Mb to 64Mb. All cards support 3.3V and 5V systems.

Smart Modular www.smartm.com

Anti-dumping deal will keep RAM prices stable

RAM prices should stabilise after an EU deal to stop Japanese and Korean vendors dumping chips in Europe at below cost. The deal signalled the end of anti-dumping tariffs imposed in 1996 after prices fell when the market was flooded with cheap RAM — good news for users, but not for European manufacturers.



Direct DRAM memory module (see also story below)

Chip makers have agreed to collect company data on costs and prices for DRAM and Flash ROM chips. This will be made available to authorities in the event of a new anti-dumping probe.

Dataquest analyst Richard Harris called the deal a "gentleman's agreement" freeing the EU of the hassle of regulation and helping companies monitor prices. He predicted that prices will bottom out and stabilise over the next year. "Prices have been declining particularly catastrophically in the last few years, but it's the way of the market. You get a few years of boom and roll, then bust and recovery."

Marina Sajitz, of Kingston Technologies, which has been hit by price falls in the past, predicted: "Prices will continue to fall slowly, although not at the same rate as the last two years. By March 1999 we'll start to see a shortage of products like 64Mb RAM, and that will drive prices back up again."

Susan Pederson

Memory races to keep up with processors

Two technology strands will evolve rapidly over the next two years to plug a growing performance gap between the PC processor and its working memory. DRAM speeds have increased only about tenfold since 1980, while the operating frequency of processors has increased sixtyfold from 5MHz to 300MHz.

The task of memory designers grows harder as system buses that transport the data get wider and faster (100MHz boards will ship later this year), leaving less margin for timing errors and signal degradation.

The next-generation fast RAM is evolving from Synchronous DRAM, which has more or less superseded Extended Data Out (EDO) and Rambus (RDRAM), currently seen mostly on graphics sub-systems but expected to migrate to main memory.

SDRAM is synchronised with the clock that controls the main processor, allowing the memory controller to know which clock cycle can carry data requests. It is triggered by the rising edge of the clock pulse. SDRAM can use four banks of memory, and has a burst mode that addresses blocks rather than individual bits of data.

Two variants are emerging. Coming this year is *SDRAM II*, also known as DDR (Double Data Rate) because it doubles the speed for a given clock frequency. It is triggered by both the rising and falling edges of the clock pulse.

SyncLink (SLDRAM), developed by a consortium of 12 memory and system vendors, is an enhanced version of SDRAM II using up to 16 banks of memory. New control logic uses packet protocols to maximise bandwidth for a given bus width.

	SDRAM			RAMBUS		
	Standard	DDR	SyncLink	Standard	Concurrent	Direct
Peak Mb/sec	125	200	400	600	600	1600
Organisation	JEDEC	JEDEC	SLDRAM	Rambus	Rambus	Rambus
1st shipment	1997	1998	1999	1995	1997	1999
Voltage	3.3	3.3	2.5	3.3	3.3	2.5

Chart: Kingston Technologies

Newsprint update

Rambus involves the use of a dedicated byte-wide linking circuitry and custom-control chips. It is used mostly in PC video cards currently but is expected to migrate to main memory. There are two variants.

Concurrent RDRAM uses a more efficient protocol to maximise bandwidth even with scattered data blocks, and can deliver 600Mb/sec. *Direct DRAM* uses16-bit linking at 800MHz with a 90 percent efficient protocol delivering 1.6Gb/sec.

Intel has endorsed Rambus by promising to support it in its chipsets from 1999, which would appear to give the technology a market edge over SLDRAM. But a white paper* from memory specialist Kingston Technology observes: "Predicting where the DRAM dust settles is difficult. All...the top ten DRAM manufacturers like Samsung, Toshiba and Hitachi are developing Direct DRAMs yet are continuing aggressive R&D related to alternative next-generation technologies such as DDR and SLDRAM."

**SDRAM and beyond: the rise of evolutionary DRAMs from 1997 to 2000.*

Other sources used were www.rambus.com and www.sldrm.com.

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Court reporter

Microsoft's legal battles continued as we went to press. But Bill Gates has a point when he says the browser should be part of an operating system, says Tim Bajarin.

Microsoft officials are bound to have mixed emotions about 1997. On three different occasions, the US Justice Department went for them over alleged anti-trust violations. Bill Gates has emerged as the Darth Vader of the business world and every time you pick up a newspaper paper, Larry Ellison of Oracle and Sun's Scott McNealy are bashing him.

The recent suit by the Justice Department took Microsoft to task for forcing PC vendors to bundle its Internet Explorer 4.0 browser with the Windows operating system on their machines. A federal judge's ruling outlawing this practice was a win for the DoJ. But the judge gave Microsoft some short-term wiggle room by refusing to impose the $1 million-a-day fine the DoJ wanted.

Window on the world: in Windows 98 you browse your hard disk or the web through the same interface

Microsoft officials say they will comply with the order, but what effect it will have in the long run is not clear. For one thing, I fully expect Microsoft to add the internet browsing feature into Windows 98 as planned. Also, keep in mind that IE 4.0 is free to hardware vendors, who have to pay a fee to include Netscape's browser.

For Microsoft, it is a case of "Damned if we do, damned if we don't". If it continues to ship IE 4.0 to PC vendors for free, it can be accused of predatory pricing practices; on the other hand, if it charges as part of an overall Windows licence fee, it could be accused of forcing the OS on the vendor. The debate at heart is about the definition of an OS, which must involve the finding of information on the hard disk or the network and managing that information no matter where it comes from.

Microsoft sees the net as one unlimited hard disk and believes that browsing it is a natural function of any OS. I suspect that Netscape agrees with that definition to some degree, but argues that the fetching of internet data demands a separate software tool or a dedicated browser. Ironically, we are in this situation because Netscape gave its software away for free until it had a huge installed base, and then made users pay for upgrades.

Now the definition of an OS is going to be decided by a legal establishment that has very little understanding of the dynamics of the PC business and almost no precedents to work from. Yet, in the end, Bill Gates will probably have the last laugh. Unless something dramatic happens to keep Microsoft from putting its browser into the next generation OS, the legal issue will be shortlived.

I predict that the bigger threat to Netscape and other Microsoft competitors will come from Windows CE, not from a Win98 or WinNT with a built-in browser. The battle for the desktop is over: Microsoft has won. Netscape and others can try for some of the desktop action, but the next war will be for the heart and mind of the consumers.

It is in the consumer market where Windows CE is poised to become a major standard. Except for a Java play by the NC gang, no other standards-building OS on the consumer horizon has any teeth. It is hard to define Java as an operating system as it stands today. An OS needs to have standard APIs and various calls that control things like printing, I/O functions and other digital housekeeping chores. Windows CE does that and more in code small enough to run on all kinds of digital appliances.

Java needs a lot of work to make it as viable as Windows CE is already. This will become very clear in early January when Bill Gates introduces his Auto PC platform that uses Windows CE. Windows CE will soon be applied to devices like the Palm Pilot and handheld PCs that are three times bigger than today's HPC devices. By mid-year, Windows CE will be in smart cellular phones and web phones. And by the end of 1998, it will be in Microsoft's Web TV and possibly in other PC/TV combinations as well.

Today, Microsoft has the Windows OS in millions of PCs. In the future, it could have Windows CE in billions of devices for the living room, the kitchen, the bedroom and even the bathroom. You can see why this prospect gets Microsoft's foes mad. This potential monopoly will stupefy the DoJ: how does it go after Microsoft in a market which does not yet exist and has no legal precedent? No wonder Bill Gates had a ho-hum attitude when he learned about the DoJ ruling. He knows that in the end, he will get his browser on all desktops using Windows 98, and he is on track to get his Windows CE on billions of digital appliances as well, and the Justice Department has very little legal power to stop him. ■

TV Times a'changing

Word is that the next killer app will be a TV guide. It may sound dull, but like the browser it could prove to be more than the sum of its parts. Clive Akass reports.

The next killer application will be an electronic programme guide to help you keep track of the new digital video and data channels which start going on air this year. So says Lana Vaysburd, head of Adaptec's Satellite Networking Group which is trying to kickstart the technology (*see page 25*).

The channels will be accessible via a set-top box and satellite, but in the early days at least you will get more flexible and possibly cheaper access using a sub-£200 adapter on your PC.

Gone will be the days of fiddling with video controls and squinting at tiny LCD screens to get your favourite programme on tape. You will be able to arrange both your viewing and recording easily — even remotely, via the internet — using a friendly full-screen graphical interface.

This may sound trivial — a kind of computerised TV Times — but, like the web browser, this guide could turn out to be rather more than the sum of its parts.

Bear in mind that there will eventually be hundreds, thousands and even millions of channels on tap, including land-lined web content. Satellites for the first time offer us cheap bandwidth: 45Mbits per second per channel in the case of Eutelsat, which is partnering Adaptec. Delivery will be predominantly one-way at first but still eminently useful.

The guides look like being to push technology (where informaton is broadcast for anyone wishing to access it) what the browser is to pull technology (where you seek and choose what information to download). But the distinction between browser and guide is already beginning to disappear in Windows 98, which is a primitive (in terms of what is going to come) attempt to draw all these features into one operating environment.

Cheap bandwidth will bring all kinds of small-business opportunities. There will be people with airtime to sell. Concert promotors may sell live videocasts as well as tickets. Football clubs may videocast away games for housebound fans.

Data broadcasts will be even cheaper. Eutelsat is already hosting two finance channels, but there will clearly be services for everything from racing results to software delivery. You may download your daily newspaper at night and print it (or rather, the bits you want to read) at home.

The guide may eventually have to do tasks like working out the cheapest way to get or send information, when several communications channels are in place (cable, ADSL, plain old telephone, satellite, snail mail). You may go for a cheap overnight service rather than a costly instant delivery, for instance.

All this is going to need an elusive critical mass of users even to begin to reach its potential, which could take anything from five to fifty years. My guess is that it will happen sooner rather than later, and that it will change lives almost as much as did the advent of radio and television. The effects will not all be for the good, but fears about Big Brother Rupert Murdoch ruling our lives may be misplaced. Cheap bandwidth will hand the media back to the people: you too can be a publisher. Even today, on the cart track we call the web, anyone can make money publishing anything if — a big if — they can attract the punters.

Rupert Murdoch's UK newspapers, including The Times, The Sunday Times and The Sun, are already gearing up for the digital revolution. All are available at www.lineone.co.uk, for a £4.95-a-month content subscription or bundled with a £14.95 internet access package (or £4.95 for three hours, plus £2.95 for each extra hour).

There are worries about electronic media alienating us from the "real world". This has already happened in many ways: we eat food from ground we never see; we have virtual families in the form of soap opera stars and their cousin, royalty (witness the mourning of Diana); city dwellers do not know what night is, because their sky never fully darkens.

But we could hardly spend more time communing electronically than we do already, and the new media are at least interactive rather than passive like television. They will mesh intimately with the fabric of our lives, which is why there is something eerie about these emerging electronic guides. They will end up programming our access to information according to our whims, wishes and likely needs. They will, to a degree, define our relationship with the world. ■

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Notebooks for power users

Mobile users can pick their poison — price, weight or flexibility — with the latest notebooks. Toshiba thinks it has worked out a good price to performance ratio with its 233MHz MMX-based Satellite Pro 480CDT.

With a 4.1Gb disk it is well suited for data-intensive presentations and costs £2,995 ex VAT. Advanced power management will let Win98, when it ships, switch devices off to save batteries.

Siemens Nixdorf expanded its notebook midrange with the "stylish and slim" Scenic Mobile 510, weighing less than 2kg.

It has a wedge design with rounded edges and a flat case in what is cryptically described as a "characteristic tendency green". A docking station is available. Prices start at £3,099 for a 166MHz model.

Mobile users may want to look at Pico Direct's Showman Pro 8600/9600 series. These are claimed to be the highest-spec models to offer a LCD panel that can be used with an overhead projector. The 166MHz models start at £2,499.

Susan Pederson

Pico Direct 01483 202 022, www.picodirect.co.uk;
Toshiba 01932 828 828, www.toshiba.com;
Siemens Nixdorf 0800 125 555, www.sni.co.uk

Short stories

Pilots get connected

■ Handfax, from Widget Software, lets PalmPilot users send faxes via a GSM cellphone or modem. Its HandStamp Pro gives them net email facilities. Both cost £49.95 (inc VAT). Widget 01438 815 444, www.widget.co.uk

Geofox price drop

■ Geofox has slashed prices of palmtops by up to 20 percent. An entry-level Geofox-One now starts at £385 (inc VAT). Geofox 0845 8440109, www.geofox.com

Super-8 server

■ Data General's NT server uses eight 200MHz Pentium Pro processors. The AV 8600 supports up to 1Mb L2 cache and 8Gb memory. Data General 0181 758 6000, www.dg.com

Program a historic computer

■ You would have needed a campus full of these machines to match the power of just one of the notebooks described above. But this one, nicknamed Baby, was the daddy of them all.

It was built at Manchester University in 1948 and is claimed to be the first digital computer to use stored programs.

Now the Small Scale Experimental Machine, as it was called, is being rebuilt for its 50th anniversary in a project by the British Computer Conservation Society and ICL.

Programmers all over the world are invited to enter a competion to program the machine. The winner will be run on the machine in a birthday ceremony on 31st June. Heading the judging panel will be Emeritus Professor Tom Kilburn, who wrote the first program for it.

Details, including emulation software, are at www.cs.man.ac.uk/prog98

Top 10 Windows software

			Last Month
1	MS Encarta Deluxe 98 CD	Microsoft	1
2	PC Protector Kit	Roderick	-
3	MS Flight Simulator 98	Microsoft	5
4	MS Bookshelf 1996 (Win 95)	Microsoft	2
5	Nuts + Bolts(3.1+95)	Xatlantic	6
6	MS Money 98 Financial Suite	Microsoft	3
7	MS Win95 UG +IE 4	Microsoft	-
8	MS Office Pro 97 + Books UG	Microsoft	-
10	IBM Via Voice V4.1 CD	IBM	-

Top 10 CD-ROMs

1	Music File 98	File Productions	
2	Oasis Interactive	Europress	2
3	Encarta 98 Deluxe	Microsoft	4
4	GCSE Maths	Europress	-
5	Encarta 98 World Atlas	Microsoft	5
6	James Bond: Ultimate Dossier	Eidos	-
7	Star Wars Trilogy	One Stop	7
8	Encyclopedia Britannica	Acclaim	-
9	Speak Fluent German	BTL Publishing	-
10	Encarta 98 Standard	Microsoft	6

Top 10 DOS software

1	PC Anywhere V5 Host	Symantec	-
2	System Commander v3.0	POW	4
3	DOS 2 Win95 UG with internet	Microsoft	1
4	Turbo Pascal v7.0	Borland	2
5	MS DOS v6.22 UG	Microsoft	3
6	Corel WP 6.2 UG	Corel	5
7	FSFX	UG for MS Flight	7
8	Novell Personal netware	Novell	8
9	MS Mail PC remote 3.2	Microsoft	9
10	Ms WFWG 3.11 Base	Microsoft	-

Top 10 peripherals

1	UMAX Astra 610p	UMAX	1
2	HP ScanJet 5P	Hewlett Packard	2
3	USR Sportster Flash EX	USR	4
4	MS Sidewinder Game Pad	Microsoft	5
5	MS Sidewinder Force Feedback	Microsoft	6
6	MS Sidewinder Precision pro	Microsoft	9
7	AWE 64 Value ISA	Creative Labs	8
8	Evergreen 486/586 proc UG	MID	7
9	Wacom Pen Partner Bundle	Wacom	-
10	USR Sportster Win Modem In	USR	-

Sounding Off

Revenge is sweet on those who dare to spam Michael Hewitt's inbox. He hates receiving junk email and suggests a cure, starting from the ISP end.

Michael Hewitt

Along with his Christmas cards, a Mr "John McHugh" (the quotation marks are his own, so I assume that it's a pseudonym) will shortly be receiving literature from the London Impotence Clinic, Readers' Digest, the Franklin Mint, Anglia Double Glazing, Quality Paperbacks Direct, and Watchtower Publications. This is because I've written to these organisations on Mr McHugh's behalf, expressing an interest in their products and asking that he be added to their mailing lists.

The reason Mr McHugh is benefiting from my seasonal largesse is that his company recently spammed my private email account. In other words, unbidden, he sent me, and no doubt thousands of others, email messages announcing a range of products and services which would apparently enrich my life considerably.

I daresay some people's lives are actually improved for knowing that at £14.99 each, Mr McHugh's toner cartridges represent savings over those in the high street. No doubt they're the same people who experience a frisson of excitement whenever it's announced that Fairy Liquid is now available in new lemon flavour, or that Winalot now comes in bigger, tastier chunks. The majority of us, however, are not just unimpressed but are aggrieved by the violation of our email in-boxes. So, as Arnold Schwarzenegger might say, "it's payback time".

While planning my revenge, I paused for thought: why is it that junk email causes such negative emotions, while its paper-based counterpart is merely regarded as a wastebin-enhancing nuisance? We may not be overjoyed about a pizza company telling us that on presentation of their unsolicited communication we can get a free soft drink, but most of us harbour no desire to retaliate by putting them out of business. I suppose it's because we at least realise (subconsciously, anyway) that some effort and expenditure has gone into putting it there. Flyers have had to be printed, envelopes stuffed and postal rates paid. That sort of thing. Junk email has cost the sender virtually nothing, in either time or money. Yet there's a possibility, however slim, that he might make some sort of profit from his venture (I believe there's something like a three percent positive response rate). Basically, we all have this in-built resentment against people who appear to be making a lot of money without apparently doing much to deserve it, hence our wry smile when a coachful of lawyers breaks down, or our barely restrained chuckles when a bankrupt estate agent has his Porche repossessed.

But lawyers and estate agents are always telling us that they're actually much misunderstood human beings; that if we really looked into what they did, we'd come to appreciate their personal qualities and their value as fellow human beings. So why, you might ask, don't junk emailers do this? In fact, a couple now do.

Check out www.webmarketeer.net for example. Basically, they say, they are truly noble people. We should be thanking them for their efforts, not decrying them. What we're getting isn't actually junk mail *per se*, but the salvation of the planet. That's right: Cyber Promotions and its ilk are really eco-warriors, right up there with Swampy and Greenpeace. By sending junk email instead of junk snail-mail they're preserving the Brazilian rainforests for us and therefore our children's heritage.

I applaud those sentiments, as we all should. Now that I'm aware of Mr McHugh's Green credentials, I'm seriously thinking of helping him out a lot more. So, if he does me a further favour by sending me another of his missives, I'll reciprocate by signing him up with yet another mail order firm. That way he'll be able to recycle all the material they send him; material which would otherwise be wastefully binned by less ecologically aware individuals. Indeed, I might even consider appending his address to the end of a future column, then all of you can assist him.

But for people who think this is all bullshit and that the internet is a worse place for all the junk that's now circulating, is there an answer? Of course there is. It just needs a few minor modifications at the ISP end. Telecommunication firms usually make a distinction between business customers and domestic: the business customers pay more because they get more. The ISPs should apply the same principles: if you're a domestic customer, you can do all you want for a tenner a month, the only downside of this being that you can't send more than 20 messages per day. You can reply to however many people mail you, but you can't originate more than 20 in a 24-hour period. If you try, you get heavily surcharged. Twenty is enough for anyone to communicate with, I would have thought.

Businesses, on the other hand, should be allowed to send as many emails as they like but there'd be a sizeable up-front charge for doing so. Junk emailers do what they do because it costs them nothing. Take away the cost advantage of mass emailing, and they'll stop.

Mike.hewitt@mjh1.demon.co.uk

Straight Talking

Barry Fox considers his standards. Well, not strictly *his* standards, but all those CDs, CD-Rs, CD-RWs and so on. The battle rages between the big industry names.

Barry Fox

Low-cost recordable CD has arrived. Sales of drives look likely to have reached two million in 1997 and to top five million in 1998. Sony has abandoned Mini Disc as a data format. "CD-RW is the only candidate for the Re-writable standard," says Hidetoshi Kamoto, general manager of the Data Storage Division. So many firms around the world have ramped up their production of blank write-once discs that there is massive over-production. Kodak is cutting back at its new Irish plant. Convoluted rebate offers in the USA have reduced the real price to zero. But there is method in this madness.

Blank CDs have so far been expensive and the no-erase restriction has been a deterrent. Tape steamers and removable hard disks have been getting increasingly cheaper. The latest Hewlett-Packard Colorado tape software finally offers the simple but vital feature of "disaster recovery", making boot floppies which let a PC use the tape drive needed to recover stored data. Didn't HP ever actually try and use it to restore after a crash?

The latest CD-R drives are cheap and record either onto write-once CD-Rs or erasable RWs. The price of RW blanks will only fall when demand ramps up production. Giving away CD-R blanks sucks people into buying drives. They get one free RW blank and get a taste. Then they start buying RWs. That's the theory, anyway. It may work, but as usual there are pitfalls for the unwary. And, most people promoting the products have only the vaguest understanding of what they are selling.

Six companies are pushing CD-RW (Sony, Philips, Yamaha, Mitsubishi, Hewlett-Packard and Ricoh). Philips makes the drives for HP. Sony is still promoting drives which can only use write-once blanks. Small wonder that Philips has the lion's share of the exploding market.

Let's recap. The earliest CD-record drives used only CD-R, Write-Once blanks. Although files can be deleted from a CD-R disc, this is done by altering the index of contents so a player cannot read the deleted data. The space cannot be recovered for re-use. The Universal Disc Format provides for random erasure on CD (and DVD) so that the optical disc works like a very high-capacity floppy disc. But the first CD-RW drives do not support this feature. When a file is deleted, the space is not recovered for re-use until the whole disc is bulk-erased.

It is only now, with second-generation CD-RW drives from Philips (and badged by HP) that the RW system is exploiting its full potential. Files can be deleted and the space re-used without the need to bulk-erase the complete disc. This random-access feature will eventually become standard but, until it does, anyone who buys a CD-RW drive without checking may be in for nasty disappointment. Conventional CD-ROM drives will only read RWs if they follow the Multiread standard. This adjusts laser sensitivity to match the lower reflectivity of RW discs, so when buying a ROM drive go for Multiread.

CD-Recorders, for home hi-fi use, also use RWs. But although any track can be erased, only the space recovered from the last music track on the disc can be re-used after deletion. All blanks look the same but there are two types of CD-R blanks and two types of CD-RW blanks: one for consumer audio and another for computer data. The difference is in the pre-embossed groove which guides the laser and provides timing information; a slight but deliberate difference, to stop PC blanks working on a consumer audio recorder. The consumer audio blanks are more expensive because in many countries they carry a tax or levy to compensate the music industry for home recording from CDs.

In theory, a PC recorder should be able to play either blank — consumer or PC. In practice, first-generation PC drives may work only with PC blanks. PC users will not willingly pay extra for consumer blanks but some shops may stock the wrong type through ignorance, or hope of a higher profit. The idea of split pricing is made a nonsense by software which comes with PC recorders and allows a PC to make audio recordings. The six CD-RW firms are promoting DVD-RW, an erasable version of DVD. This puts them in head-on conflict with firms who are backing DVD-RAM, another form of erasable DVD based on Panasonic's PD optical CD recorder.

The commercialisation of DVD-ROM hangs on Microsoft and whether DVD-ROM support is built into Memphis/Win98. There will be no drag-and-drop for copying movie files, but if the operating system can read DVDs and backup to RAMs or RWs, manufacturers will feel safe to build DVD drives into PCs.

The format battle centres on the Philips/Sony claims that DVD-RW can more easily be made compatible (with CD-ROM, CD-R, CD-RW and DVD-ROM) than DVD-RAM. Needless to say, Tosh, Pan and Hit dispute this. None of the DVD-ROM drives on sale will be compatible with future DVD-RW or DVD-RAM recordings. Which seems to me a good reason for not yet buying DVD-ROM.

■ 100131.201@compuserve.com

Business Matters

Software is not produced in factories on production lines; it is the product of a team of programmers' dedication and craft, which is why bugs still, er, bug.

Brian Clegg

As a bit of light reading (okay, I confess, it was for a review — I'm not that boring) I was recently perusing Robert L Glass's informative book *Software Runaways* (Prentice Hall, 1998). The subtitle gives the plot away — *Lessons learned from massive software failures*. There's always something deeply fascinating about disasters and other people's failure, but Glass isn't setting out to entertain — he provides lessons for the wary.

There are good reasons for caution, as devising systems and software is fraught with danger. Glass provides a horrendous list of calamity. Not being clear about the objectives of the system. Bad planning and estimating. Unfamiliar new technology. Inadequate or non-existent project management methodologies. Insufficient senior staff on the team. Poor performance by hardware or software suppliers... the list goes on. Strangely, one thing that isn't listed is incompetence on the part of the programmers.

If you are a non-programmer, this might seem strange. After all, when did you last hear of a piece of software coming out that didn't have bugs in it? Doesn't it seem reasonable that those overpaid programmers should at least be able to produce something that works without breaking? This is a thought that is certainly popular among the management of the large companies who employ programmers to write software for them.

In fact, the chances of a software project delivering perfect code on time are negligible. When Glass comes on to recommendations after the horror stories, most of what he deals with is managing risk and the issues that arise, rather than achieving perfect quality. Others have been bolder, applying to programming those mechanistic quality measures that get British Standard identifiers with unmemorable numbers attached. I have real doubts about this, because the whole approach is based on the false premise that writing software can be treated as if it were any other production line, churning out lines of code instead of forks or Mars bars. Frankly, this is wishful thinking. Life would be a lot easier if software could be produced by the yard, but reality is rather different.

Writing software, particularly PC software, is somewhere between an art and a craft. It is a product of individuals and small teams, not of a factory. This is something that IBM took a long time to learn. The traditional IBM approach was to throw a huge number of people at a problem, because this was obviously going to achieve results faster. In the early days of the IBM PC, IBM tried to increase the machine's popularity by selling a range of software under the IBM brand. This software was generally produced by small- to medium-sized companies who hoped to gain respectability (and riches) by dealing with the Armonk giant. In fact, many of them suffered, as IBM would throw more people into the team they sent to coordinate the development than the software company had on its payroll. The result would often be to stifle a productive small company and tie it up in confusion.

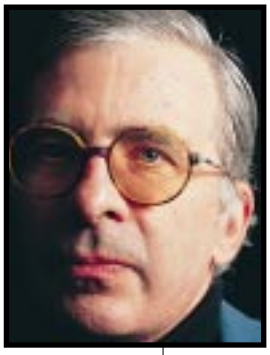
It's enlightening that Frederick P Brooks, the author of the classic book on how not to write software, *The Mythical Man Month*, was an IBM staffer. The book shows how the concept of programmer time as a production unit is totally fallacious. In fact, it is quite possible that doubling the size of a team can result not in halving the time that a project takes, but in increasing it. Reflecting the art side of programming, really great programmers can be ten times as productive as the average. What's more, it simply doesn't hold water to say that such prima donna programming isn't acceptable as the resultant code isn't standard enough. The result of eliminating the great programmers is not the same program written more conventionally in ten times the time. It's a mediocre product.

What is the answer? There's little doubt that Glass's risk management approach is right when it comes to systems failures, but buggy software needs something different. Just doing more testing isn't the answer either: plenty of problems will emerge only when the software is used in anger. Commercial software vendors have discovered a good way to exploit this — giving copies of beta software away to a mass audience has proved very effective at discovering flaws. This approach has yet to reach many corporates, but a variant on it would be worth considering. After production, the assumption should not be that the software is going to work in all circumstances, resulting in angry calls and recriminations. Instead, the user should accept there will be problems in exchange for the developers committing to quick fixes, ideally by putting a hot programmer in with the users for periods when the new software will be in heavy use. We could even get to a state where "new software has bugs" isn't news. Or is that too much to hope for?

BrianClegg@msn.com

From the desktop

Tim Nott lives the life of a superhero — well, at least in comic-book form. A superhero of old, Asterix, teaches French, and our writer returns to journalism school.



Tim Nott

Skrak! Thwipp! Wump! Pow! Fwamm! No, I haven't been at the controlled substances, but I have been at the Marvel Super Heroes Creativity Centre. Amid the concrete walls of New York City, at the Marvel Headquarters where the legendary Stan Lee and his team work tirelessly to chronicle the epic tales of the world's greatest superheroes, someone, or something, is trying to sabotage the completion of the latest epic. All communication in and out of New York City has been cut off, and all the Marvel artists have disappeared without trace. Only you can help Stan finish the book and unmask the Super Villain At Large.

Fortunately, Stan has a special studio kept ready for such emergencies. If you want instant creative results, there's the layout table where you can make posters, comic-book covers and so on, by dragging and dropping from a selection of backgrounds, characters and other props. Disappointingly, these only appear to print out at screen resolution. At your desk, you can listen to news bulletins and loud music on the Spidey radio, or browse the computer database. This contains a small selection of the artists and their creations so you can bone up on Snowbird (real name, Anne McKenzie Narya; current occupation, goddess), Doctor Doom (real name, Victor Von Doom; current occupation, monarch; former occupations, student, scientist and leader of an order of Tibetan monks) or Spiderman (real name Peter Parker; supernatural powers derive from being bitten by a radioactive spider). An interesting bunch, I'm sure you'll agree, but sooner or later you're going to have to get down to some real work at the drafting table. Here, there is a series of lessons and assignments covering the basics of drawing: form, shading and perspective. This is real hands-on stuff. You don't pussyfoot about with computerised drawing tools, but will need real pencil and paper to complete each lesson. There's a load of activity sheets you can print out (this time, fortunately, at full printer resolution) to help you practise sketching, colouring and so on. Having learnt the basics you move on to the Marvel secrets and technical niceties of drawing characters such as Spiderman, Wolverine or the Incredible Hulk. At the end of each assignment, a Marvel Challenge tests your knowledge and you get another step nearer completing the course and unmasking the mysterious Super Villain.

Heroic perspective: learning to draw the Marvel way

Digital drumming

Continuing on the onomatopoeic theme, how about a bit of thub-chikka thub-chikka thub-chikka BAMM! kraaash? DrumX is a drumkit that exploits the MIDI capabilities of your sound card. It's a joint venture by drum makers Simmons and leisure software house Kit for Kids, and, with the help of your sound card's joystick port, it is fully plug-and-play. Or in my case, plug, crawl on the floor and play, as the PC sits underneath the desk and the DrumX lead is too short to reach the desktop comfortably. DrumX looks like a large mouse mat, and indeed will function as one if you don't mind it tipping up when you rest your hand near the edge. It sports a picture of a drumkit, divided up into pressure-sensitive panels. The companion Kitbuilder software shows a similar picture, but you can configure each instrument from a range of 120, and save up to six drumkits for instant use. You can play the pad either with your fingers or with the sticks provided, and a couple of extra panels at the side of the kit add configurable special effects such as rolls, pans and bends.

Unfortunately, I'm not able to do this fine product the justice that it deserves. For a start, my cheapo standard 16-bit sound card wouldn't play all of the 120 available

Give it some stick with DrumX

instruments, and those that it did sounded very quiet in comparison with file-based MIDI. In fairness, the packaging does state that you need a 32-bit wavetable sound card. Secondly, I can't play the drums anyway. But if you have percussive talent and a wavetable sound card, this could be just the thing for practising at home or for relieving tension in an open-plan office.

Learn yourself Gaullish

And now for yet more noises. Plouff! Ouiiiin! Roooon! Zzz! Those last two, I should mention, are the sounds made by the only Gaullish rooster with adenoids. And if that doesn't give you a clue, then Par Toutatis! Yes, we're in the company of Asterix, Obelix and their chums, who are teaching us French. You get two CDs which run on Windows 3.1, 95 or Mac, straight from the CD-ROM. The heart of the matter is a gripping yarn, in traditional cartoon format, about the mysterious arrival of a baby in Asterix's village. When Obelix accidentally doses the baby's bottle with Magic Potion, the content of the nappy hits the ventilation system in earnest: cows go flying and Roman soldiers are used as rattles. This isn't really aimed at absolute beginners, but those with the basics can improve both their written and spoken French by just listening, just reading the speech bubbles or both. For each frame, a translation and teacher's notes on vocabulary and usage are a button-click away. The latter are particularly well thought out, with additional information such as when and where to use the dreaded subjunctive.

Put that cow down! Asterix teaches French

You have a choice of seven "home" languages, and other titles in the series include Irish, Welsh and Latin. Despite having lived in France for four years, my French has ample scope for improvement in any direction you care to name. As an Asterix fan, I found this an excellent and fun way to progress.

World view

Next up is the National Geographic Photo Gallery, which contains the work of contemporary photojournalists such as William Allard, Randy Olson and Melissa Farlow, and comes with a copy of PrintMaster Gold Classic 4.0, which enables users "to quickly and easily integrate these landmark photographs into… greetings cards, signs, posters, and more." As with Asterix there was no setup and nothing copied to my hard disk, and unlike Asterix, no prompts to alter my display properties. These people know the way to a reviewer's heart. From the three buttons, I chose "View and Export". It appears that Mindscape picked this viewer up second-hand, as it offered me the option of searching under Media (watercolour, oil, cut paper), Tone (humorous, traditional, spiritual) and Style (abstract, painterly, cartoon). But since all the images on here are photos, none of these other options return any hits. In fact, it's hard to stop thinking of ways the viewer could be improved: thumbnail view is awful, you can't open a picture in a separate window, and you can't set it as wallpaper or any other of the options you might expect from a decent browser.

Spot the first mistake as a EuroReporter

Approaching the collection through the Photographers Gallery button makes a rather better job of things. Your web browser springs into action and you can view the work of each photographer, with text and spoken voiceovers, and small slideshows of their work. Although the usual browser "Save picture" command exports the full 640 X 480 jpg to your chosen destination, there is no in-place way of viewing the images full size.

The photo-journalism itself is more eye-candy than reportage — don't expect too much McCullen-esque shock or Cartier-Bresson observation — but nevertheless contains some stunningly gorgeous images, ranging from the polar landscapes to lots of happy smiling faces. A pity that the means of looking at them is so badly implemented.

PCW Contacts

Marvel Super Heroes £24.99, Zablac 01626 332233 www.cloud9int.com

DrumX around £49.99, 0500 222220 www.simmonsdrums.com

Asterix Interactive French £29.99, EuroTalk 0800 0182551

National Geographic Photo Gallery £29.99, Mindscape 01444 246333 *www.mindscapeuk.com*

EuroReporter Helicon 01865 246448

Letters

Send your letters to:

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32-34 Broadwick Street
London W1A 2HG

or email
letters@pcw.co.uk

or fax **0171 316 9313**

All white on the night

Glancing through the latest copy of *PCW*, something struck me that has been staring me in the face ever since I first owned a PC (I hadn't noticed it before). It's white. Or at least, slightly off-white. Or cream or light grey. And so are the cases of virtually every other external component available for PCs — monitors, scanners, modems, the lot.

When you buy a car, one of the most important considerations is what colour you want. But this is not an option when purchasing a PC or component. Surely it would not be beyond the ability of manufacturers to paint their cases a different colour, or put a dye into plastic for the cases of components with plastic cases? To corrupt the phrase coined by Henry Ford: "You can have any colour you want as long as it's white". Does anybody have any suggestions as to why this is the case (excuse the pun)?

Nigel Wilson
Wils12x12@aol.com

We agree, but despite occasional attempts by some manufacturers to come up with something different, it's never really caught on. ADI offered a coloured monitor, keyboard and mouse, imaginatively called the Yabba-dabba-duo. Agfa has recently boasted the world's first black flatbed scanner, and a couple of manufacturers have shown home entertainment PC systems in reassuring darker shades. It's down to economics and demand, with most colour options coming from specialised painters. Certainly the PC will never really become truly welcomed into the living room next to the TV and VCR unless it shares the same coat.

Modem mystery

I thought your readers may be interested in sharing what appears to be a well-kept secret concerning net connectivity.

I recently upgraded my modem to a 33.6K model. I was surprised, however, when my connection speeds were still no faster than an indicated 28.8K, and often much slower. I queried this with my ISP who suggested that the fault lay with my telephone line.

I contacted BT which informed me that it was necessary to make a modification to my line at the exchange in order to allow faster transmission speeds. This work was carried out free of charge and my connection speeds did go up slightly. However, the fastest speed that I have seen is only 31.2K and it is still often 28.8K or less.

BT has said that there is nothing else it can do. Apparently, 28,800 is the fastest reliable speed at which standard copper telephone wires can transmit; anything above this should be considered a bonus. This seems at odds with the claims made by modem manufacturers and ISPs which are both heavily promoting connection speeds of up to 56K. It is as well to be aware of this situation before investing in the latest modem technology.

Glen Mitton
glen@mitton.co.uk

Data transfer speeds are affected by a number of factors, including your modem, phone-line quality, net service provider and how busy the internet is at any time.

The 33.6Kbps and 56Kbps data transfer rates quoted by modem manufacturers refer to

Contribute to our anniversary issue

May 1998 sees the 20th Anniversary of *Personal Computer World*. Yes, we're older than the original IBM PC! To celebrate, we're putting together a special issue — and you can help. We're looking for long-term readers of *PCW*, or anyone who's been involved in the IT industry in some form, to write and tell us how it's changed over the past two decades: which systems, software or events stood out and changed the way you work.

Please write to us at the usual *Letters* address (*above left*). Your contributions will be most welcome. And don't forget to vote in our 1998 Awards (p116) for the chance to have your say and win £1,000-worth of PC equipment of your choice.

p66 ➢

the theoretical fastest speed possible over a particular modem; a point that PCW *always makes when reviewing modems. In everyday use, 33.6Kbps modem owners achieve speeds of around 31 to 32Kbps at best. Users of 56Kbps modems are generally seeing transfer rates in the low forties. And remember, this is only incoming from ISPs with 56K technology. The outgoing transmission rate is the same as for 33.6Kbps modems.*

Unclassified carnage

What exactly is all this trouble with Carmageddon? Look at it this way: if the original game had been released with blood, it would have carried a censor's "18 certificate" and people could then have chosen whether or not to buy it.

But no! The British Board of Film Classification (BBFC) decreed that Carmageddon was unacceptable, despite allowing games like Quarantine and Twisted Metal through its net.

So Carmageddon is released with "zombies". Fine. But now the game doesn't warrant a certificate. So, with the Splat Pack recently released, anyone with enough sense to buy a computer game and install it can now have the Splat Pack where you mow down pedestrians.

I am not against Carmageddon. In fact, I have both it and the Splat Pack, and think it is a great game. But I believe that game would be much safer with an "18 certificate" rather than the current situation, where even a child of ten can buy and play it.

Come on, guys, let's have a British Board of Film Classification, not a British Board of Complete and Utter Rubbish.

MJ Kimber
MJKimber@aol.com

In praise of the IT girls

I read with interest your article on women and IT (*PCW*, Feb). As an IT student I beg to differ with the author's view that there are not many women entering the industry. The majority of my fellow students on my HND software development / computer support course are females and do as well as the males, if not better. Also, a large portion of these female students are more mature (30 or more years old) so do not have the advantage, like myself, of having been taught computing at school or having learnt at home during the home computer boom of the early eighties.

However, I have to agree with the comments made about sexism: that it is still rife in the workplace, especially in the fields of computing and engineering. I have overheard some of my fellow male students putting down female students' aims for a career in programming or network support. These commentators are in the minority, however: I am glad to say most of us men are happy that more women are looking to the IT industry for a satisfying and worthwhile career.

William Stewart
billystewart@hotmail.com

The BBFC replies: *"In 1995-96 we wrote that '…violent video games are less violent to play than to contemplate, since the focus is on beating the machine rather than the human figure… the violence is more symbolic than realistic, with nothing like the impact of video violence, where one identifies in a human way'.*

"This was true for the BBFC until we encountered Carmageddon. The Board took the view that a competition in which the player is rewarded for the hit-and-run killing of passive, indeed docile, human-like figures was morally reprehensible and likely to encourage callousness towards the suffering of others.

"The game was refused a certificate in June and appealed in the summer, to which the Board responded with its reasons for rejection. The Appeal was heard on 31st October, and the panel split three to two in favour of the appellant, as a result of which the Board had no choice but to grant an '18' certificate."

The Irish question

Having received a newsletter from the Microsoft Network about its new 56K access number for the UK, I decided to investigate when such an access number might be available to MSN Ireland

customers, such as myself. I chose to email technical support with my query. Yes, my query was responded to within 24 hours. No, I was not impressed with the response I received from Jason at MSN technical support.

The reply I received was: "I don't know." Full stop. He's certainly not one for beating about the bush. Apart from the not-so-interesting "Tip of the Week" about busy web sites, there was no further information offered and no advice as to who I might contact about the issue.

So, after that little encounter with MSN technical support, I am still in need of enlightenment as to the availability of a 56K access number for the Republic of Ireland. Any ideas?

Colin McCarthy
C _ McCarthy@classic.msn.com

We contacted Microsoft which helpfully confirmed that there isn't a 56K access number for Ireland and could not provide us with a date for one in the near future.

Date lines

Good article about year 2,000 problems in your February issue. But what about Son of the Millennium Bug? The year 2000 is not a leap year, due to the fact that leap years take a little bit too much time off the world's rotation. The exception to the rule applies every 400 years. So 29th February 2000 is not going to happen.

Ironically, my Gateway 2000 successfully passes the Y2K rollover: it thinks 29/02/2000 exists — perhaps that's why it's called a Gateway 2000? But guess who falls foul of Son of the Millennium Bug? Microsoft!

Both Win95 and Windows NT4 also think 29/02/2000 is a real day. The upshot of this is that Tuesday 1st March will become Wednesday 1st March etc. so you'll be perpetually a day ahead of yourself.

While that nice Mr Gates may think everyone in the world will be using Windows 98 or Windows NT5 by then, he'd be wrong. I mean, there will be people still using Windows 3.x on that auspicious day. Actually, I look forward to seeing if the new Windows incarnations also fall foul of the Son of the Millennium Bug.

Simon Booth
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Sound advice

In a fit of madness at a charity auction I became the proud owner of an IBM 730-75 Pentium PC model 6876-N5F. I would now like to fit graphics and sound cards but understand that since it is an MCA system, this could pose a problem. Can you tell me which companies could supply new or secondhand MCA cards?

Chris Elliot
(email address not supplied)

IBM's MCA (Micro Channel Architecture) failed to set the world alight and disappeared into expansion-bus obscurity. Consequently no-one, as far as we know, manufactures new MCA products so we're afraid it's back to the secondhand market, either through stores like Morgan Computers or, dare we say, computer auctions.

Speed tests

Please clarify a point in Will Lean's letter (*PCW*, Feb): he says Intel processors run Quake faster than the "equivalent" AMD K6. As I understand it, Quake is a DOS game and not a dedicated Win95 game. Does this mean that the K6, which is apparently very hot with Win95 software, will run dedicated Win95 games equally quickly?

Mike Kitchen
Mike.Kitchen@tao.j-sainsbury.co.uk

While Quake is a DOS game, id software created a Win95 version with the release of its upgrade disk (v1.08). The new Quake II runs under Win95 and WinNT only.

As for the processors, it is widely accepted that Intel does indeed have a stronger Floating Point Unit which handles the calculations, needed by games like Quake, faster. All our tests have shown this to be the case but the actual difference in performance ranges from two to four percent, depending on the application.

The truth is, however, that it is the graphics card which can really make or break gameplay performance. Graphics cards like the Apocalypse 3Dx, Monster 3D or Righteous 3D have shown how much they increase the frame rate of games (see our Graphics Cards group test, PCW *Dec '97).*

Reporting a fault

I would like to say how sorry I am that you failed to point out in your review of 3D graphics cards (*PCW December*) that although ATi Xpert@play does well in tests, it will not deliver the goods on certain games.

I followed your advice and purchased an Xpert@play 4Mb, only to find that in Quake 2 it does no better than the 2D card it replaces.

Roger Hanke
roger _ ha@online.rednet.co.uk

We chose the ATI Xpert@play not for its ability to play one game only, but for all of its features compared to those of its competitors — we stand by our choice. Some good news is that ATI will be releasing OpenGL drivers for Windows 95 which will then be able to run Quake 2 and, hence, provide superior performance. Expect these in the second quarter of this year. ■

Gadgets

Compiled by Adam Evans. Photography by David Whyte.

First colour palmtop

Boasting a full-colour display and integrated voice recording, the **HP 620LX** is the first colour palmtop to arrive at *PCW*. Hewlett-Packard is aiming this fully-featured handheld PC at the presentation-giving travelling professional. Windows CE 2.0 features Pocket PowerPoint which, in conjunction with a special palmtop-to-VGA PC card, can display slideshow presentations created in PowerPoint. This will certainly ease the strain of lugging heavy notebooks around, but we reckon those travelling professionals will only be truly happy once Quake is ported to CE so that they can fill their dull hotel-bound evenings. The HP 620LX is reviewed in full in *First Impressions*, page 74.

Price £799 (£680 ex VAT)

Contact Hewlett-Packard 0990 474747 www.hp.com

Label of love

Are you one of those people who can look in the mirror and honestly say to yourself: "Labels are my life"? If so, you have an excellent excuse to splash out on this gorgeous label printer from Seiko. It uses direct thermal printing technology for quick and tidy results, with each label taking about three seconds to print. The software will automatically re-size text to fit the labels and you can even print postal barcodes, giving a helping hand to those splendid people at the Post Office.

Price £129 (£109.79 ex VAT)

Contact Seiko 01628 410357 www.seikosmart.com

Mouse of distinction

Occupants of mahogany-clad boardrooms throughout the land can breathe a sigh of relief with the launch of the Venus mouse from Primax. The exquisite fake wood effect is designed to blend in seamlessly with the most elegant surroundings: it is not for nothing that Primax subtitles it "The Distinctive Mouse". On the more prosaic side, it has three buttons and a moulded grip, and comes in a variety of colours including silver white, anthracite grey, sapphire blue and forest green.

Price £19.99 (£17.01 ex VAT)

Contact Primax 01235 546020 www.primax.com.hk

Organise your life

People often ask us: "What's in your pocket, mate?" The launch of this little doobrie from Texas Instruments provides a convenient smartarse answer: "All my addresses, telephone numbers, reminders, notes and tasks". All this information is accessed via a keyboard, a dedicated calculator-style number pad and a backlit screen capable of displaying 24 characters on each of its six lines. There is a password-protected area for storing confidential information and all the data can be synchronised with Lotus Organiser on your PC. If all you want is a small, light device for storing information, the Pocket Mate 400 could be right up your alley.

Price £169.99 (£144.67 ex VAT) with Lotus Organiser; £149.99 (£127.65 ex VAT) on its own

Contact Texas Instruments 0181 230 3184 www.ti.com

Talking loud and clear

Are you tired of frantically searching for your microphone each time you want to record a brilliant idea that pops into your head? Philips may have the answer to your problems with the Speech Mike, a combined microphone and trackball that takes the place of your mouse. It has an in-built speaker, features full support for "professional dictation" (*someone who's paid to talk constantly? - Ed*) and the supplied software allows you to control SoundBlaster applications via the built-in play, record, rewind and fast-forward buttons.

Price £116.33 (£99 ex VAT)

Contact Philips 01206 755802 www.philips.com

Scanning room only

There are lots of reasons for buying a scanner. Fuji, the maker of this neat colour version, would have you believe that it is ideal for both business and home use. But let's be honest: 99 percent of all office scanners are used for tweaking office-party photographs into depraved images more suitable for the walls of a Roman orgy house. Which is nice. And what's nicer still is that the Fuji CS-1 scans photographs without bending them, leaving the originals in a suitable condition for showing your grandmother. Turn to *First Impressions*, page 87, for a full review.

Price £169.99 (£144.67 ex VAT)

Contact Fujifilm 0171 586 3787 www.fujifilm.com

First Impressions

There are two new **HP CE 2 PDAs** compared on p74. And for the fastest notebook available, look at the **Apple PowerBook G3** (p77). We offer you peace of mind on p89 with **Norton Utilities 3.0** and **Borland' s** best yet, **dBase version 7.0**, is on p92.

Hardware

Dell Dimension XPS D333

Almost all you could want: nice insides, nice price with a new, fast, Deschutes processor.

Intel has just released a new speed of PII processor, this time cranking the speed up to 333MHz. The D in the XPS D333 refers to Intel's codename for this processor: Deschutes. However as well as being faster the processor marks a significant move forward in that Intel has reduced the die size of the chip. The PII 333 is built using a 0.25 micron process, rather than the older 0.35 micron process. Simply by shrinking the chip using 0.25 micron process, Intel can speed up its processors as the transitions (the electrical pulses of ones and zeros) occurring on the processor are physically closer together, so the speed is automatically increased.

Intel says it can produce processors running at up to 450MHz using the 0.25 micron process and expect to introduce these in the next year. The smaller die size also means that the voltage has to be reduced, so power consumption is down to around 19W, compared to 38W on the PII 233. The PII 333 fits into the same Slot 1 as the earlier versions. Intel announced plans to build 333MHz versions of the chip for a range of different machines and not all of these will have

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

the same connection to the motherboard (see this issue's *Newsprint* section). And like earlier versions of the chip the PII 333 still has 32Kb of L1 cache and also within the cartridge 512Kb of L2 cache which runs at half the core speed of the processor; in this case at 166MHz.

To make the most of this new processor, Dell has put together a formidable bundle. The first thing that strikes you are the drives, which include a Hitachi GD-2000 DVD drive and an internal Iomega Zip drive as well as a standard floppy drive. The DVD drive is a second generation drive and so will read CD-R disks, and this is coupled with the necessary MPEG card inside. Intel was claiming that you should be able to run DVD with software MPEG on this processor, but Dell has obviously opted to play safe.

To match the graphics to the processor, Dell has, as you might expect, included an AGP graphics card: the Velocity 128 from STB. The PCI version of this card won a *Highly Recommended* award in our last group test of graphics cards (December '97 issue) and was one of the most impressive performers, both on 3D and 2D performance.

The other components are well thought-out. The hard disk is a massive 9.1Gb Ultra ATA model from Seagate, which is plenty large enough for almost any user. However it was not partitioned which would have made most people's lives much easier. There is 64Mb of SDRAM in two DIMM slots, which leaves one DIMM slot free for RAM upgrades. Sound is handled by a Creative Labs AWE 64 Value, while the speakers are a set of ACS495 speakers from Altec Lansing. Unfortunately Dell was unable to get its hands on these speakers early enough for the review, so sent us ACS295 speakers instead.

There is not a great deal of expansion room in the tower case. There are two free PCI slots and one free ISA slot left by the time you have got in the video card, sound card and MPEG card, which does not leave a great deal of free room if you are going to add such standard components as a SCSI card and an internal modem. There is one free 5.25in and one 3.5in front facing bay and an internal 3.5in bay for a second hard disk. There is USB on the motherboard, with two ports enabled, as well as the usual serial, parallel, and two PS/2 ports.

The system comes with a 19in Philips monitor. It is capable of a top resolution of 1600x1200 at 75Hz and has a viewing area of 17.9in.

Windows 95 is loaded on the machine and it comes with a copy of Microsoft Office 97 SBE on CD. In the box there are also three spare zip disks, drivers for the sound-card, video card and IntelliMouse, but the drivers for the video card did not work when we had to reinstall. Instead Dell has a folder on the hard drive with all the updated drivers on it — just as well we did not decide to format C. There were no drivers in the box for the DVD drive and no boot disk, so again if you hit a real problems you are going to have to work round it carefully.

Despite these minor gripes it is a good machine with just about everything you could wish for from a machine and at £1,974 it represents excellent value for money. The performance was not as good as we had expected from Intel's performance figures, but it is nevertheless a very quick machine.

Adele Dyer

PCW Details

Price £2319.45 (£1,974 ex VAT)

Contact Dell 0870 152625; www.dell.com/uk

System Reviewed PII 333, 64Mb SDRAM, 9.1Gb hard drive, 19in monitor, DVD drive, Zip drive.

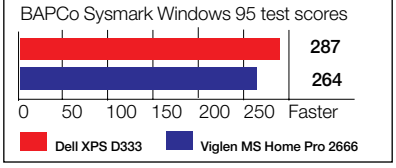
Good Points DVD and Zip drives.

Bad Points Performance not as good as expected.

Conclusion Good components at a very good price.

★★★★

Performance results



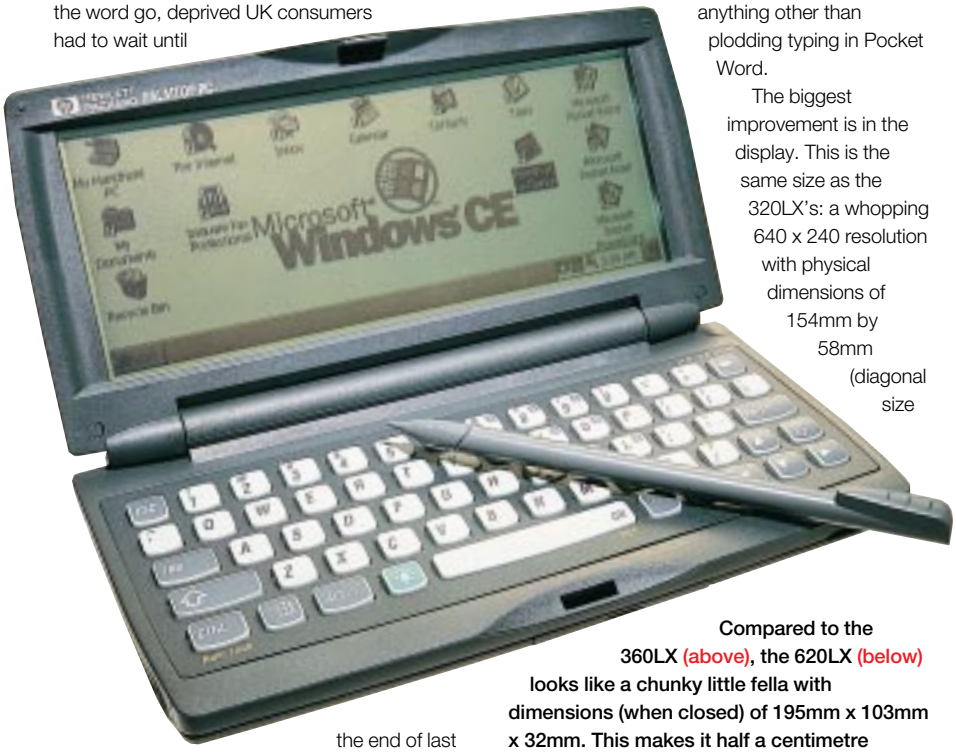
p74 ➢

Hardware

HP 360LX & HP 620LX

Great! Not just one but *two* new CE palmtops: just pay your money, and take your choice.

So, farewell then, Windows CE 1.0, we hardly knew you at all. It may have existed for over a year but, although CE palmtops were available in the United States from the word go, deprived UK consumers had to wait until the end of last summer before getting their hands on the first models. These limped out into the marketplace in dribs and drabs, and it is hardly surprising that take up of these early products has been nothing to shout about. However, the launch of CE 2.0 has prompted promises of exciting new products from a number of companies. The Hewlett Packard 360LX is the first CE 2.0 palmtop to reach *PCW* and we also have an exciting glimpse into the near future with the first colour palmtop, the HP 620LX.



Compared to the 360LX (above), the 620LX (below) looks like a chunky little fella with dimensions (when closed) of 195mm x 103mm x 32mm. This makes it half a centimetre higher and a centimetre wider and longer, but it is still tiny in comparison to the average notebook

HP 360LX

The HP 360LX is the direct successor to the HP 320LX (reviewed in *PCW* June 1997). Outwardly, they are identical but a quick play around with the new HP 360LX soon reveals the differences. The most obvious is the operating system, Windows CE 2.0, which has a number of improvements and new features (*see boxout, opposite*). Having said this, Hewlett-Packard is now selling the HP 320LX as a "value line" product, with Windows CE 2.0, for £528.75 (£450 ex VAT).

The HP 360LX comes with 10Mb ROM and 8Mb RAM as standard, compared to the 320LX's 5Mb ROM and 4Mb RAM. The processor has also been beefed up with a 60MHz Hitachi RISC chip replacing the 320LX's 44MHz version. This increased processing power is welcome but it still isn't enough to keep up with anything other than plodding typing in Pocket Word.

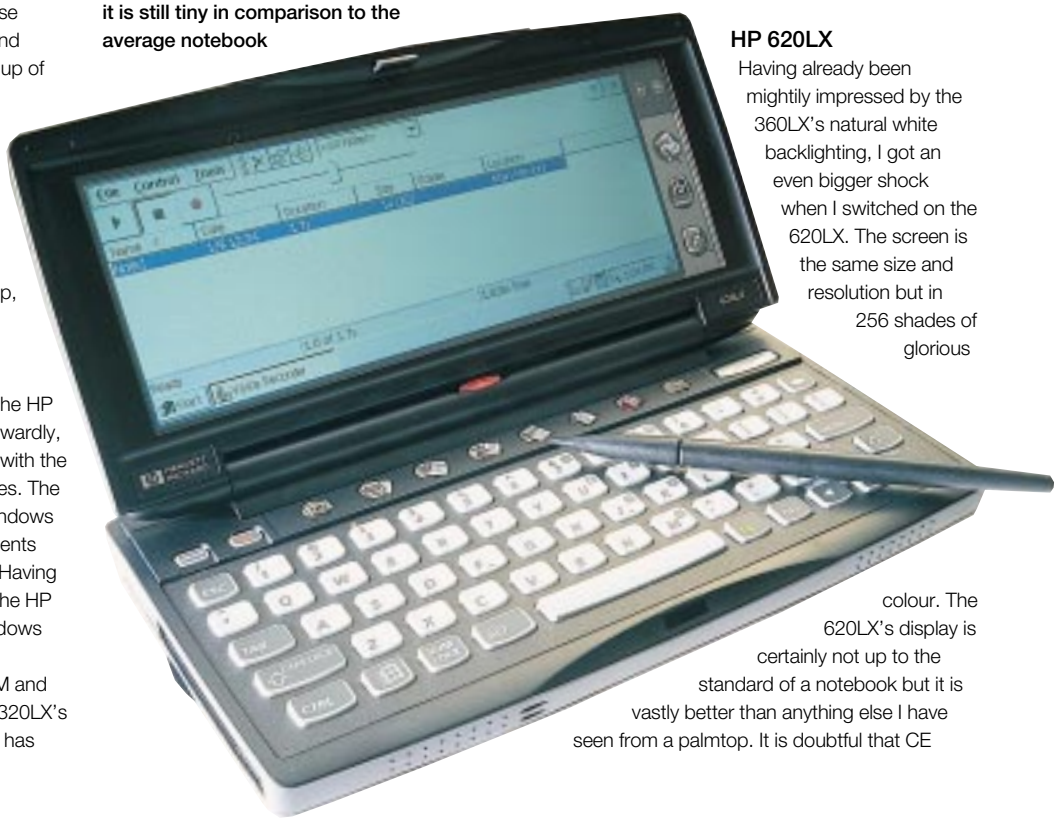
The biggest improvement is in the display. This is the same size as the 320LX's: a whopping 640 x 240 resolution with physical dimensions of 154mm by 58mm (diagonal size is 164mm). The greyscale has increased from four shades to 16, yielding better gradation and definition but the best part of the new screen is the backlighting. The 360LX makes use of "natural white" backlighting which, if you are used to the backlighting in every other palmtop around, will bowl you over with its clarity and sharpness. The problem with this, if you can call it a problem, is that it is so good that you become reluctant to use it without the backlighting. This puts a heavy drain on the batteries which last for around ten hours if you do not use backlighting or a PC card. The 360LX uses two AA batteries, normal or rechargeable, and automatically recharges NiMH and NiCd batteries when plugged into mains power.

As far as usability is concerned, the most important aspects of a palmtop are the display and the keyboard, followed by ease of synchronisation with your desktop PC. The screen is a winner and Windows CE 2.0 seems to be a fairly solid platform. The keyboard is composed of small hard rubber keys which are angled to provide a more positive response. Although cramped and a little fiddly, it is possible to type at a semi-reasonable speed with a bit of practice.

The HP 360LX also features a PC card slot, CompactFlash slot and comes with a well-designed docking cradle, user manuals, two rechargeable AA batteries and a button cell battery for data backup.

HP 620LX

Having already been mightily impressed by the 360LX's natural white backlighting, I got an even bigger shock when I switched on the 620LX. The screen is the same size and resolution but in 256 shades of glorious colour. The 620LX's display is certainly not up to the standard of a notebook but it is vastly better than anything else I have seen from a palmtop. It is doubtful that CE



Windows CE 2.0: What's it all about?

Windows CE 2.0 is the second version of Microsoft's operating system for Handheld PCs or palmtops. It is designed to look and feel just like Windows 95, to make users feel immediately at home when switching from their desktop PCs. There are two parts to CE 2.0: the operating system that is held on ROM in the palmtop and the software supplied on CD for your desktop PC.

It is important to realise that the operating system is not a cut-down version of Windows 95 or NT 4. Applications written for these PC platforms will not run on palmtops but programmers can write applications that look and feel the much same as the PC versions. File formats — for Pocket Word, Pocket Excel and so on — are different and have to be converted when transferring files between a palmtop and a PC. This is one of the functions of the CE software that sits on your PC. It also allows you to access all the directories on your palmtop from the PC (but not launch applications or view files), synchronise files that are held on both machines and transfer individual files from one computer to another.

Version 2.0 of Windows CE has a number of additions to the original. H/PC Explorer in CE 1.0 has been replaced with Microsoft Windows CE Services, which means that you can use the standard Windows 95 explorer to browse the palmtop. The file synchronisation tool, ActiveSync, now offers continuous background synchronisation and can synchronise files and mail messages, as well as appointments, contacts and tasks. Synchronisation can be done via the infra-red port, a network card or remotely using a modem. It is possible to synchronise multiple palmtops to a single desktop computer and to synchronise a single palmtop to two desktop computers.

Web browsing has been made simpler: Pocket Internet Explorer has been integrated into the Windows CE 2.0 file and folder browser which means that you can browse the internet from the same window you use to browse local files and folders. This echoes the same approach in the PC based Internet Explorer 4 and Windows 98. CE 2.0 is also more customisable, with the ability to adjust the division between menus and buttons on most window command bars. Cascading commands in menus have also been implemented.

Pocket Word and Pocket Excel have a new zoom feature which lets you zoom in for easier viewing of documents and spreadsheets. You can also zoom out to see document structure and more content. A number of new document and spreadsheet templates are included to help you quickly structure and format your files. Pocket Excel has a particularly handy expense report template. It also has new split pane and freeze pane features which allow you to keep column headings at the top of your spreadsheet as you scroll down, compare different parts of a spreadsheet on-screen at the same time and so on. Pocket Word now has a spelling checker but the major glaring omission from CE 1.0 (the word count facility) has still not been implemented.

The applications that comprise Microsoft Pocket Outlook (Calendar, Contacts, Tasks, Inbox) now work more closely together to give features similar to Microsoft Outlook on your desktop PC. Meetings can be scheduled using Calendar then meeting notices can be sent through Inbox, using email addresses entered in Contacts. Notes can be attached to appointments, contacts and tasks.

Finally, there is a new application: Microsoft Pocket PowerPoint. This allows you to show presentations created in PowerPoint on a PC. No editing is possible but you can annotate slides by drawing on the touch screen. ■

palmtop screens will ever catch up with notebooks because of the touch-sensitive layer that have to go over them.

The 620LX has all the features of the 360LX together with a few of its own. There are four icons next to the screen and ten special keys above the keyboard. These are all shortcuts to various applications apart from the on/off switch and a button that automatically launches the Voice Recorder application and begins recording via the inbuilt microphone. Hewlett-Packard claims that its compression allows an impressive one hour of voice recording per Mb. Voice recording on this pre-production model is poor, with the microphone unable to pick up anything up below a shout. Recording can also be activated without opening the 620LX, by holding down the button on the case. This button doubles as an alarm and a useful charging indicator: red for charging, green for fully charged.

The 620LX has both a PC card and a CompactFlash slot, and features a 75MHz RISC processor and a massive 16Mb RAM. The additional power requirements of the colour screen means that the 620LX uses a lithium-ion rechargeable battery which theoretically yields around seven hours of use at full charge.

The inclusion of Pocket PowerPoint in CE 2.0 means that the 630LX is a competitor to notebooks for people who use them mainly for presentations and information storage. A PC card is available which will output the colour display to a monitor (incidentally, the 360LX will also output in colour using the card).

Finally, a word on reliability. The 360LX did not have any problems over the two week review period but the pre-production 620LX did crash a number of times when using the voice recorder. This is something that Hewlett-Packard needs to look into before going into full production. However, both machines stood up well to being knocked around and the 620LX even survived a potentially nasty mince pie incident with the aid of a quick wipe from a damp cloth.

Adam Evans

PCW Details

HP 360LX

Price £599 (£509.79 ex VAT)

Contact Hewlett Packard, 0990 474747 www.hp.com

Good Points Excellent backlighting.

Bad Points Not the fastest machine we've seen.

Conclusion The screen makes it one of the best palmtops around.

★★★★

HP 620LX

Price £799 (£680 ex VAT)

Contact Hewlett-Packard 0990 474747; www.hp.com

Good Points Fabulous screen, bigger and better keyboard.

Bad Points Battery life is a worry.

Conclusion At this price it is a serious threat to a lot of notebooks.

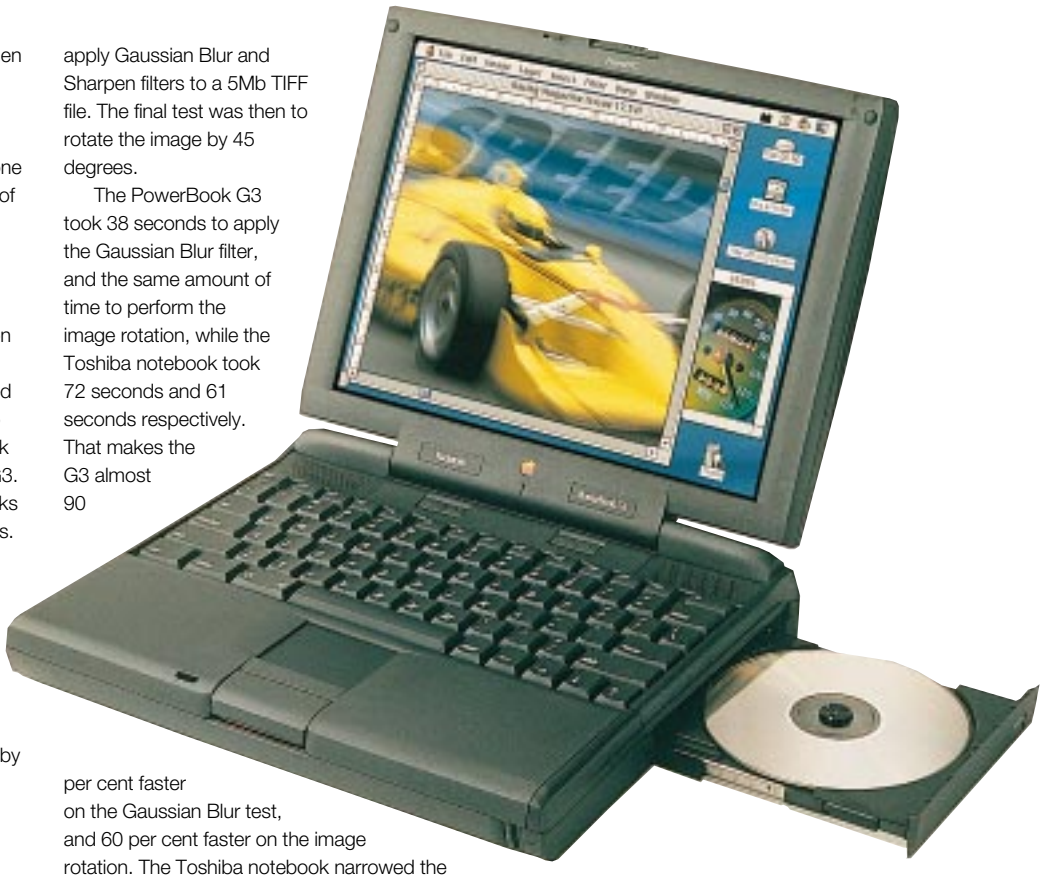
★★★★

p77 ➢

Hardware

Apple PowerBook G3

If you want the fastest thing on two knees, this Motorola-powered notebook is the quickest yet.



There was a time, not that long ago, when Apple was the world's leading manufacturer of notebook computers. The sleek, black designer styling of the Apple PowerBook made it a must-have accessory, one that set the top executives apart from the rest of the sales force with their dreary grey PC notebooks.

Then Apple took its eye off the quality-assurance ball and introduced the exploding PowerBook 5400. The PowerBook's reputation plummeted (along with its sales) and Toshiba, Compaq and the rest of the PC industry walked away with the notebook market. But, after two years, Apple is seriously targeting the notebook market once more with the new PowerBook G3.

The G3 isn't perfect. It's expensive and lacks features that are available in rival PC notebooks. However, it is very, very fast. It is based on the new PowerPC 750 processor developed by Motorola. The processor used in the G3 runs at 250MHz, which is only slightly faster than the 233MHz Pentium processor used in current top-of-the-range PC notebooks. However, the performance of the PowerPC 750 is given an additional boost by its new 'backside cache' architecture.

The G3's main system bus runs at 50MHz, but the 512Kb of L2 cache built onto the processor communicates with the processor through a separate bus that runs at 100MHz. This means that the processor's overall performance is significantly greater than that of processors with a similar clock speed, but which have slower, conventional cache designs. Apple claims that the G3 is twice as fast as its predecessor, the PowerBook 3400, which uses a 250MHz PowerPC 603e processor.

Another advantage of the PowerPC 750 processor is its low power requirement. In the past, Motorola and Intel have both had to develop special low-power versions of their processors for use in notebooks. These low-power processors are normally less powerful than processors designed for desktop use. That's one of the reasons why the overall performance of notebooks has always tended to lag behind that of desktop systems. However, the PowerPC 750's low power consumption means that it can be used in both desktop and notebooks systems without any modification. The G3 can therefore run at speeds similar to that of desktop systems based on the same processor.

To put Apple's claims to the test, we compared the performance of the G3 with that of a 233MHz Toshiba Tecra notebook. Both notebooks had 32Mb of RAM, 512Kb of L2 cache and 5Gb hard disks. We used the native Mac and Windows versions of Photoshop to apply Gaussian Blur and Sharpen filters to a 5Mb TIFF file. The final test was then to rotate the image by 45 degrees.

The PowerBook G3 took 38 seconds to apply the Gaussian Blur filter, and the same amount of time to perform the image rotation, while the Toshiba notebook took 72 seconds and 61 seconds respectively. That makes the G3 almost 90 per cent faster on the Gaussian Blur test, and 60 per cent faster on the image rotation. The Toshiba notebook narrowed the gap a bit on the Sharpen filter test, taking 15 seconds, compared to the G3's 12 seconds, but that still leaves it lagging behind by some 20 per cent. For many users that speed alone will make the G3 worth buying.

There's a fairly high price tag attached to that performance, although at £4165 ex VAT, the G3 is only a couple of hundred pounds more expensive than the Toshiba Tecra that we tested it against. Other features supplied as standard are a 20x CD-ROM drive and a floppy disk drive that both use the same multi-purpose drive bay. It has the standard Mac serial and SCSI ports, as well as built-in Ethernet and an external VGA output connector. There's an infrared IrDA port, and 16-bit sound system with four speakers and a microphone built into the body of the notebook. And, although it's a Mac notebook, it can use PC Card peripherals and has a slot that will hold two Type II or one Type III card.

The one criticism that can be made of the G3 is that a notebook costing more than £4000 ought to have more than an 800 by 600 resolution display. The display size is 12.1in, which is acceptable, but most high-end PC notebooks now offer 1024 by 768 resolution. Mac users tend to focus on graphics applications so a higher resolution display would make sense for many users.

Nonetheless, the G3's performance certainly puts the PowerBook range back on the map. Apple has also launched two G3 desktop systems, costing £1775 and £2199 ex VAT. Although these are intended as mid-range systems, they come close to the performance levels of Apple's current top-of-the-range PowerMac 9600, which costs more than £3500 ex VAT. So we can expect to see the 9600 killed off and replaced by new high-end G3 models very soon. It will be even more interesting, though, to see if Apple can come up with low cost G3 systems to spice up the lower end of its notebook and desktop product lines and grab back some of the market share that it has lost in the last two years.

Cliff Joseph

PCW Details

Price £4893.88 (£4165 ex.VAT)

Contact Apple UK 0800-127753 www.apple.com

Good Points The fastest notebook currently available.

Bad Points Expensive.

Conclusion Puts the PowerBook range back on the map.

★★★★

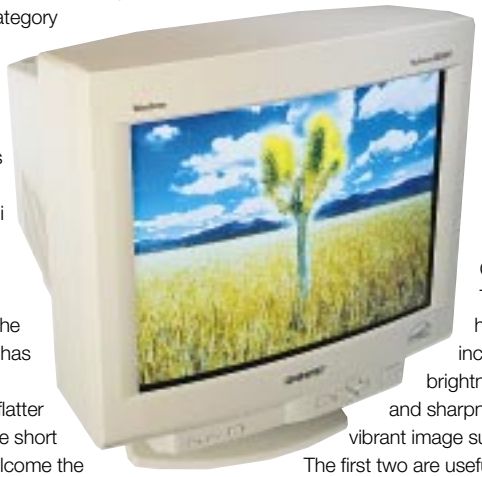
p79 ➢

Hardware

Sony MultiScan 200GST

An entry-level mid-range monitor — in our view, a great performer at a reasonable price.

You wait ages for a monitor and then a whole new range turns up. Sony has revamped its offerings with new entry-level, mid-range, multimedia and high-end monitors, the latter category boasting the company's first 19in and 21in models.



There are improvements across the whole new 1998 range. A new ARt anti reflective and anti static screen coating minimises glare and external reflections. The front faceplate depth has also been reduced to 10mm, resulting in a flatter display surface. Those short on deskspace will welcome the shortened neck on new tubes, reducing the overall depth of the monitors.

We've taken a closer look at the new mid-range 17in 200GST model, which measures 406 x 432 x 420mm and weighs 18Kg. Its viewable diagonal measures 408mm. Sony may have a dedicated new multimedia range, but has kindly fitted the 200GST with modest built in speakers and headphone jacks — sufficient for basic office audio. The on-screen controls are comprehensive and easy to use.

Sony's particularly proud of its graphic picture enhancement (GPE) feature on the GST and AST range. This front panel button has three presets which increasingly bump up the brightness, colour temperature and sharpness to give a particularly vibrant image suitable for presentations. The first two are useful, but the most severe setting, said to be designed for video, was a bit too much for this viewer.

We were impressed to find this mid range monitor boasting an 85KHz maximum horizontal scanning frequency; in real terms this will display up to 1280 x 1024 resolution, non-interlaced at a flicker free 75Hz refresh rate, and 1024 x 768 at up to 105Hz. The 200GST also complies with the strictest TCO95 safety standards.

The image is sharp, clean, bright and vibrant, typical for a Trinitron tube, but some users will still find the two thin, but visible stabilising wires off-putting. Rock bottom 17in monitors cost around £330, and higher end ones usually clear £450. Sony's 200GST looks particularly good value at £399, only £40 more than its new entry-level 200EST.

Gordon Laing

PCW Details

Price SRP £468.83 (£399 ex VAT)

Contact Sony ITG 0990 424424; www.sony-cp.com

Good Points Good image, spec and features.

Bad Points New GPE feature not particularly inspiring.

Conclusion Great performance at a competitive price.

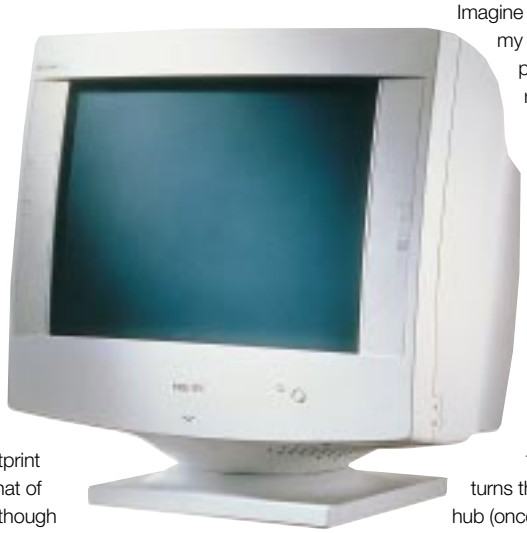
★★★★

Philips Brilliance 109

Personal Computer World Recommended

A 19in monitor for the high-end corporate DTP and graphic design markets. Great pictures.

With an eye on the declining sales in Europe of smaller monitors like the 14in, Philips is hoping to capitalise on the recent growth in sales of larger monitors with its new 19in aperture grille model, the Brilliance 109. Aimed at high-end corporate DTP and graphical design, and equipped for Windows 98 and USB, the 109 arrives with an unsurprisingly hefty price tag dangling from its sculpted curves.



The designers have obviously taken into account office demands for deskspace, and the 109 has a footprint of similar size to that of a 17in monitor. Although one grows accustomed to it after a while, the sheer size of the monitor's screen is startling at first.

The picture the 17.9in affords is superb, capable of vibrant colour, and flanked on either side by speakers. Philips claims a maximum resolution of 1600 x 1200 at 75Hz, and with an Imagine 128 graphics card in my PC, the 109 could provide a maximum resolution of 1280x1024 at 85Hz. With the low dot pitch of 0.22mm the picture remains focused even at higher resolutions, and the picture remains uniformly sharp across the screen. Philips has provided both USB and BNC connections, and accompanying the 109 is a module that turns the monitor into a USB hub (once Win98 and USB products arrive). Philips has also provided a compatible On-Screen-Display software package, Customax 3.0. Once loaded it allows the user to change the monitor's audio, visual, and hardware settings through the USB connection to the PC. Another neat touch is the superb manually-operated OSD that can be operated using the rotary knob positioned on the underside of the monitor. The menu is user-friendly and covers everything from the audio to geometry and screen colour.

Paul Trueman

PCW Details

Price RRP £880 (£749 ex.VAT). Street price £650 (£553.20 ex VAT)

Contact Philips Business Electronics 0181 689 4444; www.monitors.be.philips.com

Good Points USB hub, excellent picture, great OSD.

Bad Points More expensive than other 19in recent releases.

Conclusion An excellent forward-thinking performer.

★★★★★

p80 ➢

Hardware

NEC MultiSync LCD400V

If you really can't wait, here's a flat panel monitor which will cost you less than most others.

Most of the flat-panel displays we have seen so far have been aimed at the high-end corporate market. The V at the end gives it away as being for the value-minded, cost-conscious user as does its price of £1695, which although still steep compared to a CRT monitor, is considerably cheaper than the average £2000 for most flat-panel displays.

The LCD400V measures 14.1in diagonally which will give you a viewing area roughly similar to a 15in CRT monitor. It has a maximum resolution of 1024 x 768 in millions of colours and runs at 60Hz which is quite fast enough on an LCD to give a sharp, stable picture. It takes a single standard VGA analogue connector.

The on-screen controls are easy to operate and do give you all you could need, including brightness and contrast, display position, colour control and language selection. It also has an image adjustment setting for course and fine to get rid of any clocking problems you might experience.

The picture quality is good and as with all TFTs, its active matrix technology makes it easier on the eye than a CRT. As you would also expect from a TFT, the picture is sharp to the edges of the display. The colours are good and the display is bright. The viewing angle is 100° horizontally; reasonable for its price range. However you get a little more distortion when looking at it from above than you might expect, due to a low vertical viewing angle. While it is not as good as some of the flat-panel displays we have seen, the price does put it in a slightly different category.

However the price is a bit of a moot point. It is several hundred Pounds cheaper than other flatpanels, but it is still considerably more expensive than a CRT. It is not the best quality of all flatpanels we have seen and if you want one, but it is quite good enough to be worth the money.

Adele Dyer

PCW Details

Price £1991.63 (£1695 ex VAT))

Contact NEC 0645 404020 www.nec.com

System Reviewed P233MMX, 64Mb RAM, 3.2Gb HD, 15.1in TFT screen.

Good Points Cheap compared to most flat-panel monitors.

Bad Points Still very expensive compared to a CRT.

Conclusion If you can't live without a flat-panel monitor, you could do worse than this.

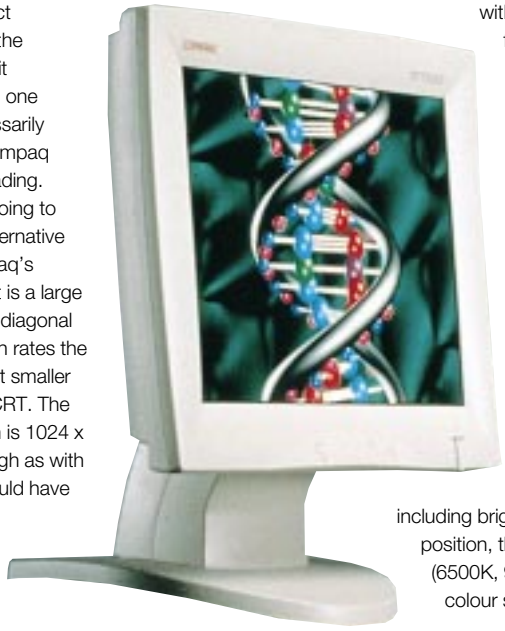
★★★★

Compaq TFT500

Here's another flat panel monitor for your consideration. Its got a large panel; 15ins diagonal.

Compaq is not necessarily a name you would associate with monitors, but it describes itself as the world's number one monitor vendor. This is not such a surprising fact when you consider the number of systems it shifts each year, but one would still not necessarily think of buying a Compaq monitor when upgrading.

The TFT500 is going to offered as a CRT alternative with some of Compaq's business systems. It is a large panel, with a 15.1in diagonal measurement, which rates the viewable area as just smaller than that of a 17in CRT. The maximum resolution is 1024 x 768 at 75Hz, although as with most TFTs, you should have to run it at anything more than 60Hz for a stable picture.



However the footprint is not that small as the stand is around 22 x 25 cm and one of the largest stands we have seen.

The stand doubles as a USB hub, with four ports in all: one for connection to the PC and three for peripherals. This is particularly useful if the monitor is running off a PC which is not on the desk as in a dealing room, for example. The horizontal viewing angle is a very respectable 120 degrees.

The on-screen controls offer all the functions you could need on a flat-panel, including brightness, contrast, position, three colours settings (6500K, 9300K and a custom colour setting) and a digital conversion control which helps avoid the clocking problems associated with converting an analogue signal back to digital.

The picture itself is good, as you would expect from a TFT, but it is not the best we have seen on a flatpanel. The picture was not as razor sharp as we would have wanted which showed up particularly on icons and on text that was just one pixel wide. As many flat-panel users are going to be using them to look at large spreadsheets, this could prove an annoyance.

Adele Dyer

PCW Details

Price Typical price £2790.63 (£2375 ex VAT)

Contact Compaq 0990 134456 www.compaq.co.uk

Good Points Large 15.1in screen.

Bad Points Not the sharpest picture we have seen.

Conclusion There are cheaper and better flat-panels available.

★★★

p82 ➢

Hardware

QMS DeskLaser 1400P

Not particularly fast but a good, solid, laser printer offering clean results at a decent price.

This compact 14ppm laser printer fitted comfortably on my desk. A paper tray holding 550 sheets was supplemented by a manual feed input which was capable of handling up to 100 pages or 30 envelopes with the option of adding a further input bin for 500 sheets. Ten paper and envelope sizes should meet most needs but the driver did not include a "custom" option. Installation from the supplied disc was easy, but when attempting to identify the printer using Win95's plug and play features, a Fujitsu PrintPartner 14 was found instead.

Toner density was fairly uniform across large areas of black and cracked only slightly when folded. Slight vertical banding was evident in large areas but there was no sign of any horizontal banding. Lines, arcs and circles were accurate and true with sharp, well defined edges, but it had trouble dealing with reverse hairlines and some horizontal and vertical examples were lost.

Gradated tones were clearly defined and it was easy to distinguish between fills seperated by only a 10 percent difference in density. A print resolution of between 600 dpi and 2400 x 600 dpi ensured that even text as small as 2pt was legible. Images were handled with ease and CMY tones were easily translated into grayscale equivalents. Photographs remained clear with smooth transitions between light and dark areas.

The standard 11Mb memory, upgradable to a maximum of 67Mb, and 40MHz RISC sparc lite processor achieved the claimed print speeds of 14ppm. Postscript L2 compatible and compliant with PCL5e, this printer also offers options for Ethernet connectivity and the incorporation of a duplexing attachment. We were disappointed that it twisted the pages slightly on taking them into the body of the machine.

Cartridges come in packs of two, with each unit providing approximately 5,000 pages at five percent coverage, whilst the printer itself will sustain 4,000 power-on hours between failure and comes bundled with 35 Intel, 35 PostScript and ten TrueType fonts.

Nik Rawlinson

PCW Details

Price £938.83 (£799 ex vat)
Contact 01784 442255 www.qms.nl
Good Points Clean print, compact.
Bad Points Not particularly fast.
Conclusion A good printer at a good price.
★★★★

HP Deskjet 720C

Want a printer for your home or small office? Shhhh!… this one's very, very quiet. But it's fast!

The 720C is one step from HP's Deskjet 690C and uses the same engine, but is faster. HP claims speeds of 8ppm for black text, 4ppm for colour. It holds two cartridges at a time (black and CMY) and there is no need to switch them, which speeds up the printing process. A built-in envelope slot means that there is no need to empty the paper tray to print DL envelopes.

It is an attractive and sturdy printer with a small footprint and an ingenious door at the back which opens to make solving paper jams easier. Setup was a breeze using the intuitive CD-based software which went on to check the status of the parallel port.

The quiet printing process was fast with five word-processed pages at normal quality arriving in just 1min 51secs. On photocopy paper the quality was excellent with solid black and sharp edges. "Best" quality took just five seconds longer and produced results indistinguishable from "normal", but at 1min 2secs for five pages, the output in "econofast" showed slightly soft edges to the lettering.

Averaging 39secs per page in normal quality, our Excel spreadsheet had easily legible characters at sizes as small at 6pt on ordinary office paper. The same setting and media was used to print business graphics to a high standard. A page from Corel Draw arrived in 2min 32secs demonstrating clear, smooth fades without stepping, and solid but slightly dull blocks of colour. It was unable to print an inverse hairline at this setting, but this was rectified when changing the resolution to "best" and using Premium Inkjet Paper. This increased the time per page but presented us with vibrant colours, deep blacks.

A full page A4 photo took 7mins 14secs to print in high quality. On inkjet paper the colours were realistic with clear differentiation and an impressive handling of reflective aluminium surfaces. Our blue skies came out darker than we wanted but they were by no means as thundery as the output we have seen from other printers.

Nik Rawlinson

PCW Details

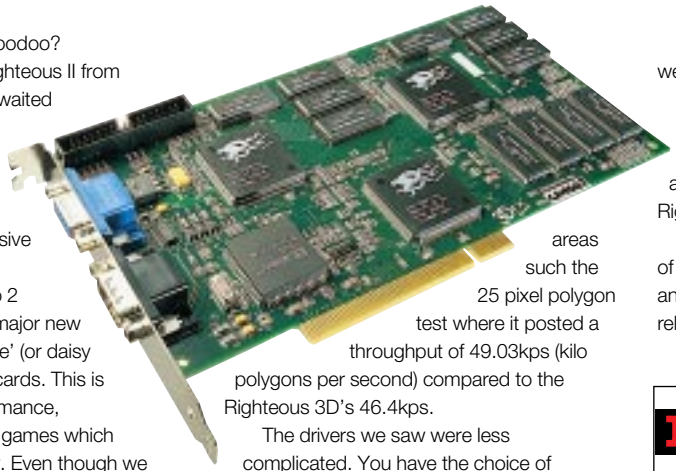
Price £270.25 (£230 ex VAT)
Contact Hewlett Packard, 0990 474747; www.hp.com/uk/
Good Points Small, fast, very quiet.
Bad Points Poor handling of inverse hairline.
Conclusion An excellent home or small office machine.
★★★★

p84 ➢

Hardware

Orchid Righteous II

We take a sneak preview at the pre-production Righteous II with the Voodoo II-based card.



What comes after Voodoo? Voodoo 2. The Righteous II from Orchid, the long awaited sequel to the popular 3DFX Voodoo chip based graphics card will soon be available, but we got hold of a pre-production model for an exclusive sneak peek.

The big sell on the Voodoo 2 based card is speed and the major new feature is it's ability to 'cascade' (or daisy chain) multiple Orchid add-in cards. This is expected to give better performance, especially with highly textured games which require lots of texture memory. Even though we had a 6Mb pre-production model with Alpha drivers we decided to see how it compares to the original Righteous 3D in performance.

Overall, the new card scored higher, but only slightly, posting an overall Final Reality benchmark score of 1.32 compared to 1.29 for the Righteous 3D. This is due to D3D's (Direct3D) inability to handle multiple texture mapping units. But it still scored consistently higher in other key areas such the 25 pixel polygon test where it posted a throughput of 49.03kps (kilo polygons per second) compared to the Righteous 3D's 46.4kps.

The drivers we saw were less complicated. You have the choice of selecting D3D or OpenGL options and the card supports resolutions ranging from 512 x 384 to 1024 x 768. It also allows you to adjust the refresh rate from 60Hz to 120Hz and there's a gamma correction option. Advanced options let you completely disable Synchronised Refresh rates, in D3D and OpenGL, so you can increase the frame rate of game playing, but it warns that this could lead to "tearing" of the image.

Unfortunately, because we had Alpha drivers, we couldn't run an OpenGL Quake II test, so the real-world game test result remains elusive, but from demos we've seen the Quake frame rate hovers around 110 FPS – which is about four to five times what the original Righteous 3D can do.

The Righteous II will come standard with 8Mb of memory, 4Mb for the texture mapping units and 4Mb for pixel mapping. The card will be released in Mid-May.

Dylan Armbrust

PCW Details

Price Under £235 (£200 ex VAT) expected

Contact Orchid/Micronics 01256 817722 www.orchid.com

Good Points Cascading ability, drivers, supports OpenGL and D3D.

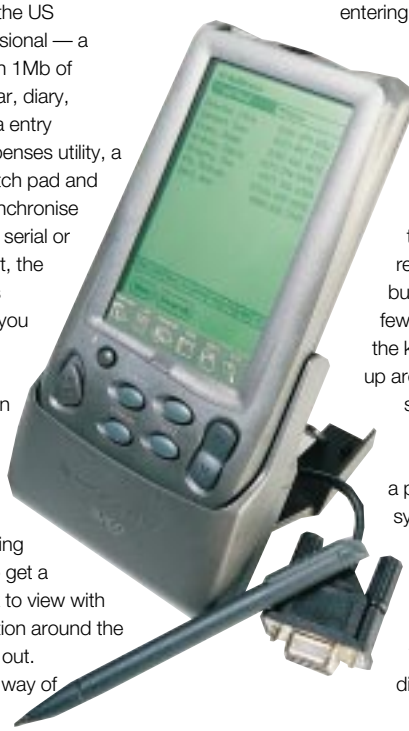
Bad Points Could be expensive.

Conclusion It's early days, but it looks promising. Expect a full review in a few months.

★★★

TI Avigo

The Avigo could be your best amigo once you can master the tricky on-screen keyboard.



The Avigo is very similar to the US Robotics PalmPilot Professional — a small handheld device with 1Mb of memory and which runs a calendar, diary, calculator, address book and data entry functions. In addition it has an expenses utility, a memory optimisation utility, a sketch pad and a world time function. You can synchronise the data with your PC, via either a serial or an infra-red link. Like the PalmPilot, the Avigo comes with a copy of Lotus Organizer 97. The manual claims you can synchronise your data and calendar with that of your colleagues, but Organizer itself can only do this in the GS version which runs on a Domino server. The calendar goes right up to the year 2099, and the schedule has several useful ways of displaying information, including sideways to get a better view of your day, or a week to view with allotted times blanked off. Navigation around the different functions is easy to work out.

Unlike the PalmPilot, the main way of entering data is via a keyboard displayed on screen. Compared to using a system such as hand-writing recognition, the input method is reasonably speedy, but it is not without a few complications. As the keyboard only takes up around a third of the screen, the keys are necessarily tiny and so accuracy can be a problem. Using this system on the train is likely to be fraught with difficulty. Alternatively you can switch to the T9 keyboard, which displays letters in blocks of three or four and will try to second guess what you are writing judging by the blocks you hit with the stylus. This way you do not have to hit specific letters. Most of the time it is reasonably accurate, although when I was using it I did not find it a great deal faster than the ordinary keyboard, but it might be easier to use on the train. The unit takes two AAA batteries which lasted around four hours for us, and the screen can be backlit to make it more readable, although this will use up the batteries faster.

Adele Dyer

PCW Details

Price £229 (£194.89 ex VAT)

Contact TI 0181 2303184 www.ti.com

Good Points Slightly cheaper than the US Robotics Palm Pilot Professional.

Bad Points On-screen keyboard can be tricky to use.

Conclusion A nice toy, but you might be better served by a Windows CE 2 PDA.

★★★

p86 ➢

Hardware

Iomega Zip Plus

Don't get too excited: it's just like the Zip drive but with a few nice extras and improvements.

Iomega has more or less blown all its competitors out of the water with the Zip drive. The Zip drive is now almost ubiquitous, especially as Iomega are now supplying an OEM version to PC vendors. But before you get too excited about the Zip Plus, I should point out that it is essentially the same drive as the Zip. The disks still have a maximum unformatted capacity of 100Mb. The data transfer rate is slightly improved, but not dramatically so. However, Iomega has made one or two little improvements which should make everyone's life a little bit easier.

First of all the Zip Plus has now got a port adapter which means you can attach it either to a SCSI card or to your parallel port, rather than having to choose either a parallel port or of SCSI version of the drive. So if you are carrying the drive about from one place to another you can just use the fastest port you have available. The adapter just screws on to the parallel port of the Zip drive to change it to a SCSI port, and the drive will automatically detect which kind of connection it has got and adapt its behaviour accordingly. This gives a maximum transfer rate of 60Mb per minute over SCSI and 20Mb per minute with a parallel connection.

Secondly Iomega has improved the user software, making it easy enough for anyone to use, no matter how technophile. Even your granny could find her way around this bit of software. Another draw for some may be the improved software bundle, which includes packages like Adobe PhotoDeluxe, Web Buddy and others.

Finally there have been a couple of improvements on the power side with a smaller, lightweight mains power adapter and an on/off switch. All this makes a good drive that bit better although on the street the Zip Plus is almost twice the price of the original Zip, which is a bit steep for the few improvements it has.

Adele Dyer

PCW Details

Price £169.99 (£144.68 ex VAT)

Contact Iomega 07000 466342

System Reviewed P233MMX, 64Mb RAM, 3.2Gb HD, 15.1in TFT screen.

Good Points Parallel and SCSI on one drive.

Bad Points Zip has never been large enough or fast enough for backing up a whole system.

Conclusion A good drive with some nice extras.

★★★★★

Olympus C-1400L

A mega-pixel digital camera with excellent picture quality but few options for functionality.

Several mega-pixel digital cameras have appeared over the past few months as digital cameras move from the realm of quick and dirty solutions to being equipment that you can use for the sake of quality as much as for their novelty value. The Olympus has a 1.4 million pixel CCD which translates to an image resolution of 1280 x 1024 pixels. Images are stored on a 4Mb SmartMedia memory card, which comes as standard with the camera. As you might imagine, at the highest resolution the card only stores four images, but you can get larger cards, of 8Mb or even a 32Mb card which is due to be introduced sometime this year. You should also soon be able to transfer SmartMedia images via a diskette which will fit into your floppy drive.

The camera looks cool and sleek as it models itself on SLRs rather than on dumpy compact film cameras. As you might expect it has a 3X zoom, and the f2.8 lens is the equivalent to a 36-110mm lens on a 35mm camera. However it does not work with a mirror as in a standard SLR, but instead uses a prism which diverts 60 per cent of the light to the CCD and 40 per cent to the viewfinder. This did not seem to affect the quality of the pictures, which were very good, with sharp definition and vivid colours.

The buttons are all quite easy to operate, apart perhaps from the annoying little focusing button on the side of the lens which is badly positioned. Buttons on the top of the camera control the image quality and compression modes, flash modes, the self-timer, the macro mode and exposure compensation. However compared to other cameras in the same quality bracket the functionality is too limited. You cannot play around with aperture setting, white balance or focus settings. The LCD only shows images you have taken and you have to rely on the viewfinder when taking images and the only other resolution drops right down to 640 x 512 pixels. For the price you would have expected a few of these areas to be addressed.

Adele Dyer

PCW Details

Price £1527.49 (£1299.99 ex VAT)

Contact Olympus 0171 253 0513
www.olympus.com

Good Points Excellent picture quality.

Bad Points Too little options for functionality.

Conclusion Overall a good camera but compared to the opposition it is over-priced.

★★★

Hardware

Logitech FreeScan

More versatile than many document scanners — you can use this in three different ways.

With flatbed scanners getting cheaper and cheaper, can you really justify using a document scanner instead?

The FreeScan is a lot more versatile than most document scanners. Strangely it comes apart into two sections, the scanner and the automatic document feeder (ADF). This way you can use the scanner in three main ways. Either you can feed in single documents or photographs in through the front and they are scanned on a straight scanning path, so the paper will not get bent. Secondly you can use the 25 page ADF, although we found it picked up more than one page at a time when loaded with the full 25 sheets. Thirdly you can take the main part of the scanner off the base and use it to scan anything at all, so long as it is flat. The main use for this is going to be scanning books.

The scanner has a maximum resolution of 600 x 600dpi optical or 4800dpi enhanced. However you can also scan at any resolution from 100dpi upwards. A full A4 colour page took 4.5 mins to scan at the top resolution and around a minute at 200dpi. Obviously the higher the resolution, the longer the scan will take and the larger the file will be. It scans in 30-bit colour and the results were very good for a document scanner, although there was a slight fault on some of the scans we took, with light green lines appearing down the length of a photograph.

The scanner comes with a package of software including DocuMagix PaperMaster for filing, Xerox TextBridge for OCR and, like almost every other peripheral on the market, Adobe PhotoDeluxe. There is also a small utility which lets you choose the kind of scanning you want to do, whether for OCR or filing or to use the scanner as a photocopier in conjunction with your print. Otherwise you can specify whether you are scanning text or a colour picture. As long as you have an application such as Word or PaintShop Pro open, you can specify to scan into that application.

Adele Dyer

PCW Details

Price Street £149.99 (£127.65 ex VAT)

Contact Logitech 0181 308 6582 www.logitech.ch

Good Points Good bundle, small footprint.

Bad Points Some lines on scans.

Conclusion Quite expensive compared to some flatbed scanners.

★★★★

Fuji CS-1 Color Scanner

A versatile, flexible colour scanner with nifty scanning times and a good software package.

FujiFilm's CS-1 compact colour scanner is one of the new breed of colour document scanners that are beginning to equal the versatility and flexibility offered by flatbed scanners. It offers 30-bit colour depth, and an optical resolution of 300dpi, which can be enhanced to 2400dpi through interpolation software. This tiny scanner measures only 276 mm by 123 mm wide. To visualise this in real terms, close your copy of *PCW,* and imagine it chopped in half, length-wise. That is about how much of your workspace this machine is going to take up.

The scanner will take documents as large as letter sized A4 and legal sized documents. We found that documents needed a little nudging on occasion when scanning, as the feeder didn't always manage to pull them in properly. A start/cancel button on the top of the scanner launches the Task Bridge software. By right clicking on one of the four buttons (Photo, OCR, Fax and Copier) you can change the settings or select the application you want to scan into. Task Bridge will automatically detect all the applications resident in your PC.

Pictures and documents are sucked in, and passed under the sensor on a flat surface – so no worries about curving or bending precious family photos. The CS-1 uses a Colour CIS (contact image sensor) optical sensor, which unlike the CCD sensors found in most flatbeds, doesn't require any warming up and can begin scanning immediately.

Scanning times were nifty. It took the machine only 12secs to preview a colour photo, 28secs to scan it in at 300dpi, and only 15secs to scan it in at a setting of 100dpi. The software package includes MGI Photo Suite for image editing and the excellent Xerox Textbridge OCR for converting documents into text files. This worked a treat. It took just under a minute to scan in a document of three columns of text, complete with a graphic and a shaded box, and plonk it into MS Word. The text came out in the correct order and needed only minimal proofing.

Lynley Oram

PCW Details

Price £169.99 (£144.67 ex VAT)

Contact FujiFilm 0171 586 3787 www.fujifilm.com

Good Points Size, speed. Software package.

Bad Points Feeder required a little help on occasion.

Conclusion A good, versatile scanner.

★★★★

p89 ➢

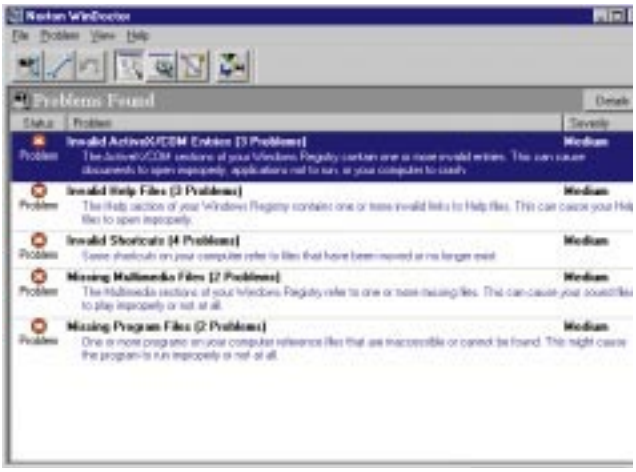
Software

Norton Utilities 3.0

When it all goes wrong, who you gonna call? Norton's, that's who. A worthwhile upgrade.

There is nothing more likely to send your blood pressure to boiling point than your computer going wrong. In fact, after a spate of problems — you name it, it happened! — it was touch and go whether my computer went through the window and I reverted to plain paper and a typewriter. The computer was returned and the replacement has worked without a hitch, but there can be no doubt that problems, even minor ones, seem to be increasingly common.

If you are new to computing or otherwise haven't used Norton Utilities, it is a suite of programs designed to prevent and fix computer problems, optimise computer performance and help you recover from disasters. The tools include Disk Editor, Norton SpeedStart, Image, Norton Speed Disk, Norton Diagnostics, Norton Disk Doctor, Norton File Compare, Rescue Disk Space Wizard, Norton Protection System, Norton Registry Editor, UnErase Wizard, Norton Optimization Wizard, Norton WinDoctor and Norton Web Services.



Left The new Integrator Below Norton automatically looks for and finds problems

Norton Utiities have been sorting out and repairing computer problems for so long it's difficult to remember when Norton wasn't there. In fact, Norton has been around for about fifteen years and apart from when it competed with the (in my opinion superior) PC Tools, it has been the market leader in diagnostic utility software. Recently, though, it has seen some stiff competition in the shape of products like First Aid from Cybermedia. We've also seen competition from standalone utilities such as the excellent archiver ZipMagic and uninstallers like Uninstaller (also from Cybermedia) which have graduated from simple uninstallation utilities to hard-disk management tools of such thoroughness, that it is difficult to function without them. So with all these standalone utilities competing for our hard-disk space, do we really need to sacrifice a further 40Mb for a utility suite like Norton Utilities, which has just reached Version 3 for Windows 95? Does it offer much that's new?

The answer is that this is really a catch-up upgrade; it offers little or nothing that is innovative, but is unequivocably a utility in which you should invest. Even if you already use Norton, the upgrade is valuable, especially if you use an Iomega Zip or Jaz disk, to which Norton Utilities occupies 539Kb. A crash protector can be a real life-saver and CrashGuard is a very worthwhile addition to the utilities package.

WinDoctor is also very worthwhile. It scans for and repairs software errors that could cause problems for the smooth running of Windows 95.

The Norton Optimization Wizard optimises the Windows Registry and Swap File to help Windows 95 run faster and safer. It is coupled with another new feature called Speed Start which works automatically in the background, requires no configuration, and is claimed to speed up application load times by as much as 50%.

Finally, Norton Utilities 3.0 comes with LiveUpdate Pro. Hitherto you have been able to use LiveUpdate to download and install minor enhancements and virus definitions to Norton Utilities, but LiveUpdatePro has the advantage of being able to download updates to many of your other applications and your hardware drivers. When you buy Norton Utilities 3.0 you receive a free six-month subscription to LiveUpdate Pro.

None of these enhancements and additions are completely innovative. Other programs have offered crash protection, automatically searched for and corrected errors, and provided the ability to download updates from the internet, but it is nice to have these tools integrated with all the other Norton utilities. On the downside, Norton offers little in the way of internet protection such as provided by Cybermedia's GuardDog.

Paul Begg

now lets you save rescue information and make a rescue disk that enables you to boot directly into Windows if you ever need to recover your system (which you can do with comparative ease using the Rescue Recovery Wizard).

This is just one of several enhancements to existing utilities in the package. Others include the addition of the Norton Utilities Integrator, which is simply a front-end giving quick and easy access to all the utilities, and System Doctor which now repairs as well as scans for viruses. But it's the new programs which combine to make this a worthwhile upgrade for existing users or investment for new users.

Other programs like First Aid have offered some form of protection from potential data-losing crashes. When a rouge command, a conflict or some other gremlin causes your computer to crash or hang, these crash protectors leap in and give you a chance to save your data before rebooting and to close the errant application. CrashGuard 3.0 runs in the background and uses only 150Kb of memory (compared with the First Aid Crash Protector which, according to Norton's System Information,

PCW Details

Price £104.57; £45.00 upgrade

Contact Symantec 01628 592222

Good Points Good integration. Good selection of tools.

Bad Points No internet tools. Nothing truly innovative.

Conclusion A worthwhile new purchase and a sensible upgrade.

★★★★

p92 ➢

Software

Borland Visual dBase 7.0

A major revamp, including 32-bit code, make the best dBase yet. But are you compatible?

This is the first 32-bit version of Borland's classic database manager, whereas Microsoft's Visual FoxPro, the other mainstream xBase contender, has been 32-bit for several years. But Visual dBase 7.0 does a good job of catching up, in some areas even pulling ahead of its rival.

The classic dBase file format, known by its .dbf extension, now looks hopelessly dated. Visual dBase introduces an updated version, addressing its main weaknesses. The new format supports referential integrity, so that the database engine enforces the relationship between individual tables in a database. You can also prohibit duplicate values in a field, or specify other constraints such as a minimum value or a formula that must evaluate to true. These are great features, although they come at the expense of compatibility. The main reason for using .dbf files in the past has been because virtually every application that reads data can read them, including word processors, spreadsheets and other database managers. If you use the new format, that is no longer true, particularly since Borland has not supplied an ODBC (Open Data Base Connectivity) driver. Since even Visual dBase 5.0 could use Paradox tables, which offer similar features, the real gain is unclear.

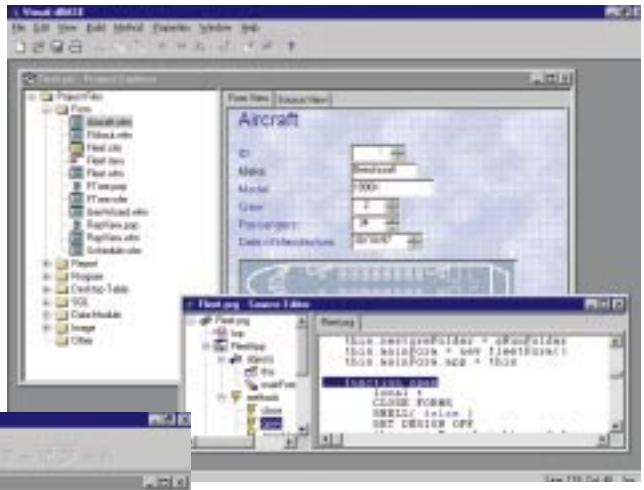
Like Delphi and Corel Paradox, Visual dBase uses the BDE (Borland Database Engine), a set of components which allow access to both local and remote data in a variety of formats. Because it is a shared component, all the products that use the BDE benefit from its flexibility. It can handle ODBC drivers, although it is better suited to dBase, Paradox, or its own native drivers for SQL databases. The BDE can present version problems, and when we installed Visual dBase 7.0 it broke the database access in Delphi 3.0, installed on the same NT system. There is always a way round these problems, but care is needed.

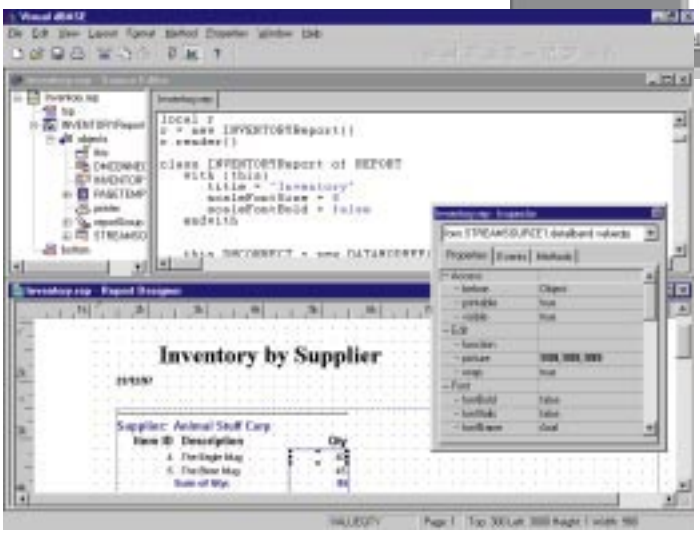
Visual dBase 7.0 is deeply object-orientated. This extends to data manipulation code, thanks to a new set of database classes such as Query, Rowset and Database. For experienced xBase coders, this represents a major change of style. The online help assists by suggesting object-orientated alternatives to traditional xBase commands: for example, if you look up Replace, the old way to change the value of a field, you will be encouraged to use the value properties of Field objects instead. Most old xBase keywords still work, with the exception of user interface commands originally intended for DOS applications. The new data classes are more powerful, though. For instance, Session classes simplify multi-user access by encapsulating each user's work in a session, with its own data objects, so that data integrity is protected. Visual dBase 7.0 also has a brand new native and object-orientated report designer, whereas earlier versions came bundled with Crystal Reports.

The Project Explorer combines both visual and source code views of all the elements of an application, with easy access to editors and designers via the right mouse button. Applications can be compiled to an executable file, although unlike Delphi this is interpreted pseudo-code rather than native code. InstallShield Express is provided for creating setup disks. The client-server edition adds native SQL drivers for the BDE, the InterBase database server, and OLE Enterprise for managing distributed OLE automation server objects. There is no documentation on how to use OLE Enterprise with Visual dBase, and Visual dBase cannot create automation servers, so it will only be useful when combined with other products.

This product represents a substantial advance over Visual dBase 5.5 and is a must-have upgrade for dBase developers, provided that 16-bit compatibility is not required. The inability to create automation servers is a significant problem, particularly as use of distributed COM objects becomes more widespread. If you want to integrate Visual dBase with other applications such as Microsoft Office, the only solution is DDE. When it comes to speed of data processing, initial tests suggest that Visual FoxPro retains an advantage, although in many cases that will not be significant. Another problem is that for application deployment, Visual dBase still carries a lot of baggage, in the form of the Borland Database Engine and the dBase runtime interpreter.

Tim Anderson





Above Visual dBase 7.0 showing its elegant project explorer and two-paned source editor

Left Two-way tools allow you to edit reports or other objects either visually or in source code. Visual dBase keeps the two synchronised

PCW Details

Price Professional edition £249 (ex VAT), Client-server edition £995 (ex VAT)

Contact Borland 01734 320022 www.borland.com

Good Points Object-orientated report designer. New data classes. Improved .dbf file format.

Bad Points Cannot create automation servers. New incompatible file format. Requires large runtime files.

Conclusion The best dBase yet, but watch out for compatibility problems.

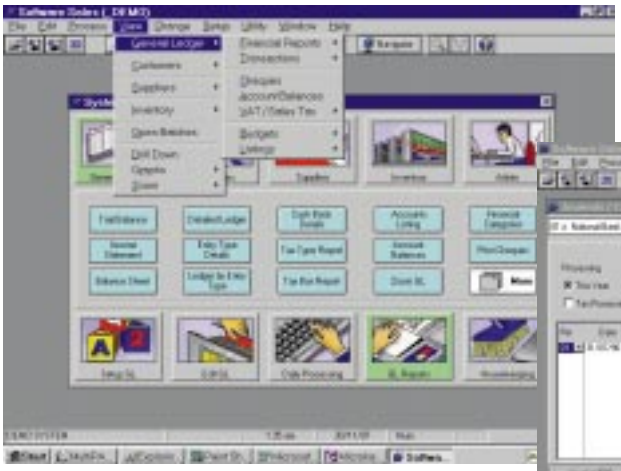
★★★★

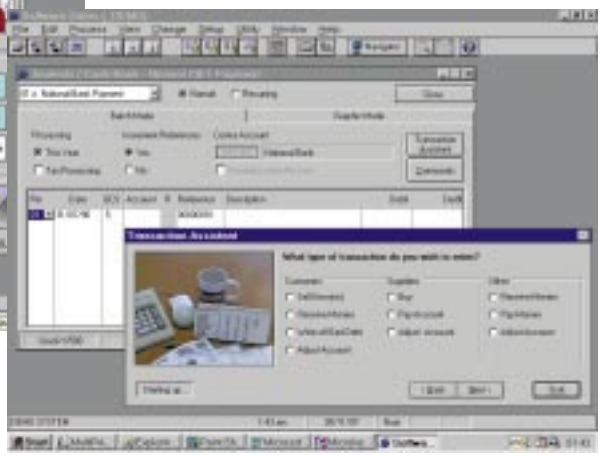
Software

MAP Pastel SOHO Accounting for Windows

Invoicing and inventory control for the smaller business, and easy for beginners, too.

To dispel any misunderstanding for new readers immediately, SOHO Accounting is not limited to keeping the books for sleazy strip-joints or posh restaurants in one of London's more colourful quarters. No indeed. SOHO is an acronym for Small Office, Home Office, and is indicative of where MAP Pastel, its publishers, think its main market lies.





Above You can move around using SOHO's graphic Navigator matrix or the conventional menu and button bar

Right The Transaction Assistant is particularly useful for the more arcane operations

To that end, SOHO has a useful, though not comprehensive, set of features at a competitive price. The features include the usual three ledgers — sales, purchase and nominal (here called "general"), plus a cashbook, invoicing, and simple inventory control, as well as VAT processing. You do get both cash and accrual VAT management controls (cash VAT accounting means you don't have to pay VAT until you've been paid by your customer). The manual provides adequate operating instructions, although you'll need to look elsewhere for an accounting tutorial. Still, you can't cavil at the price. You do get useful online help.

If you're a beginner to accounting you'll benefit from SOHO's Set-up Assistant, which helps you choose a set of accounts appropriate to your business. Mind you, it isn't foolproof: the first question you're asked is the name of your new company. Try typing in the name you've just registered and the program balks after eight letters because what it really wants is not a company name but a code for the relevant DOS directory. An inauspicious start, MAP. It does, though, indicate another SOHO feature, the ability to run as many different companies as you wish. If SOHO doesn't have quite the right set of accounts for your business or you make a mistake, you can edit the full accounts list at any time to add or remove items as required.

Two other aids to easy entry are the System Navigator and the Transaction Assistant. The Navigator offers a slightly different approach than the Windows menu (which you can still use) in finding your way around the program. The Transaction Assistant guides you when making individual entries even if you can't tell a debit from a credit.

There's also a useful data verification option to look after your data's integrity in the event of power interruptions, hardware failure or file corruption. This checks your files to ensure that all records are still readable. Optionally, it will also restore your accounts into balance, printing an audit trail of the corrections it has made.

Ledger transactions are entered in "batches" which gives you the opportunity of checking their details before they are irrevocably posted to the journals. Batches can be as large as 500 transactions or as little as one. For cheques and deposits, you can also choose the more intuitive graphic mode. SOHO doesn't force you to close your books at any particular period end — you can go on forever if you like. You can also post entries to any period in any year, but do remember that this will invalidate any reports you may have printed and be especially careful to check the VAT implications first.

Report facilities are extensive, covering ledgers, inventory, customers and suppliers, and can be printed, viewed on-screen, or exported to a spreadsheet or word processor. Some reports can be represented graphically, and certain reports also offer a "drill down" facility whereby clicking on, for example, an invoice total reveals the descriptions and prices of all the items making up that invoice. SOHO also lets you customise your forms: invoices, statements, labels and cheques. You can add or remove information and alter layouts, including text, graphics, boxes and lines, and alternative fonts. Incidentally, this uses the same drag-and-drop forms designer found in higher-priced Pastel products.

Speaking of other Pastel products leads on to the upgrade path when your business ceases to be small. Naturally MAP would like you to use the file-compatible Pastel Accounting, which offers job costing, inventory bar codes and bin numbering, and a "manufacturing" module with bills of materials and parts build-up. It also offers up to ten cashbooks, up to 30 separate tax types, and up to 32 types of entry, all commensurate with its price tag of £399 ex VAT.

James Taylor

PCW Details

Price £99 (£84.26 ex VAT)

Contact MAP Pastel 0161 624 5662
www.pastel.com

Good Points The Transaction Assistant and System Navigator provide welcome help for beginners, while the versatility of the sales and inventory modules should help to extend SOHO's usefulness before the need to upgrade.

Bad Points Runs slowly in anything but a leading-edge system.

Conclusion SOHO Accounting is a well-featured small-business accounting made easier for the beginner by the Transaction Assistant, although, as always, a little accountancy knowledge will get the best from it.

★★★

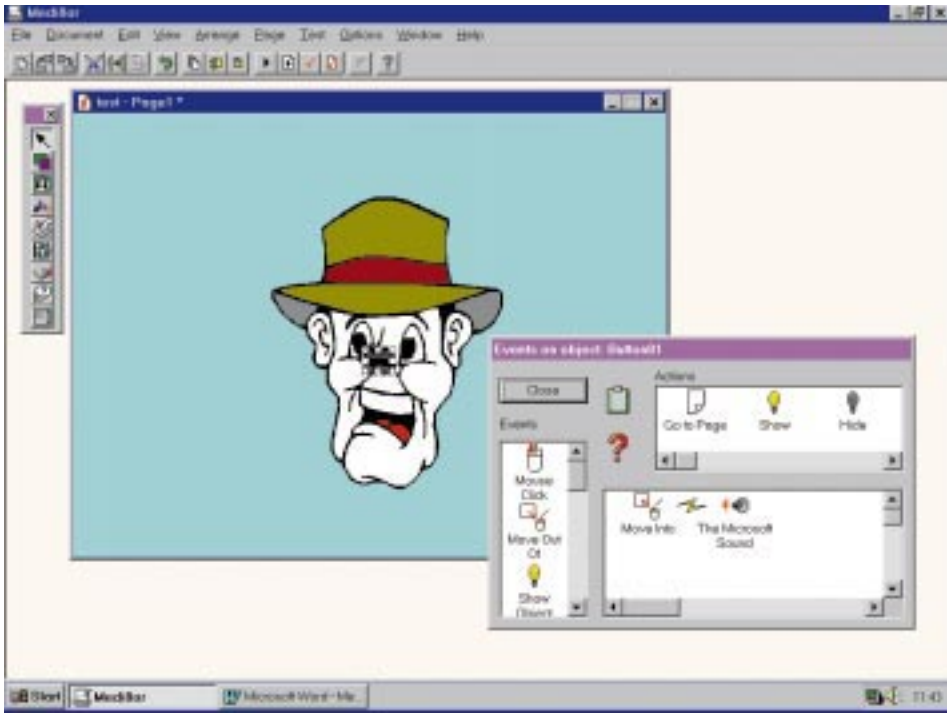
p94 ➢

Software

MatchWare Mediator Pro

Low-end multimedia authoring at its best, but this new version is really just fine-tuning.

Multimedia authoring tools fall into two camps: high-end packages like Asymetrix IconAuthor and Macromedia Director, which strike fear into most people's hearts with their scripting languages and complex features, and end-user packages like Corel's Clik and Create, or Illuminatus. Mediator falls into the latter camp and doesn't call on you to do anything much more complicated than to click your mouse to achieve the effects you are looking for. It won a Highly Commended award in our last multimedia authoring group test (*Nov '97*) for just this ease of use.



A drag-and-drop dialogue box makes it easy to create events

Last version of Mediator we looked at was aimed mainly at the schools market, where it had done very well in its native Denmark. But this update has gone more mainstream and is hoping to attract business users. The box suggests it can be used for presentations, interactive training and CD-ROM publishing, which is pitching the product at a completely new audience.

The package has not changed essentially, however. It is still based on the same set of mouse clicks and dialogue boxes, but this time it has taken on more of a Windows look for the first time. The last version did not have menus and windows, which can be disorientating when you are used to looking through menus to find what you want. This version of the package lets you work in whatever way is most natural to you, mouse clicks or menus. Whichever way you work, you create object and events in the same basic manner. The tool palette has what you need to create objects such as text or picture boxes or buttons. You then bring up a dialogue box to associate that object with an event. Events, such as a sound file playing when the user moves the mouse over a picture, or turning to another page when he or she clicks on some text, can be put together by choosing the options you want and dragging and dropping them into a window. You are then prompted to locate the files you want to use and Mediator automatically puts the event together for you. This version of Mediator supports more file types, notably .png for image files, and there are ActiveMovie drivers on the CD.

Events can be as simple or as complicated as you like and either spark off a single event or a series of events, such as are needed for creating animations or dictionaries or just simple actions. However, if you do want to get into more complicated actions, you can do some programming. Be warned, however, that you might be getting into heavy weather here as the manual is less than helpful.

Images should now be manipulated before they are put into Mediator and to this end there is a package on the CD called Chameleon. This is a fairly simple image manipulation package and the chances are that if you already own a scanner, you will already have some form of image manipulation software which is better than this.

Otherwise, there are a few changes and a few extra features. You can create the front-end to databases to put into your presentations or CDs. The package can be linked to any existing OBCD database, provided you have the relevant drivers which are bundled on the Mediator CD. The fields in the database work with a Mediator variable so they can appear in simple dialogue boxes.

Mediator files can now be distributed via a web server, so anyone who has downloaded the Mediator plug-in can view Mediator files over the net. For this reason, a lot of attention has been given to making Mediator files as small as possible, hence the inclusion of the .png format. Within Mediator you can instruct the application to go off and find web pages. Mediator is also the only multimedia authoring package which lets choose tracks from a CD to play at a specific point as the file is playing back.

Other changes are more like fine-tuning than a rethink. You can assign events to a right click, and the page dialogue structure has been smartened up. Hypertext and hotspot editing is marginally easier, and errors no longer stop the program from running when you are testing a file but instead give you an error message.

Active Page Management limits the amount of RAM a Mediator file takes up when executing — that is, it only loads one page at a time into memory. This is important if you are going to be putting CDs together, but is less crucial to smaller applications. And there is now a bit of 32-bit code in there, rather than being all 16-bit.

Despite all this, however, not much has changed since the last version. Mediator is still probably one of the best low-end multimedia authoring packages around, but there is little to tempt existing users to upgrade.

Adele Dyer

PCW Details

Price £233.83 (£199 ex VAT)

Contact MatchWare 0181 940 9700 www.mwin.com

Good Points Acitve Page Management. Ease of use.

Bad Points Unhelpful manual.

Conclusion Still a good package, but not much that is new.

★★★★

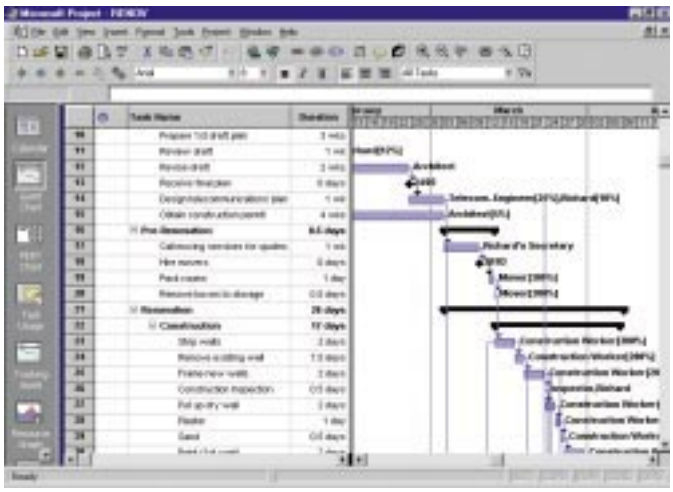
p96 ➢

Software

Personal Computer World Recommended

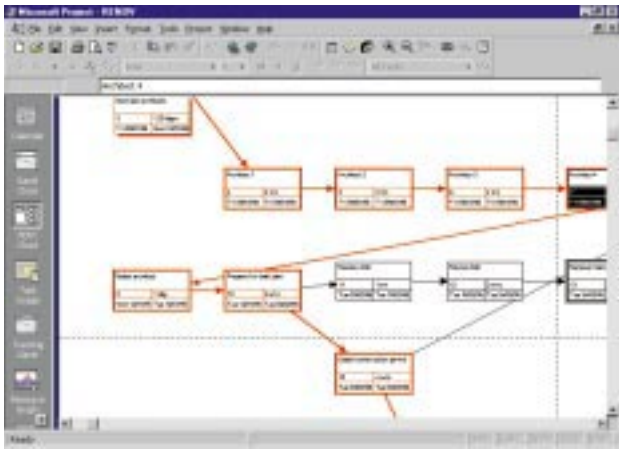
Microsoft Project 98

Specialists and novices alike will enjoy the flexibility and good integration of Project No. 5.



Left Project 98's Gantt chart view of a renovation project

Below Project 98's PERT chart view of a renovation project



This is the fifth re-incarnation of MS Project, the world's best-selling project management software with (according to Microsoft) over two million users. This is no doubt due to the Microsoft name and the product's competitive price, but when you think about it, two million isn't a fantastically high figure — consider the number of executives in the world who should really be using this type of tool for managing their projects but instead tend to use a spreadsheet.

They probably do so not because project management software is awkward to use or beyond the average pocket. It has more to do with the fact that at the early stages of our education we're taught how to read, write and count, but not how to manage, even though in life we need this skill as much as being able to handle words and numbers. We tend to think of management as a specialised skill and therefore more complex and advanced than, say, arithmetic. However, project management is really not a terribly complex concept. You have a list of things to do, which constitute a project, and you have to put them in some kind of order in which they need to be done, taking into account how long each will take to complete. Project management software does all the calculations for you. Apart from a few unknown terms you may encounter, that's basically it.

MS Project 98 includes very good material for beginners, including a step-by-step guide to setting up and managing a project from start to finish. Perhaps this will help in getting more people to use this kind of tool which is so useful for curing (among other things) managerial headaches. The user-interface has the new, modern Microsoft look of software such as Internet Explorer 4. A menu with various different project views on the left resembles that of MS Outlook, to which Project can set reminders such as one to flag a given number of days prior to the end of an important phase in your plan. There's also improved email to communicate with team members for delegating project tasks, sending project updates and collecting project status information.

Project 98 is described by Microsoft as "a natural extension of Office 97" and yes, there are many similarities. For instance, there's an Office Assistant which watches as you work and offers planning tips and suggestions, and there are Find and Replace and AutoCorrect functions. Project 98 files can now also be included in Microsoft Office 97 Binder files.

Many of the new features make the program better able to reflect real-life management situations. This is crucial, because you need to describe all aspects of your project to the computer — in other words, to build an accurate model of it — before the software can calculate how long it will take to complete, costs, resources and whatever else you need to know.

One of these new features is the ability to split an individual project task. Again, this is important, because if one of the tasks in your project is interrupted by something unexpected, you need to be able to divide that task into two to incorporate the consequent time gap.

The program is full of such features to cope with things that may happen in the course of a project and which you couldn't possibly foresee at the beginning, or things that need more flexibility in the way they're defined.

Resource units can now be expressed as a percentage or as a decimal. And there's Effort Driven Scheduling — you can control the duration of a task by assigning or removing additional resources. So, for example, one painter assigned to painting an office can have a second painter assigned to help, and the task's duration would be cut in half.

New Resource Rates automatically incorporate pay-rate changes into project cost calculations. Each resource can have five different rate tables and can be "charged out" at different rates within the same project, depending on the type of work being performed on an individual assignment.

There is of course support for multiple projects, and you can link them if they share resources or are dependent on each other in some way. You can also consolidate multiple project files with greater control. A new file format allows you to save multiple projects and all their formatting information in a single file, and you can link to the web so that your colleagues can read your reports, and web hyperlinks can be inserted into a project plan.

Visual Basic for Applications 5.0 and ActiveX are now supported, and MS Project files can be viewed from within a web browser or in other MS Office documents in their native format.

Panicos Georghiades and Gabriel Jacobs

PCW Details

Price £369 (ex VAT), upgrade £137 (ex VAT)

Contact Microsoft Connection 0345 002000 www.microsoft.com/project

Good Points Relatively cheap. Excellent integration with MS Office and other office software, and Visual Basic programmability.

Bad Points There's better, but also more expensive.

Conclusion The best buy on the market, good for specialists and novices.

★★★★★

p100 ➢

Software

IDT Net2Phone

It's good to talk, but not through a haze of crackle and jerky dialogue. Perseverance counts.

Until about a year ago, trying to make a phone call over the internet was an exercise in frustration. Although the economics were attractive, the quality of the sound was awful, connections frequently failed, and you could only call people who happened to be logged on to the net at the same time as yourself. No wonder internet telephony has been slow to catch on.

Then, in 1996, IDT launched Net2Phone. This vastly improved system allowed internet calls to be made to any phone in the world, even if there was no computer at the other end, which was a huge advance. But the quality was still appalling. This latest release of Net2Phone attempts to crack the quality problem once and for all and it almost succeeds. Calls no longer sound like a 78rpm record being played with a blunt needle in a strong wind, but voices are still jerky and unsettling pauses still creep into the conversation.

If, despite this, you fancy some cheap chats to your cousin in Canberra or your auntie in Albuquerque, here's what you do. First download the free Net2Phone software from www.net2phone.com and install it on your PC (a Mac version is also available). Then, from the same site, use your credit card to open an account and purchase a block of pre-paid time. The smallest chunk you can buy is US$25, or about £16.

To make a call you must first log on to your ISP. Then run the Net2Phone software, which appears on your screen as a telephone handset complete with speed dial button, volume control and mute button. Punch in your security code and the number you wish to call. If all goes well, and it usually does, you will be connected in about 30 seconds. You can now start nattering.

You don't need to know this, but your call is in fact routed over the internet to IDT's switching centre in New Jersey, and from there it's dialled out as a normal voice call. So wherever in the world you are calling to and from, the call always travels via the United States, which explains the lop-sided economics of the system. If you are phoning a US number from the UK, you pay IDT's domestic call rate plus whatever it costs to reach your local ISP. That typically works out to about 13 pence per minute at peak rate, which is a worthwhile saving over BT's equivalent of 20 pence. Better still, if the call is to a toll-free (800) number in America, the US domestic element is free, which means these calls cost the same as UK local ones. But if you use Net2Phone to make a call from one UK number to another, you will be stung 15 pence a minute. That's right: phoning from London to Richmond, Yorkshire will be dearer than London to Richmond, Virginia. It's also about twice as much as BT's national rate.

Just like the real thing: over the internet, local calls work out more expensive than international calls

Other calls from the UK will save you money, but not always very much. A daytime call to France or Germany works out at about 20 pence per minute with Net2Phone, just a few pennies cheaper than BT. But Australia is a bargain 16 pence the Net2Phone way, compared to 42 pence for BT users. None of these figures take account of any internet connection charges, by the way. Whether the cost savings justify the questionable quality is for you to decide. I tested Net2Phone for a week, and only a few of my calls sounded as good as they would from a normal phone. The pauses and delays were a constant irritation, and I lost count of the times the person at the other end would say "Hey, this is a terrible line. Let me call you back." Of course, this is another way of saving money. People also complained of hearing an echo, which turned out to be their own voice played a moment or so later over my speakers and relayed back through my microphone.

The other serious drawback with Net2Phone is that it is no use for making calls from a friend's house or the pub. To overcome this, IDT is developing a service called Net2Phone Direct, which is currently being tested in Chicago. Essentially, it lets you access Net2Phone by dialling a local number from a normal phone, thus eliminating the PC entirely. IDT says that this service will eventually be available in the UK, but not for at least six months.

On balance, Net2Phone is worth considering if you want to phone beyond Europe and are not too phased by the less-than-brilliant speech quality. Personally, I've decided not to persevere. After a week of crackling conversations and jerky dialogues, I was glad to get back to my old-fashioned handset.

Mike Lewis

PCW Details

Price Software is free; you pay only for your calls.

Contact IDT +1 800 438 8879 www.net2phone.com

Good Points Cheap for phoning USA and beyond.

Bad Points Speech quality is still disappointing.

Conclusion The budget-conscious will find it worth a try.

★★★

p103 ➢

Software

Fandango

Trip the light fandango as you create the wild and wacky screensaver you've always wanted.

There's no need to go trawling the internet to find something to brighten your PC in the minutes and maybe hours it sits idle. Fandango makes it possible for you to create screensavers quickly and easily in a wide variety of styles. Send family snapshots swirling into oblivion, promote your company as its logo cruises across the monitor and bounces off the edges, or maybe produce royalty-free screensavers for promotional download from your web site. Each completed production is totally independent of the creation software and needs no runtime modules to operate.

Seven preset movement options including rain, drift, splat and gravibounce are customised by changing the number of images on screen at any one time, as well as their sizes and the speed and direction of travel. Adding a swirl effect can make graphics appear to ricochet as they hit the sides of your screen or twirl further and further away from where you sit, while a mysterious "Factor X" adds its own undocumented feature to each effect. (Those unwilling to try-it-and-see are encouraged to email the writers for an explanation.) Sound effects and background music can be set to synchronise with the images on-screen, and while the package includes over 5,000 resources, we were also able to import our own photos, logos, backgrounds and even .AVI files for seamless integration into our creations. Without the need for any further applications, Fandango was able to import a series of bitmap images and link them to become what it calls an "actor" — a small animation to be included in our design.

Add some photos, slide some bars. Fandango makes screensavers simple

Fandango is a fraction of the cost of many of its competitors and those who want to try before they buy can download a shareware preview version from the Digital Workshop web site (*address below*). Registration of the commercial version, which comes with a 60-day money-back guarantee and free lifetime telephone support, attracts free updates as and when they become available.

Nik Rawlinson

PCW Details

Price £29.32 (£24.95 ex VAT)

Contact Digital Workshop 01295 273476 www.digitalworkshop.co.uk

Good Points Royalty-free output. Fast. Easy to learn.

Bad Points No Windows 3.x support.

Conclusion An excellent product, and not before time. Fan-dango-tastic!

★★★★★

Colour Copier 2

This nifty colour-copy software could mean the end of all those hurried visits to the copyshop.

Workers in large offices, using sophisticated colour photocopiers, will not need Colour Copier 2. For the rest of us, especially workers at home or in small offices, it could be the answer to a prayer. At its simplest, it enables you to place a document into your scanner and produce a photocopy from your printer.

During our tests we used a Primax Jewel 4800 scanner and an Epson Stylus Colour 600 printer, and produced excellent-quality colour copies. We also ran tests using an HP LaserJet 3P and produced good monochrome copies. Be aware, however, that copy quality is limited by hardware performance. An inferior scanner will still produce poor copies even if a top-quality printer is used, and vice-versa.

Many aspects of the printer and scanner performance can be set from within the application, but we found that once the program has been loaded it's impossible to change the scanner mode (from colour to greyscale, for example). To do this you must exit Colour Copier, make the change, and reload Colour Copier. Similarly, despite indications to the contrary, we couldn't change the printer used by Colour Copier after it started. Whatever changes you appear to make, Colour Copier insists on using the system default printer at the time it loaded.

Colour Copier 2 incorporates several features found on sophisticated copying machines, and some enhancements of its own. All the usual enlargement and reduction facilities are present, and you can produce posters of up to A0 size (on tiled A4 sheets) from an A4 original. Image editing features abound: you can control the position, size and direction of the image on the final copy, and rotate and mirror it if you wish. Using the transparent overlay feature you can add images from files, add your own text, and highlight or obscure existing text. The powerful composite copy feature lets you scan several images from different sources and paste them together in the final copy.

Turn your scanner and printer into a colour photocopier

Steve Cotterell

PCW Details

Price £34.95 (£29.75 ex VAT)

Contact Data Becker UK 01420 22707 www.data-becker.co.uk

System Reviewed Windows 95.

Good Points Colour photocopies without a colour photocopier.

Bad Points Results depend on the hardware used. Scanner mode and default printer can't be changed from within the application.

Conclusion Easy photocopying, but includes some fairly sophisticated features.

★★★

p105 ➢

Hardware

Kurtzweil VoiceCommand

Speech recognition may well be on its way, but not in this guise. A productivity tool that isn't.

There will come a day in the not too distant future when you will not need to know how your computer works, or even how you should type; you will just speak to it and it will do your bidding. There are numerous dictation packages on the market at the moment, two of which let you use continuous speech — that is, you can speak naturally without having to pause between your words, while others make you use discreet speech (pausing between words) but also let you dictate commands to the computer.

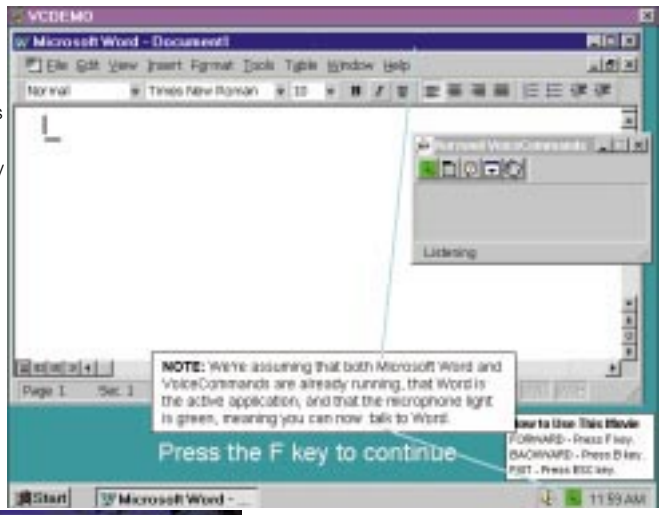
VoiceCommand is not a dictation package but simply handles spoken commands, although it is the first to use continuous speech. It lets you format text you have already entered without having to touch the mouse or keyboard, and without having to know the sequence of mouse clicks on the menu.

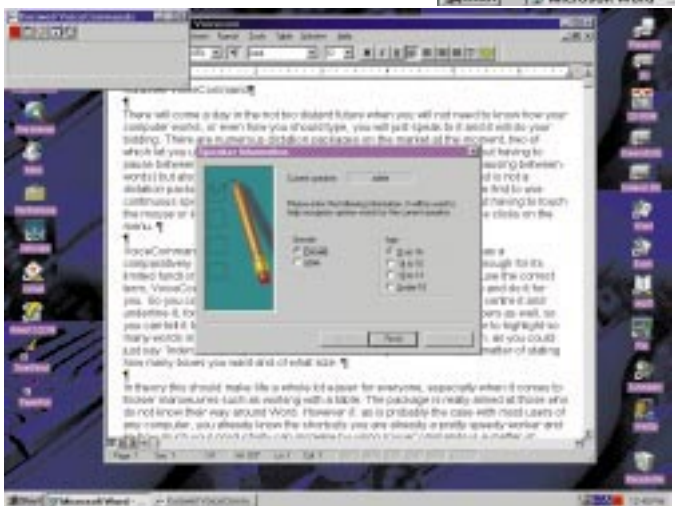
VoiceCommand works with only two products, Word 7 and Word 97, and has a comparatively limited dictionary of over 300 words, although this is quite enough for its limited functionality. As long as the command exists within Word and you use the correct term, VoiceCommand will theoretically recognise what you are trying to do and do it for you: you can navigate around your document, select a line and bold it, centre it and underline it, for example, or add a table.

VoiceCommand recognises numbers as well, so you can tell it to move the cursor up five lines or down three paragraphs, or to highlight so many words in a sentence. This also makes it easier to indent a paragraph, as you could just say "Indent this paragraph one inch", and formatting tables is simply a matter of stating how many boxes you want and of what size.

In theory this should make life a whole lot easier for everyone, especially when it comes to trickier manoeuvres such as working with a table. The package is really aimed at those who do not know their way around Word. However, if, as is probably the case with most users of any computer, you already know the shortcuts, you are already a pretty speedy worker and so how much your productivity can increase by using VoiceCommands is a matter of debate. And if you are used to working using mouse clicks or keyboard shortcuts, it can seem like more work to launch a separate application and to have to use the headset, which is, incidentally, included in the box.

In use the system is clumsy. Its recognition was neither as accurate nor as fast as I had hoped, and as it does not have any way of learning from its mistakes, there is no way to improve the recognition rate, only the use of the application. Although it is supposed to run on a P90 with 16Mb RAM under Windows 95, it was slow with a P150 and 32Mb RAM. In short, if you are already able to cope with Word on your own, you can find a better use for the 20Mb of hard-disk space it takes up.





Above The VoiceCommand training video shows you how it all works
Left The system adjusts itself to your voice, according to your age and sex

Adele Dyer

PCW Details

Price £49.99 (£42.55 ex VAT)

Contact Alpha Software 0181 387 4112
www.lhs.com

Good Points Free headset in the box.

Bad Points Low recognition rate. It's quicker to use the menu bar.

Conclusion A productivity tool that does not speed up your work.

★★

Compton's Interactive Encyclopedia 1998 Edition

The maps have been improved, there's a comprehensive thesaurus and some special features as well.

Come the 1998 editions, it is difficult to escape the feeling that the multimedia encyclopaedia has finally come of age. Pushed by Encarta (from Microsoft) and the ever-threatening and probably now superior World Book (from IBM), all the major players in the field seem to have pulled out all the stops to make their latest editions more informative and more entertaining than ever before.

As with Encarta, Grolier and World Book, Compton's now comes in a single-disc Standard edition and a better-value two-disc Deluxe version. The main differences are 16,000 photographs and illustrations with the deluxe edition, against the standard's 8,000; 150+ videos, animations and slide shows as opposed to 100+; and 20 hours of sound rather than 16 hours. The deluxe edition includes free monthly updates via the internet, whereas standard-edition users must pay a subscription.

The deluxe edition has a feature which is absent from the standard edition, Ask the Librarian. You can use this to pose a research question on the Compton's web site and receive an emailed answer within two business days. We weren't able to test this feature because our review copy was the standard edition but we understand from those who have used it that Ask the Librarian works efficiently.

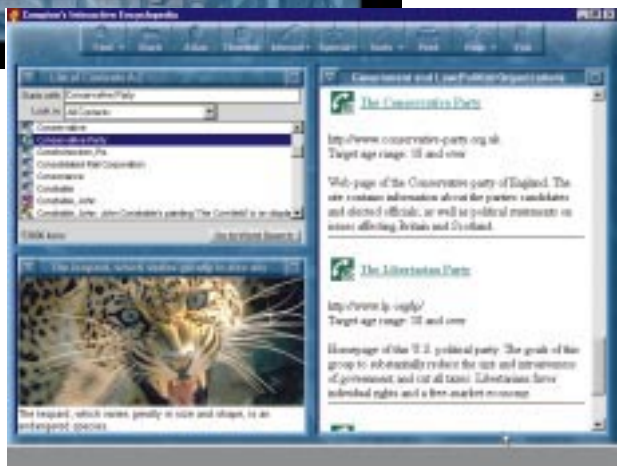
Compton's is let down by the quality of the entries. They seem shorter and less detailed than in the best of the competition: many topics that would be given a full article elsewhere receive no more than a terse footnote-style pop-up in this. The lack of localisation is not always apparent but it can be irritating. For example, UK counties receive a pop-up, whereas each US state is given a full article.

Most entries are linked to one or more World Wide Web sites and while the links worked well, they again revealed one or two shortcomings. There seems to be too much reliance on the web: for example, there was no encyclopaedia information about the Conservative Party beyond a web link. This is not so hot if Compton's is your only source for a homework project and you have no internet access.

Nevertheless, there are 6,600 direct web links and a well-annotated directory of 4,000 web sites organised by topics and sub-topics, complete with a guide to the age range to which the site would be of interest.

The maps are a distinct improvement over previous years. Although they still fail to match the maps in Encarta and World Book, they will satisfy most general needs. They are excellently linked to related text in the encyclopaedia: place the mouse pointer over Poland, for instance, and the mouse arrow will change to a book; one click and the entry appears. But despite having previously mentioned that the articles are a little lightweight in comparison to what is provided by the competition, in the case of Poland, the article was impressively detailed and gave much information about the history, industry and economy of the country, along with many links to annotations, illustrations and web links.

Left A dramatic opening screen welcoming you to a great deal of knowledge



Below You'd better have internet access if you want to learn about the Conservative Party

Two special features have no counterpart in alternative titles. ShowMaker lets you compile your own slide show from articles and media elements, adding your own voice narration if you wish, while the Planetarium displays the night sky at any time, place and viewing angle.

Compton's is also unique in that it has a 21,500-entry thesaurus. This combines with a 78,000-definition dictionary to provide an extremely useful feature: if you click on a word in the text of an article, a definition instantly appears. It is a quick and easy way of finding the meaning of unfamiliar words.

Other special features include Exploring Questions. This poses a question such as "How many varieties of grape have been developed from the single species used in winemaking?" which links to an article where the answer to the question is found. This sounds like a piece of frippery, and it is, but most of the questions spark curiosity and in finding the answer you do learn quite a bit. For instance, did you know that as many as 4,000 varieties of grape have been developed from one species, *Vitis Vinifera*, which is used for nearly all the wine made in the world?

There's also a directory of key events during 1996 and 1997, an On This Date feature which looks at what happened in the past, a timeline, and a notebook in which you can organise your research.

The package also includes a free copy of Compton's Interactive World Atlas.

Paul Begg

PCW Details

Price £29.99 standard version; £39.99 deluxe.
Contact The Learning Company 0181 246 4000 www.learningco.com
System Requirements Windows 3.1 or 95.
★★★★

Compton's Reference 1998

Another CD with an American bias but nonetheless comprehensive: don't look up Kent, though!

Let's get the worst bit over with first. This CD has a noticeably American bias. Click on Kent, for example, and you'll first find out about five US counties called Kent (they're in Delaware, Maryland, Michigan, Rhode Island and Texas, by the way). Then the towns in Connecticut, Ohio and Washington, the counties in New Brunswick and Ontario, *and* the Kent River in Cumbria which flows into Morecambe Bay. Only after all this, is reference made — somewhat alarmingly — to the "Former county, SE England". Kent, of course, still is a county, or at least it was when I last looked out of the window. Ah, the next entry refers to the present Administrative County… And you won't find mention of Bobby Moore, Stanley Matthews or Matt Busby, but instead will find biographies of baseball players.

However, this is a very good and economical collection of pretty-much essential reference material. There are ten books in total: an encyclopaedia containing more than 5,000 text articles from *Compton's Concise Encyclopedia*, the 1997 edition of *The World Almanac and Book of Facts* providing a wide variety of statistical data in the form of text articles and tables, *Webster's New World Dictionary* and *Webster's New World Thesaurus* give word meanings and synonyms (almost 100,000 entries combined), and the complimentary *Merriam-Webster Concise Handbook for Writers* which gives guidance on correct grammar and punctuation.

In addition, there is a world atlas with more than 300 maps — *Merriam-Webster's Geographical Dictionary* containing over 41,000 entries on geographical features. A home medical guide provides quick access to easily-understood information and there is also a section entitled World History.

John, Paul, George and Ringo: click the button and away you go

Add to all this an internet directory providing a descriptive list of more than 4,000 web sites, their addresses and click-of-a-button access, plus loads of multimedia including animations, pictures, slide shows, sounds and videos. The whole adds up to an impressive collection of reference material which can be searched either as a whole, or by individual book.

Paul Begg

PCW Details

Price £29.99

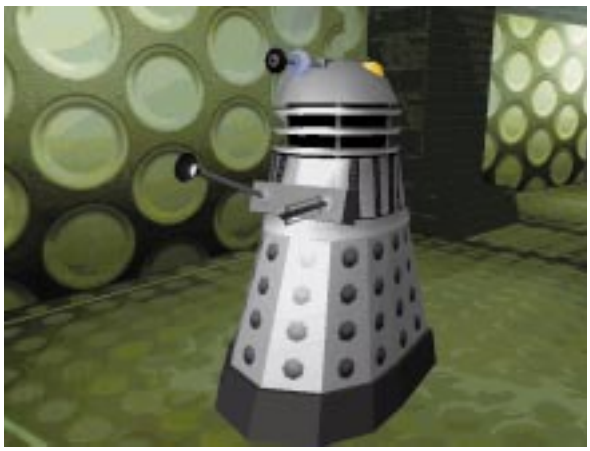
Contact The Learning Company 0181 246 4000
www.learningco.com

System Requirements Windows 3.1 or 95.

★★★★

Dr Who: Destiny of the Doctors

Pay a visit to the Doctor — in all seven incarnations — and rescue them from the evil Master.



Everyone has their favourite actor who has played the part of the Doctor in this long-running TV series. In turning the TV show into a CD-ROM game the BBC has been very canny: it has managed to include all seven of the Doctor's incarnations in "Destiny of the Doctors".

The only disappointment is that you don't get to play the game as one of them. Instead, you are Graak, an electro-telepathic entity created by the Doctor in anticipation of yet another of the Master's megalomaniacal schemes. The game is played from a first-person perspective, in which respect it is very much a Doom clone . In true Doctor fashion, there isn't much violence, although there is plenty of action. Gameplay is quite cerebral, with lots of puzzles and some lateral thinking required.

The Master is deliciously overplayed in the opening video footage by Anthony Ainley, reprising the role he played from 1980 until 1989. Having seized control of Siralos, a mythical planet of pure mental energy, the Master has managed to summon all seven incarnations of the Doctor and now holds them as prisoners in the Determinant. It's your mission to free them.

Don't despair if your working knowledge of Doctor Who mythology is a little rusty. Everything you need to know can be accessed in-game via the Tardis log and the excellent Monster Database.

Dabble in Dalek-dodging deeds of derring-do

Lets face it, the bad guys were the best part of Doctor Who, and ten of the nastiest crop up here, including Cybermen, Autons and my favourite, the Daleks.

The graphics are excellent. It is rare in a CD-ROM to want to view the video footage more than once but I found myself doing just that. Another nice touch is the specially-recorded audio material from the four surviving Doctor actors (Tom Baker, Peter Davison, Colin Baker and Sylvester McCoy). Although popular assistants like Jo Grant are absent, you do receive plenty of advice from good-old Brigadier Lethbridge-Stewart (Nicholas Courtney). Well, it wouldn't quite be a Doctor adventure without him, now would it?

Lynley Oram

PCW Details

Price £29.99

Contact BBC Multimedia 0181 576 2000
www.beeb.com

System Requirements Windows 95

★★★★

p108 ➢

Petz II

Virtual pet lovers! Mourn no more for your dead pet: these on-screen animals don't shrivel up.

When Dogz first came out, it was the start of something big. It was phenomenally successful and quickly followed by Catz. Since then, neither have rarely been out of the top-seller list. And the saga continues with a whole range of virtual pets, from HP's Mopy fish and Fujitsu's FinFin, to Creatures and the ubiquitous Tamagotchi.

Petz II is more of the same thing as the first version. There are several different cats and dogs to adopt, name, feed, water, play with, pamper and scold. In fact, there are five different breeds of dog and five varieties of cat, plus you can download more pets from the web site, as well as toys and treats for them. And that is, essentially, that. But these little creatures bounce around in their own window and, unlike a Tamagotchi, if you ignore them they do not curl up and die.

So why is it that these things are all so popular? Why is it that sane adults want to spend time and energy feeding, watering, petting and running after their pets with pooper scoopers?

They are cute enough, but there is nothing to them. If you prefer virtual friends and virtual dates to the real thing, then you will probably love these animals. But if, like me, you find virtual pets intensely cloying and grating, then you will probably be merely irritated by their cartoon cuteness.

And while we are on the subject, what is this thing about "Z"s? Since when was dogs spelt with a z? And cats and pets and toys and treats (or rather, catz and petz and toyz and treatz)?

As you might guess, I hated the whole idea of this. But if you like that kind of thing, it is probably one of the better virtual pet programs.

Adele Dyer

Choose from five different virtual dogs or cats to play with

PCW Details

Price £19.99
Contact Mindscape 01444 246333
www.mindscapeuk.com/
System Requirements Windows 95
★★★

Greetings Workshop Deluxe

Make your own invitations, greetings cards and stickers… or send rude messages to your friends!

This package needs to be told your level of computer experience. We tried all three levels, from beginner to advanced, but could see little difference in the level of understanding needed to use the Workshop.

Whereas MS Office users are guided by a talking paperclip, MS Greetings Workshop instead employs Rocky, a cute pup who sits in the bottom corner of each screen, pointing and giving directions with speech bubbles.

Fourteen different project areas including stationery, invitations, stickers and even multimedia greetings are accessed by clicking on items on a large bookshelf. Although we had no problems creating the animated multimedia greetings and emailing them around the *PCW* office, we found it impossible to play them back.

The two-CD package contains over 10,000 customisable templates, 4,000 messages and 15,000 images, which should provide a good starting point, but those still lacking inspiration can either connect to a web site to download add-on packs or consult the Hallmark Ideas Book. This rather dull help file lists suggested uses for the package but is unlikely to appeal to a young audience.

Among sections on girls' nights out and ways of telling your work colleagues "Hey, hear your life kinda stinks" are articles on how to use the Greetings Workshop as a business package. This easy-to-use package offers spellchecking and image-cropping facilities. Single mouse clicks allow for the addition of speech and thought bubbles in a wide range of colours and sizes, and everything is easily resized or moved. Having experienced some problems, we clicked the "fix printing problem" button and were unhelpfully told to consult the help file on the Windows start menu.

This quirky package seems to be aimed at a wide audience: the concept and interface will appeal to children yet many aspects seem more suited to adults, who would certainly become frustrated by the slow design procedure. Even telling it that we had advanced computer experience did not speed up the laborious step-by-step routine.

Nik Rawlinson

Party on, dudes!

PCW Details

Price £39.99
Contact Microsoft Connections 0345 002000
greetingsworkshop.msn.com
System Requirements Windows 95 or NT 4.0
★★★

Software

I Can Be an Animal Doctor

Train drivers play second fiddle to vets on children's career wishlists. It's time to gown up, doctor.

The "I Can Be" series is based on every child's desire to imagine they are a grown-up with a career in medicine, the police force or whatever. The first two titles in the series are I Can Be an Animal Doctor and I Can Be a Dinosaur Finder.

The programs allow children to pretend-play in a very realistic way. In I Can Be an Animal Doctor, you work with Dr Max Rigby, the resident vet, to find animals that may need medical attention. There are different locations for playing, like farms, woodland and desert. Animals that may be sick are taken back to the surgery for examination — this was our testers' favourite part of the game.

There is a thorough examination to complete before you can diagnose the animal's condition. There are scales to weigh your animal on, a thermometer to check temperature, an X-ray machine for examining internal organs and bones, and a microscope for checking specimens. Everything from blood corpuscles to stool samples goes under the microscope to be checked against a normal sample. Our testers were so involved, they wanted to wash their hands once they had finished their examinations.

Only when your chart is complete do you and Max diagnose the ailment. There is a choice of three remedies and you must choose the correct one if your animal is to recover and return to the wild. Remedies vary from antibiotics to plaster casts and bandages. As you can imagine, our testers, aged five and seven, played this game happily for hours and hours. Each player has a post box in the surgery that you check every now and then: animals that have been treated successfully send postcards, to let you know how they are getting along, and there are certificates to mark your achievements.

As well as learning how to examine animals, there's lots to learn about endangered species and pet care. This CD is at its best as a game which would not work in any other format.

Debbie Davies

PCW Details

Price £19.99

Contact Ablac 01626 332233
www.besanet.org.uk/ablac/

System Requirements Windows 3.1 or higher, Windows 95, Mac

★★★★★

Lemon Dog in Soundlands

Lemon Dog goes to band practice. You can too, if you release his five band members from jail.

Lemon Dog is called a musical adventure game aimed at five- to seven-years-olds. Lemon Dog himself is a roller-skating band leader who has managed to get himself in a rather unfortunate position, in that all six members of his band have been imprisoned. Lemon Dog has to free them by going into various lands and finding objects that will provide the keys to release the band members.

Each object has a sound associated with it to help you locate it (the sound gets louder as you get closer to it). Similar noises go with similar objects, such as sweets or hats or balls, and they go together to make a tune. When you have found all the objects of the same sort for Lemon Dog, you get to hear the complete tune and then collect an arrow. When you have three arrows, you can use them to choose the notes whistled by the captive band member. Once you have correctly guessed the tune, the musician is freed and he can start to play his instrument. Free all six and you have the entire band.

Each band member has six different parts he can play and each of these goes with whatever the others are playing, so you have hundreds of different possible songs you can listen to.

There are a few problems with the installation, especially as the game does not work well with some fairly common sound cards. You may have to reinstall your sound card with the latest drivers.

Otherwise the whole thing is great fun, especially the six different lands which cover everything from Asia to sea scenes, and it does teach children how different instruments go together. At times it can be quite hard to control Lemon Dog as he ricochets about on his roller skates, especially through the increasingly tortuous mazes of the different worlds, although you can get used to this.

Adele Dyer

PCW Details

Price £19.99

Contact Europress 01625 855000
www.europress.co.uk

System Requirements Windows 95

★★★★

Software

Nightmare in the Toy Factory

No production lines in this factory. The action is fast and furious with never a dull moment.

Choosing a CD-ROM game for your children that is not a film or toy spin-off can be tricky, but Anglia Multimedia's Nightmare in the Toy Factory won our testers' approval. Anglia's research suggested kids aged between eight and 14 years old fell between early-learning software and adult games. They needed something designed for their interests and abilities, and Nightmare in the Toy Factory is Anglia's answer.

The game is set in a cavernous factory that can be scary. You start by building your own character from body parts and then set out to overcome the challenges that await you in the factory. The aim is to find and rescue Professor Whizz Bang from the clutches of a runaway snake. The movement of the motion-captured, animated 3D character is entertaining and realistic — our testers enjoyed back-flipping their character whether they needed to or not. The original music, composed especially for the program, was liked too.

The game progresses from one room to the next with a challenge in each. You may have to jump over crevices or running water, avoid being squirted by poisonous paint or avoid capture by robots. Mastering the game depends on being able to orientate yourself as you enter each room. Our testers, one of whom was aged seven, managed to master the mouse to take a panoramic view around rooms before they entered. They could then plan their survival route.

Each time you successfully navigate a room, there is a toy to collect that can then be played with. This adds to the play value and is a good contrast to the main game. There are 25 toys to collect, including a 3D etch-a-sketch and a virtual-reality construction set.

Nightmare in the Toy Factory lends itself to updating and Anglia plans a web site to support it. There will be new game elements and toys to download. With or without internet support, there is plenty of play value on this program. Our testers' only criticism was that a factory as the setting for the game can become monotonous.

Debbie Davies

PCW Details

Price £29.99

Contact Anglia Multimedia 0171 579 4106 www.anglia.co.uk

System Requirements Windows 95

★★★★

Ready for Learning

Will this Play Family CD from Fisher Price win over fans of the plastic garage? Read on and see.

Are your toddlers better off with the latest multimedia from Fisher Price rather than the Fisher Price toy garage you and I grew up with? It is difficult to find a child psychologist who is enthusiastic about toddlers and computers, so Fisher Price has a challenge on its hands with the launch of Play Family, a program aimed at children aged between 18 months and three years. It has 20 activities with two levels of difficulty. Level one uses the keyboard, level two introduces the mouse for moving the cursor. Games include counting, ABCs, shapes, colours and opposites. Together, they cover familiar learning topics for youngsters, but how well does the program work in practice?

Our tester, rising two, tested the program sitting on his parent's knee, as advised by Fisher Price. Keeping his interest on the screen was difficult, no matter what the game. The more complicated the game, the lower his concentration level. Some of the novelty that Fisher Price has introduced adds to the complexity: games in which you blow balloons or bubbles so they are big or small can be played with the microphone — you blow into it. Even with our microphone set for maximum sensitivity there was a considerable time lapse between blowing and seeing bubbles or balloons grow. You find yourself blowing harder and harder. The telephone game can be played with pre-recorded messages or your own customised messages. This impressed our parent tester: he could record messages and play talking telephones with his son no matter where he was. But our child tester was unimpressed. He was just playing talking telephones and probably wondered why his Dad had gone to so much trouble when he could have just picked up the telephone.

Herein lies the problem with computers and toddlers. Professor Sheila Wolfendale, director of Educational Psychology at the University of East London, is cautious about a new generation of playthings. "Toys which are very easy, accessible and engage children at a direct level, have stood the test of time," she says.

No matter how fast or engaging the computer screen gets, it will always lack the accessibility of a Fisher Price garage.

Debbie Davies

PCW Details

Price £19.99

Contact Fisher Price CUC Software 0118 920 9100 focus.cucsoftware.com

System Requirements Windows 3.1 or higher, Windows 95

★★

Hardware

1 YEAR TEST

Dell Dimension XPS P200s

Good news for Dell and its fans — sleep easy as this one-year-old has never been cause for complaint.

When it was first launched, in December 1996, the XPS P200s cost a whisker under £2,000. Its P200 processor put it near the top of Dell's product tree and, to prove the point, it came with a copy of Microsoft Office Professional.

Its 3.2Gb hard disk was generous at the time, as was the main memory. Despite its rarity a year ago, Dell managed to install 32Mb of SDRAM. The rest of the system comprised an own-brand 15in monitor and Altec Lansing speakers. The AWE 32 sound card was a daughterboard upgrade to the on-board sound.

I've been using this PC for a year and it hasn't had an easy ride. Despite serving as a workhorse and receiving a flogging in the process, it has behaved almost flawlessly. Hardware alterations have included a new monitor, two new graphics cards and three changes of CD-ROM drive.

I never expect hardware upgrades to cause problems, but software is another matter. If you review a lot of software, which I do, you often get early and untried versions that can be fatal to an unstable machine. The Dimension coped with a range of programs and has only recently begun to crash on a regular basis. But as soon as I found time to reinstall Excel, the problem disappeared.

It's the physical side of upgrading that has been the most difficult. The casing is common to all subsequent Dimensions: it comes apart with a thumbscrew and two latches. It's meant to be easy to open, but is generally a two-person job.

The motherboard is a clean design with all the expansion slots, including DIMM sockets, well clear of any cabling. Drive bays are another matter: take the front off, swing the drive cage out, and you're set to add another CD-ROM drive. But unless you do this every week, it is hard to view it as anything other than an inconvenience.

So far, this machine laughs in the face of technical support (…*touch wood!*)

John Sabine

PCW Details

Price £1,983.40 inc VAT in Dec '96. Now discontinued in favour of the Dimension XPS D series now available.

Contact Dell 0870 1524601 www.dell.co.uk

Good Points Well built, well specified and backed by Dell's reputation. No calls to technical support.

Bad Points Case is awkward to open. Drive cage is a pain.

Conclusion The Dimension works, and that's one of the greatest accolades you can give to a business machine.

★★★★

Evesham HXSE Pro200

1 YEAR TEST

This Platinum HXSE Pro200 really shines. Although it's a bit too cosy inside, it moves like lightning.

Back in December 1996 I hunted through advertisements in *PCW*, selected three vendors and made calls to their sales numbers. Based on price and quick delivery times, I decided to go with Evesham Micros.

The PC I plumped for was the Pentium Pro 200, to which was added an Ilyama 17in monitor and a Matrox Millennium video card. The memory was expanded to 64Mb and the hard disk was increased to 4Gb. My aim was to use the machine primarily as a Linux workstation, with Win95 as a secondary OS.

Delivery was made a day earlier than promised and arrived with Windows OSR2 pre-installed. However, only the original Win95 CD came with it, so repartitioning to install Linux meant losing the OSR2 features. This was no great loss, however.

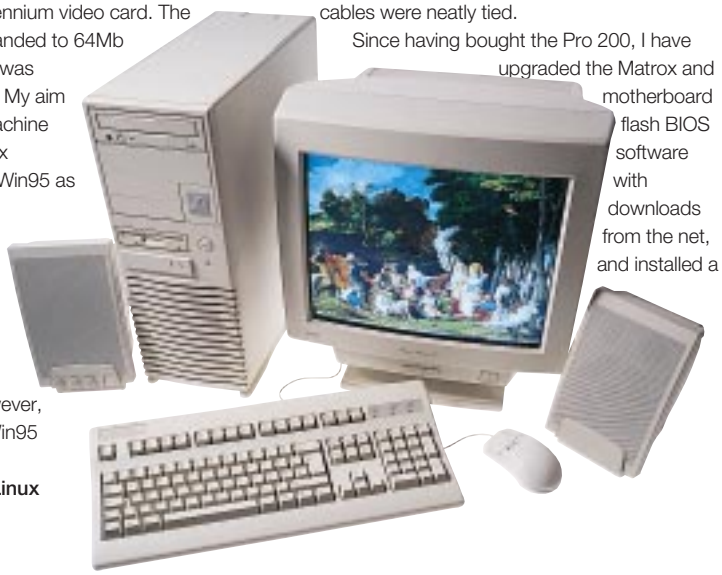
Taking the case off to install an ethernet card was a breeze — I simply undid a locking nut and slid the side off to reveal the interior. Connections were glued in to stop them falling out, and the cables were neatly tied.

Since having bought the Pro 200, I have upgraded the Matrox and motherboard flash BIOS software with downloads from the net, and installed a TV card and a SCSI adapter. The PC runs Linux like lightning (I wanted it for this, in the first place).

The only problem was the installation of a SCSI hard disk and CD Writer. The tied cables made it difficult to put my hands in the right place to push the cables into the back of the drives, so I cut the ties and let the cables float loose.

Air-flow through the drive bays is extremely poor, resulting in the CD Writer overheating: I was forced to put this into an external case in order to keep it cool enough. This will probably not be a problem for hard disks, since CD Writers tend to get hotter than the average drive.

Stephen Harris



This PC moves Linux like nothing else

PCW Details

Price £2,980.97 (£2,537 ex VAT)

Contact Evesham Micros 0800 6345 999 www.evesham.com

Good Points Fast. Expandable. Quiet fan.

Bad Points Air flow. Tight space for hands.

Conclusion I'm very happy.

★★★★

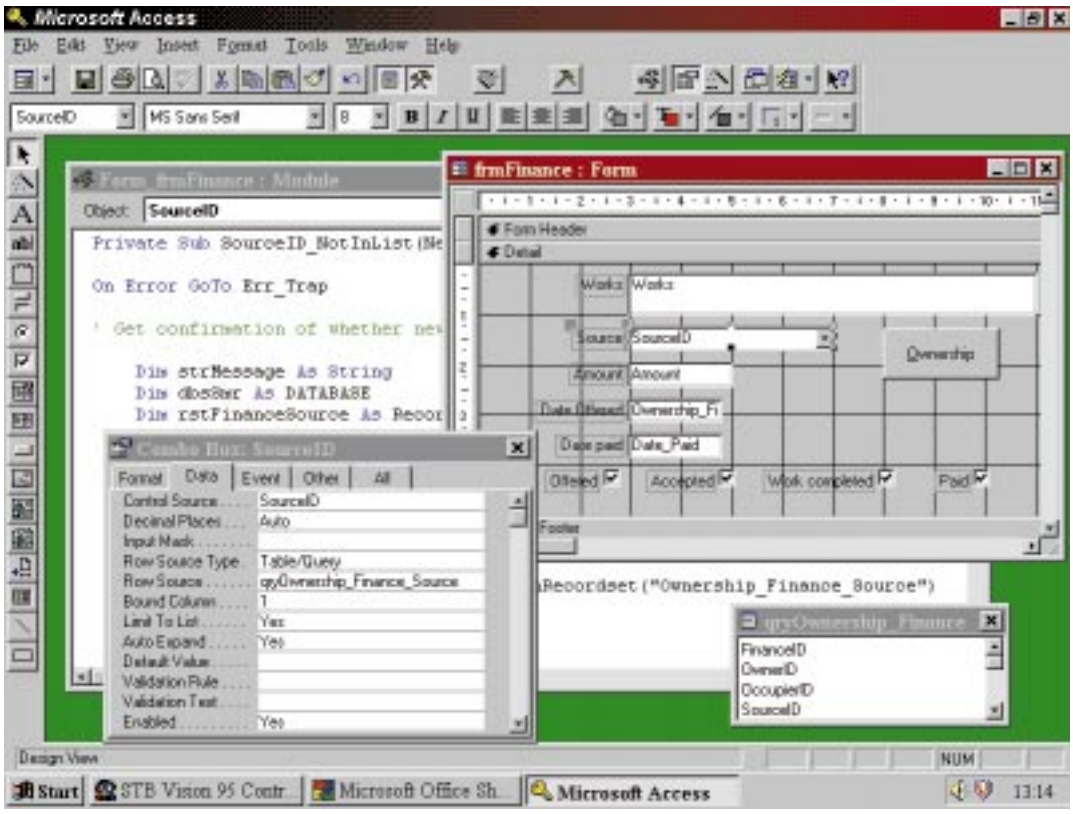
Software

1 YEAR TEST

Microsoft Access 7

Set up your tables with the help of wizards, view queries as SQL. The choices are many with Access 7.

Given the dominance of Microsoft's Office suite in the desktop market, it is hardly surprising that Access has become the database management system of choice for many home or small-office users. Having previously used dBase, I moved to Microsoft Access 7 because it came bundled with a new PC. But be prepared — the learning curve for this software is quite steep.



Creating forms in Access 7 — you can get help from the excellent wizards

Like all Microsoft products, Access comes with wizards for all the basic tasks involved in developing a database. While it is perfectly feasible to create a complete application using wizards, these are best seen as a starting point for later adaptations. Producing a properly customised project requires the use of Visual Basic for Applications (VBA) code.

Setting up tables can be carried out via a wizard, or from scratch in design view. It is worth taking some trouble at this stage to make use of the facilities for controlling data input with the use of input masks, validation rules and the like: getting it right, from the start, saved me a lot of time later, particularly when designing forms, because controls on later forms will inherit these properties. Establishing relationships between tables is carried out visually by dragging fields from one to another and selecting rules for referential integrity, so that deletions and/or updates will be cascaded to linked tables where appropriate.

Creating quite complex queries to view or amend sets of data is basically a matter of dragging fields into a grid and entering appropriate criteria. Queries can also be viewed as SQL; this enables amendments to be made to create queries which cannot otherwise be designed visually. Queries can also be written entirely in SQL. Becoming familiar with SQL is desirable if the full potential to produce useful analyses is to be achieved.

The user's interface with a database is primarily via forms which are created visually by dragging controls like text boxes, combo boxes, buttons and so on, from a control palette or field list onto a blank form. Each control has its own wizard to help, if required. Once a control is placed on a form, its properties are set in a property sheet. This includes a comprehensive set of events through which macros can be set up, or VBA code written into procedures in the form of a code module. The use of such procedures allows complex operations to be undertaken when, for instance, a button is clicked or a value selected from a combo box. Standard modules can also be created, enabling procedures and functions available to the whole database to be written, avoiding duplication of code within form modules.

Although this requires a familiarity with VBA, the language is not difficult to learn and is well covered in the online help system. Even so, it did sometimes take a bit of digging around to find what was needed.

Designing reports in Access 7 is similar to laying out a form, with objects being dragged onto the report layout and manipulated visually. Unlike other database packages, which often come with cut-down versions of third-party report designers, Access 7 has its own fully-featured system. This system has the ability to exercise sophisticated control over the output through event procedures when the report is formatted and printed. This degree of control makes the report designer one of the strongest features.

Access can provide a basis for developing databases for the desktop or a small network (or even as a front-end to a client-server system). Simple databases can be produced easily without writing a line of code, but time spent learning the intricacies of the package, and becoming familiar with VBA and SQL, is needed to get the best results.

Ken Sheridan

PCW Details

Price Latest version is Access 97, £263.20 (£224 ex VAT)

Contact Microsoft 0345 002000
www.microsoft.com

Good Points Fully-featured report designer. Excellent wizards. Compatibility.

Bad Points Steep learning curve. Requires familiarity with VBA and SQL code.

Conclusion A comprehensive development environment.

★★★

p114 ➢

Software

4 YEAR TEST

Top Level Fine Words

This word processor made the jump from DOS to Windows and only takes up 5Mb. A good performer.

I bought TopLevel's Fine Words Version 1, having taken the great leap forward to a Windows-capable computer. Already familiar with Top Level's excellent DOS word-processing (WP) program, I was further attracted by its reasonable price. Even though the software is discontinued, I would still recommend it to anyone who happens upon a copy tucked away in the dusty corner of a shop or bargain bin. Fine Words has proven admirable for my particular needs.

As a home and hobby user, in retirement, I have quite ambitious WP requirements. Using Fine Words I've written a long novel, a lengthy translation from French, numerous short stories, simple newsletters and pantomime scripts, as well as everyday personal and local society correspondence. Some of the text has been exported to Serif's PagePlus (also a bargain — and powerful). Fine Words is fully-featured but not over the top, and it needs only 5Mb for a full installation: a major plus when many packages eat up precious hard-drive space.

A complex document, such as a script, is quickly formatted by setting up several suitable styles. Calling up different predetermined layouts for different purposes saves time and achieves consistency, and the layout will incorporate the special styles needed.

The ability to use foreign and scientific characters is useful when, for instance, French is involved. These characters appear at the bottom of the screen in ten sets which can be scrolled, and the keystrokes to place the character are given. There is a Task Bar which provides shortcuts to 12 menu items, also reachable through function keys. Paragraphs can easily be given a box border, and this is useful for providing actors' scripts with scene headings.

The Collins 118,000-word dictionary and the 800,000+ thesaurus are splendid. I objected at first to the spellchecker wanting to change my surname to "Exorcist", but a personal dictionary entry put a stop to that!

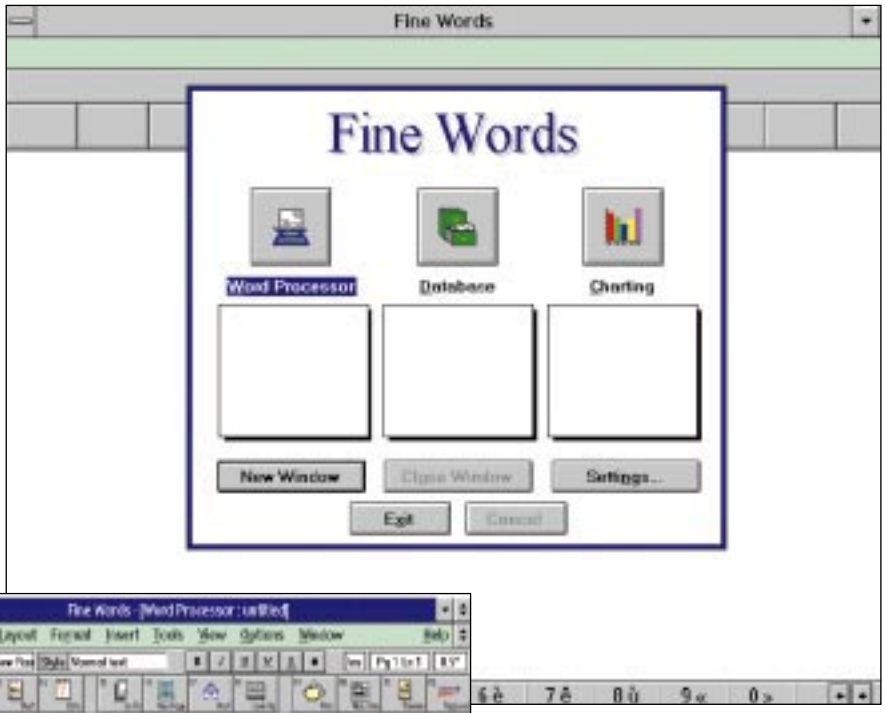
Fine Words provides a database and charting facility. The former has proved its value when used to create an address book accessible within the program. But it has much wider potential, of course, such as mail merging into WP documents. I haven't needed to use the charting feature, but the software is able to create several types of chart from limited sets of values.

Interestingly, PagePlus imports Fine Words (TWP) files as if they were .txt files. This means you don't have to convert the files to .txt or some other format suitable for PagePlus. (Fine Words can read and save files in several formats of comparable vintage to itself.) Graphics can be imported, sized and moved horizontally. Fine Words imports several formats directly, but some can only be achieved via the clipboard. In this case, I have usually preferred to export Fine Words text to the DTP program, rather than use the latter to paste a graphic to the clipboard.

Although all this may make Fine Words seem brilliant, it does have its limitations. The software has an undeclared maximum file size, but so far this hasn't proved a problem for me. I find it better to work on large documents in sections and to use Fine Words' good printing facilities to print the final document in properly-numbered sequence. A little bit of cutting and pasting between files may be needed to eliminate blank spaces at their ends, but it is easily done.

An autosave function and a Save button on the task bar would have been useful (we suffer from power cuts rather too often) and I would have liked the File menu to have shown the last few files opened. A few samples are given, but it has no submersion in irrelevant wizards, although this isn't necessarily a bad thing.

Alan Axworthy



Above & left **Fine Words deals with all your word-processing, database and charting needs**

PCW Details

Price Discontinued. Top Level's closest software package is Office Forms Professional, £82.24 (£69.99 ex VAT)

Contact Top Level 01453 753955 www.toplev.com

Good Points Requires only 5Mb. Formatting. Foreign and scientific characters. Database feature.

Bad Points Lacks autosave or a save button on the task bar. Doesn't have any wizards.

Conclusion It would take some doing to convince me that anything newer is better.

★★★★

PCW Awards 1998

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Adele Dyer	Reviews Editor
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Nik Rawlinson	Staff Writer
Paul Trueman	Staff Writer

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This is your chance to vote in the eighth annual *PCW* Awards and win £1,000-worth of PC equipment of your choice, or one of 100 runner-up prizes of two years' worth of *PCW* on CD.

Maybe it's time to upgrade those flagging portions of your PC? Or buy a new one altogether? If you are the lucky winner of our 1998 Awards draw, the choice will be yours: £1,000 (inc VAT) to spend on any computer equipment you fancy, from the advertisers in *PCW* (Feb & Mar '98 issues). It's up to you.

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The "Personal Computer World Awards" represent your acknowledgement of excellence and attention to service, so we want to know which companies have supplied you with a service you'd recommend to others. *Your votes count.* To participate, fill in as many of the 1998 Awards categories as you can and post or fax the page to us (*see the blue box, left*). The closing date is 28th February 1998.

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Personal Computer World

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Best software dealer			
Best hardware dealer			
Best PC supplier (mail order)			
Best telephone support			
Most reliable PC manufacturer			
Hardware awards	**Manufacturer**	**Model**	**Where did you buy it?**
Best PC for business			
Best PC for the home			
Best budget PC			
Best notebook			
Best laser printer under £500			
Best inkjet printer			
Best monitor (from 17in to 19in)			
Best scanner			
Best modem			
Best graphics card			
Best sound card			
Best digital camera			
Best handheld/palmtop			
Software awards	**Manufacturer**	**Title**	**Where did you buy it?**
Best software suite			
Best creative software			
Best web software			
Best accounting software			
Best utility			
Best reference/home CD title			
Best game			
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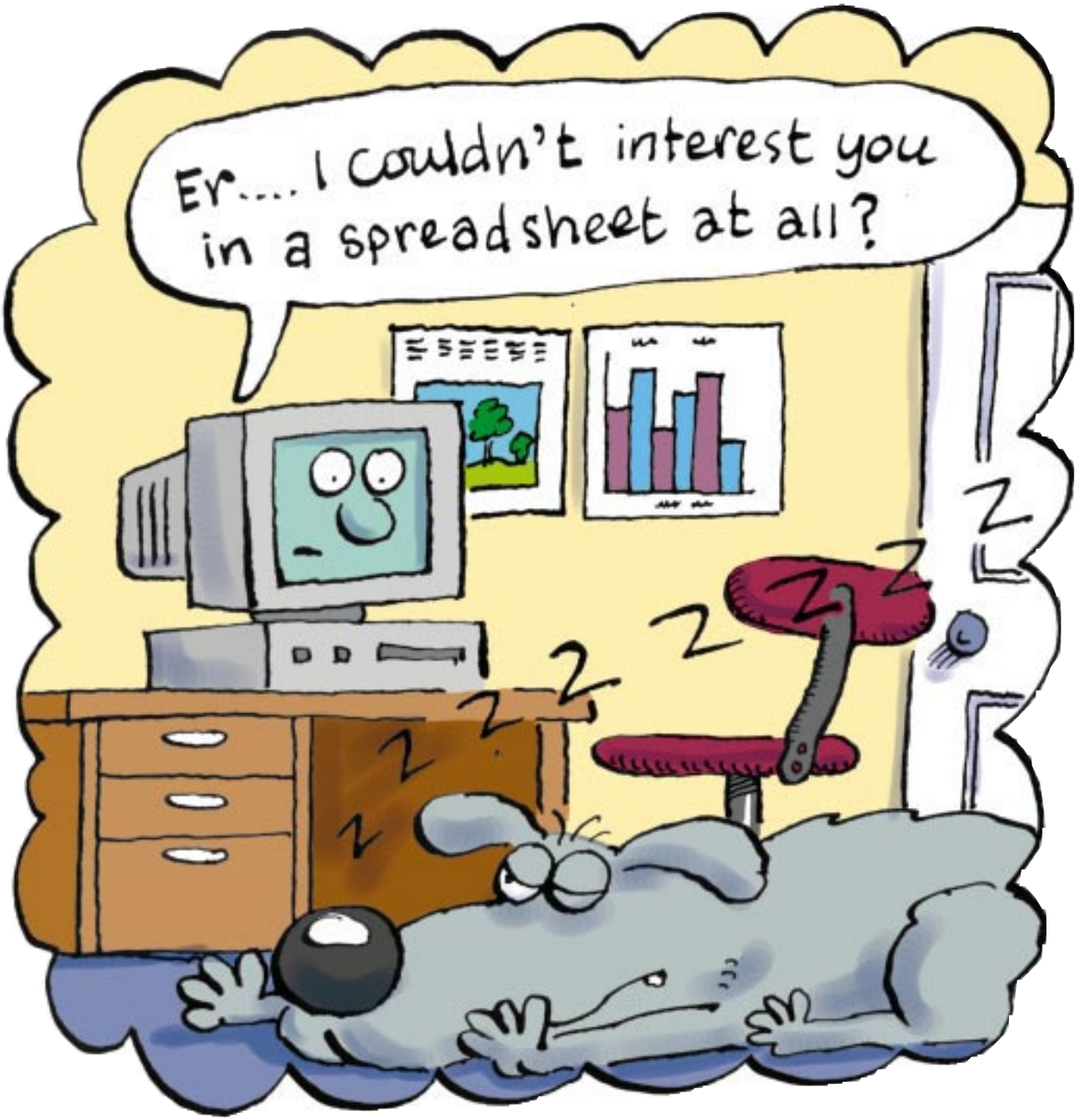
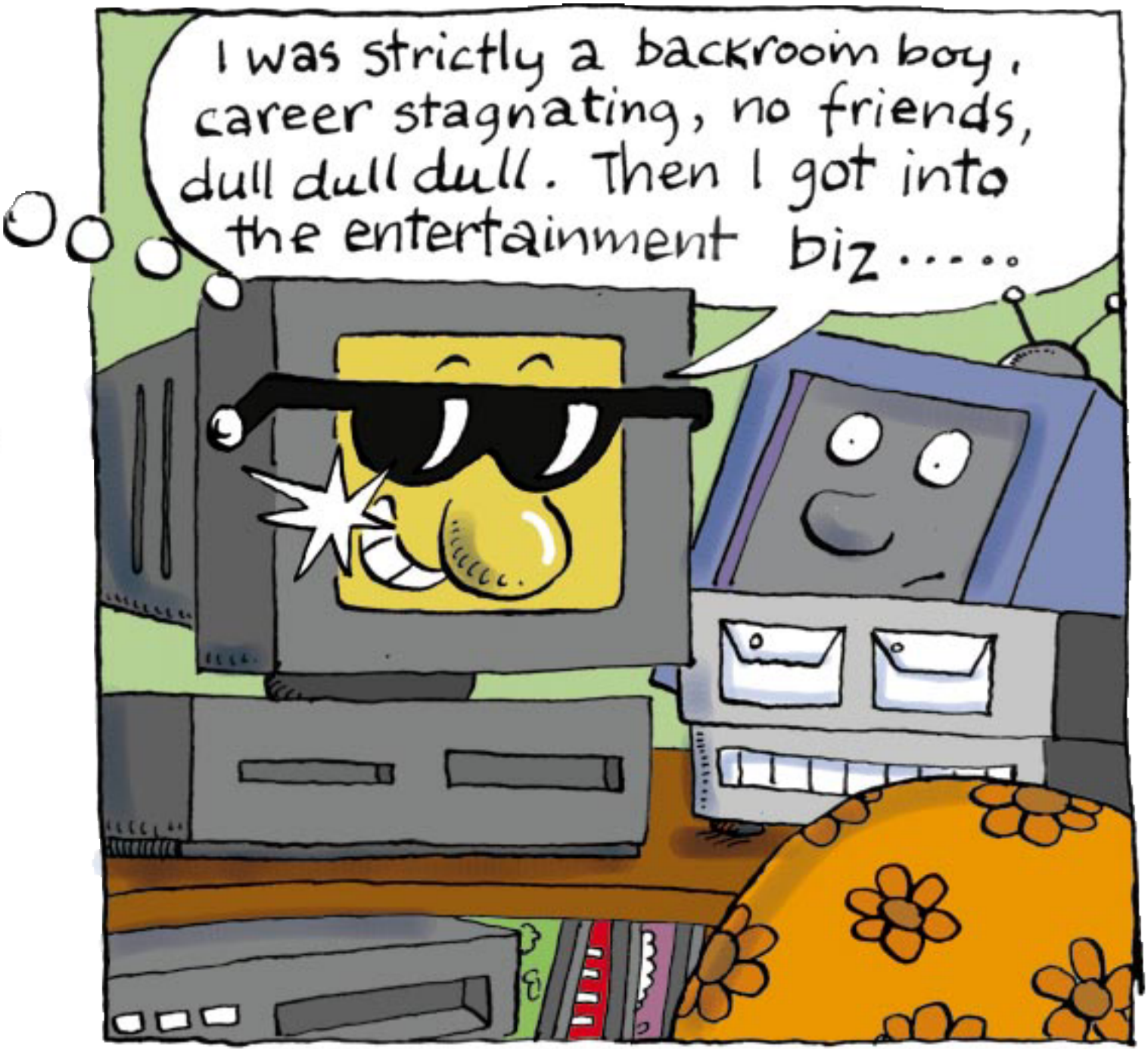


A star is born

No more the boring family member who does the accounts, sorts the filing and writes the letters. Now your PC can marry with your TV, video and stereo to provide all-round home entertainment. Gordon Laing looks at the options.

The term "consumer electronics" conjures up quite distinct images, typically those of good-looking black boxes adorned with a generous helping of flashing lights and all operated by remote control from the comfort of your armchair. Perhaps more important is the fact that they not only switch on instantly, but rarely crash and are pretty straightforward to use. These conditions seem perfectly reasonable, and are of course prerequisites for our TVs, video recorders and stereos; but can anyone honestly claim that a PC meets any of them? Could you really call a PC good-looking, with all that dispiriting cream-coloured plastic? How about easy-



to-use and rarely crashing? Even the fastest PCs take a while to start up and still insist on flashing up obscure command-line references while they're at it.

It would be ridiculous if, when powering-up our TV set, we had to wait 60 seconds as the words "Tube by Sony", "Speakers from Wharfedale" and "Aerial by bloke on high street" popped up. And yet the buzzword of the late nineties is convergence: the process of taking your PC out of the spare room and into your lounge, encouraging your existing electrical goodies to embrace it and welcome it into their fold. The PC as consumer electronics.

Having conquered the business community, the PC manufacturers are after new blood. It's understandable how excited they are at the prospect of the PC becoming as ubiquitous as the video: this so-far untapped revenue could be enormous and currently has manufacturers champing at the bit. But there's more to consumer electronics than producing groovy adverts and popping the same old gear into colourful boxes.

Future PCs and TVs will work together in perfect harmony, but today, the story is quite different as so-called "home-entertainment" systems are often put together with little thought. We reckoned it was time for some advice.

Throughout the following pages we'll look at the issues involved with DVD and connecting your PC to your TV and hi-fi. We'll make sense of all the surround-sound formats, consider the future of PCs as pieces of consumer electronics, and ask why you should be willing to relive the arguments heard at the birth of home computers, when one member of the family wanted to play JetPac while Coronation Street was on.

ILLUSTRATION: Trevor Dunton

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DVD, compression and watching DVD movies

Several years ago, the latest thing was multimedia. To make a multimedia system, all you had to do was take a PC and fit a sound card and a CD-ROM drive. To make a home entertainment PC, most manufacturers are doing much the same but with slightly more exotic components.

DVD

Manufacturers love it when there's a new format for everyone to upgrade to, mostly because we end up duplicating our existing music and movie collection for some new-and-improved version. CD did the trick for updating our music collection, but we've been quite happy with stockpiling movies on VHS tapes for ages. The movie makers are on the lookout for a new home video format.

Above The Gateway Destination system, currently available only in the US, comes with DVD and a large VGA TV/monitor

Storing video on the 5in CD format has been tried before, but results were disappointing due to over-compression. A higher-density disc was required, so out of numerous labs, arguments and final agreements came DVD. It looks like a CD from the outside, but with finer tracks and smaller pits read by a new laser, it has around seven times the capacity — a whopping 4.7Gb per side. And that's not all. DVD can be double-sided and can feature two layers per side, boasting a massive potential of 17Gb.

DVD's nominal capacity of 4.7Gb is enough to store over two hours (sufficient for most movies) of compressed video at a quality much higher than that of conventional VHS tape. There's also plenty of room for decent sound, subtitles and a whole load of other goodies. It's perfect for home video, hence the acronym DVD (Digital Video Disc).

With up to 17Gb capacity, you could also store stacks of PC information (imagine Encarta with loads of long video clips), or even an audio format sounding even better than CDs. With this in mind, DVD is now more commonly known as Digital Versatile Disc. To read a DVD disc you'll need a PC DVD-ROM drive (available now) or a domestic DVD player for the home (to be launched this spring).

DVD-ROM drives are the natural successor to CD-ROM drives and are expected to have an 80 percent PC penetration by 2001. There are several important issues of which to be aware. Although all DVD-ROM drives can play CD-ROM discs, only the latest models can read CD-R discs. Write once and rewritable DVD are in the pipeline, but again with several issues in the balance.

DVD rewritable (also known as DVD-RAM) will initially have a capacity of 2.6Gb per side and only be compatible with the next generation of DVD-ROM drives, expected by mid-1998. The 4.7Gb DVD-RAM format is at least a year away and will only be compatible with drives released then. Confusing the issue further, Sony has announced development of its own recordable DVD format with an even higher density suitable for storing high-definition video.

Bearing all this in mind, you'd be right to stop and have a good think before buying a DVD-ROM drive today. Here are a few technical details to keep you going, though: current drives will play DVD discs back at up to double speed, and normal CD-ROMs at around 24-speed. Windows 95 supports DVD-ROM drives with software patches, although, like USB and FireWire, Windows 98 should support it as standard.

The big squeeze

Considering that a single frame of full-colour TV requires around 1Mb of digital storage, and that there are 25 or 30 of these per second, it doesn't take long to realise that some sort of video compression needs to be employed for playing times of over a few minutes.

DVD video employs MPEG2 compression, boasting far superior quality to VHS tape and better than Laserdisc under the right circumstances. Even at a much higher bit-rate than MPEG1, a single side of DVD can squeeze over two hours of MPEG2 video, sufficient to store most movies without having to turn the disc over or switch to another layer.

Despite being ready for release around two years ago, the Hollywood film studios held back the release of DVD movies, subsequently delaying DVD hardware, too, until they came up with a restrictive regional coding system. The result is a world split into six regions, with software and hardware which can be designed to operate in only one region.

Region 1 is North America and Region 2 covers Europe and Japan. A Region 1 encoded disc will only play on a Region 1 machine, and so on. The regional coding of discs is optional but all the US titles we've seen so far are Region 1 coded. These discs employ the 525-line 60Hz NTSC video standard. The forthcoming European Region 2 titles use 625-line 50Hz PAL/SECAM format. Your PC monitor will happily display either format using the decoded RGB information of MPEG2, but if you want to display Region 1 on your TV, it will have to be NTSC compatible.

There are cunning ways around regional coding when using your PC. Many DVD-ROM drives are sold with MPEG2 decoder cards offering TV and audio outputs. The regional identification of these MPEG2 cards is usually chosen by the user during installation. To replay other regions you could reinstall the software, but most manufacturers are limiting this to, say, five goes. After this, you're stuck with your last regional choice.

• *Our PCW tip is to create an additional Win95 hardware profile identical to your default one, but to install Region 1 drivers on one and Region 2 on the other. Choose the desired profile and, hence, region when starting your PC.*

To watch DVD movies on your monitor, the decoded MPEG2 video must be overlaid with the standard image from your existing graphics card. A common solution is to connect your graphics card to the decoder card using a short, external analogue VGA cable; the monitor is subsequently connected to the decoder card. While this guarantees compatibility will all graphics cards, it is often at the cost of the normal Windows desktop image quality, particularly at high resolutions. If you intend to display DVD video on your TV using the dedicated outputs, we advise you to dispense with the external analogue pass-through cables and leave your monitor connected to your graphics card. Some cards offer a proprietary internal pass-through of digital information, but these would only work with specific hardware combinations.

An increasing number of new graphics cards are featuring built-in MPEG2 decoding hardware. Decoding MPEG2 is an intensive task, requiring dedicated hardware chips. But there's no reason why this couldn't be done with software on a sufficiently fast PC.

Below, right The Philips DVX8000 Multimedia Home Theater is a high-spec PC with DVD and an integrated AV amplifier with AC-3 decoding. Sadly, it is a US-only product

Connecting PC to TV and listening in surround sound

Zoran offers a software MPEG2 decoder which can display smooth full-screen video using the processing muscle of a quick Pentium II PC, as long as it isn't doing anything else at the time. Bear in mind that you'll still need some sort of video output sockets if you want to display images on your TV.

While it is relatively simple to decode MPEG2 video, the encoding process is a different kettle of fish entirely. The authoring process currently takes professional video engineers several days to encode a single movie — hardly cheap or in realtime. For DVD to take off as a domestic format, I believe that buyers will want to use it as a replacement for their VHS video recorders. Not only will this require a high-capacity DVD-RAM drive, but also a cheap realtime MPEG2 encoder chip: both are at least a year away from release.

One consolation is the forthcoming Digital TV service, which is likely to consist of shows previously compressed and encoded by the broadcasters into MPEG2 format. This information could be copied directly onto disc using a DVD-RAM drive, effectively working as a digital video recorder. Either way, DVD as a replacement for the VHS recorder is quite some way off.

What's on TV?

If you want to connect your PC to your TV you'll usually need composite or S-Video outputs on your graphics or decoder card. These connect directly to your TV or VCR; the S-Video connection offers higher quality than composite video.

Remember that your TV is only designed to display resolutions of around 640 x 480 pixels. Also bear in mind that a flickery TV will be no competition, in terms of quality, for a decent dedicated RGB PC monitor. It is, however, usually much larger and normally located nearer the comfy seats — great for playing games and web browsing with an infra-red keyboard and pointer.

If your PC doesn't offer TV output, you may consider a VGA-to-TV converter, which take your graphics card's output and convert it into a TV-compatible signal. Most of these converters are fitted in between your PC and monitor and unfortunately many suffer from the same reduced-quality issues as the MPEG card pass-throughs mentioned earlier. Again, we recommend that you only use a pass-through or converter when exclusively displaying images on your TV, and remove or disable it for normal PC use on your monitor.

Some modern high-end TV sets are now boasting VGA inputs, allowing you to connect your PC directly and bypass any nasty composite or S-Video converters. This solution, as offered by Sony's KV32FD1 32in widescreen TV, boasts the best PC image quality you're going to get from a TV set.

Listen here

Most PC sound cards are capable of producing high-quality audio, yet the vast majority of us insist on using cheap, nasty speakers. There's no reason why you couldn't connect your PC's audio output to your hi-fi and enjoy better sound quality.

Just connect the line output from the PC or sound card to a spare line input on your hi-fi amplifier (such as Aux, VCR or CD): *do not use the sound card's speaker output, since this is already amplified allowing it to drive small, unpowered speakers.* The sound card's line inputs can be connected to your amp's tape-out sockets, allowing your PC to record audio. Suitable cables are available from any hi-fi shop.

Behind you!

According to the manufacturers and adverts, surround sound is the big thing for our living rooms. Where does this fit in with the whole PC convergence concept?

Most of us correctly understand surround sound to be some kind of system where sound envelopes the listener — usually achieved with several well-placed speakers around the room. However, in practice we're confused by terms like Dolby Surround, Dolby Pro Logic, Dolby Digital, DTS, SDDS and AC-3. The original Dolby Surround system, also known in the cinemas as Dolby Stereo, encodes four channels of audio into a standard two-channel format. Installations equipped with only one or two speakers could replay this encoded soundtrack, while those with a suitable decoder could recover the original four channels for surround sound.

Europe will have to wait until spring, but DVD movies have been available in the US for a whole year

This system allowed movie soundtracks to be conveniently distributed in a single two-channel format which is neatly compatible with current Nicam stereo TV broadcasts and Hi-Fi Stereo video. Almost every film made after 1977, and broadcast in stereo on the TV or replayed on stereo video cassettes, will contain the encoded surround information. Just connect your stereo TV or VCR to a suitable decoder and you'll get all four channels.

In a four-channel surround system, two channels go to the conventional front left and right speakers, the third to a centre speaker (ideally located between the left and right speakers and above or below your display), and the fourth channel is shared between the surround speakers (usually a pair in the corners behind you in a home environment).

Some systems are described as being Dolby Surround, usually meaning there is no dedicated centre channel output. The more sophisticated Dolby Pro Logic system features improved channel separation and steering, along with a dedicated centre output. However, some Pro Logic systems don't come with a centre speaker and others don't even offer an output for one. Surround systems without a centre speaker operate in a so-called phantom mode.

The centre speaker was originally designed for replaying dialogue in cinemas, ensuring that voices came from the middle of the screen regardless of where you were sitting. In the home this isn't as important, although modern sound mixers are directing considerably more than just voices to this channel. Consequently, if you're going for a centre speaker, buy the best you can afford and the closest match for your left and right speakers. This ensures it can handle everything thrown at it as well as sound consistent with your main pair.

Dolby Surround or Pro Logic, however, suffer from two main limitations. The two-channel distribution is great for compatibility bu,t once decoded, the separation between speakers isn't as good as it would be with a system delivering four or five totally separate channels. Secondly, the surround channels are limited to a narrow band of frequencies, only sufficient for basic "behind-you!" effects. Consequently, several companies developed surround systems featuring five or even seven full-range, totally separate (discrete) channels, storing them digitally in a compressed format. The three in current use are Dolby Digital (also known as AC-3 from the

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Digital surround formats and the temptations of convergence

name of its compression algorithm), DTS (Digital Theatre Systems) and SDDS (Sony Digital Dynamic Sound). MPEG has developed a similar system.

Dolby did its marketing correctly and used its influence to have its Digital AC-3 system made the mandatory surround format on all Region 1 DVD titles. Europe's Region 2 titles were set to have MPEG's system, but it looks like Dolby AC-3 could become mandatory, instead. Titles without AC-3 or MPEG audio must instead have a linear PCM soundtrack: the uncompressed digital audio system, as used in two-channel form on normal CDs.

There is, however, plenty of room on DVDs for additional soundtracks which could offer different languages or the same language in additional formats. Optional formats supported by DVD include DTS, SDDS and AC-3, MPEG or linear PCM, if they were not present as standard. In all cases it's up to the distributor, and the person who authors it, which formats are implemented. The forthcoming digital TV broadcasts are likely to feature Dolby AC-3 or MPEG surround formats.

These digital surround formats are undeniably impressive, featuring five or seven separate full-range channels and often a dedicated sub-woofer channel (normally referred as the .1 channel, hence a "5.1" or "7.1" system). But despite starting off with sound that's often better than CD, each format employs different compression techniques, resulting in differing sound quality.

Despite supporting variable bit rates and channels, AC-3 in its common 5.1 surround format is squeezed into a mere 384 kilobits per second (Kbps). DTS is considerably less severe, shrinking its 5.1 channels into 1,411 kilobits per second. DTS may require more space than AC-3, but in my opinion it sounds completely transparent — you really cannot tell that it has been compressed. Dolby AC-3, in comparison, can sound quite harsh, although 384Kbps is an impressively small bit rate and all that's available in some environments.

To get at any of these compressed signals you'll need a suitable output on your player, drive or video decoder card. Some MPEG2 cards feature an SPDIF socket on the rear that outputs raw AC-3 or linear PCM, but others don't. Unfortunately, the DTS on DVD standard has only just been finalised for players and drives to be released later this year. DTS is already available on some Laserdiscs and CDs, simply accessed from their player's standard digital output sockets. The set-top boxes used to receive digital TV broadcasts are likely to feature raw AC-3 or MPEG audio outputs.

Next, you'll need to decode these compressed signals. Many AV integrated amplifiers are fitted with AC-3 decoding facilities right now, with DTS becoming more commonplace as time goes on. Standalone AV processors or upgrades usually feature both systems; see your local AV dealer. Once decoded, you'd better be aware that all five channels are full range and potentially as dynamic as CD. Consequently, you'll want to make sure you've got decent speakers on all channels and ones that sound as similar as possible.

Taking digital surround sound seriously can be an expensive business but worth it if you're into home cinema, particularly when you consider that the AC-3 and DTS formats you'll be playing are absolutely identical to those used by the best cinemas in the world.

Convergent conclusions

By now you'll either be tempted by convergence or determined to leave your PC safe in the spare room. DVD, with its numerous issues, is currently best left to the enthusiasts and early adopters. Such people may believe convergence is the way forward but currently compromise, and end up using two very different and separate PC systems (that includes me, by the way).

If convergence is for you but you don't like the look of current PC offerings, you may want to wait a short while for the new breed of systems currently being tested in the US and Japan. Gateway's Destination is essentially a high-spec DVD-equipped PC but with two important differences: it's coloured a consumer-friendly grey, and the supplied monitor is a 32in TV/monitor with VGA input; it can even be sold with a surround sound audio system. Gateway has no immediate plans to release the Destination in the UK but is clearly thinking about it: one is currently being demonstrated in its Covent Garden, London, showroom.

In the US, Compaq and Thomson have a convergent system, as do NEC and Toshiba in Japan. Just released in the US is Philips' DVX8000 Multimedia Home Theater unit. It resembles a large AV integrated amplifier but boasts DVD, Dolby AC-3 decoding and a PC with 3D graphics acceleration. Any potential UK versions would probably feature different components.

Above DTS is the best cinema and home digital surround sound format (in the opinion of this writer) but despite being an option on DVD, Dolby's marketing machine got its AC-3 format to be the DVD standard

Right Sony's latest 32in widescreen TV (KV32FD1) features a perfectly flat screen and VGA inputs for direct PC connection

Clearly, there is a lot going on in this field and we have not even mentioned WebTV! Suffice it to say that we will keep you up to date with further developments in the wonderful world of convergence — provided you can pass on some advice on how to placate furious family members who missed EastEnders while you were web-browsing on the TV set!

PCW Contacts

Suggested web sites

Dolby www.dolby.com
DTS www.dtstech.com
Gateway www.destination.com
Philips www.mmhometheater.com
Sony www.sony-europe.com
Zoran www.zoran.com

The Real thing

Might this man one day be called 'the father of internet TV'? Geof Wheelwright meets Rob Glaser, CEO of RealNetworks and a man with an impressive IT pedigree.

Chances are, you have never heard of Rob Glaser. He may one day become known as "the father of internet TV". He is the founder and CEO of RealNetworks which, until a few months ago, was known as Progressive Networks.

How about the names of the products that Glaser's company has produced? RealAudio, RealVideo and the more recent RealPlayer have been the engine behind the development of both audio and video broadcasting on the internet, used by major TV networks, radio stations and media organisations around the world.

RealNetworks counts the BBC, major US TV networks, a number of governments and some of the world's largest technology companies (including Microsoft) among the users of its technology. And with the inclusion of the RealPlayer (video and audio client software) in Microsoft's Internet Explorer 4.0, many more millions of users are trying out "radio and TV on the net".

As surely as RealNetworks has, in less than two years, turned its RealAudio technology from being a poor alternative to shortwave radio, into a competitor to stereo FM music broadcasts, it will continue to improve the quality of video broadcast over the internet.

If Glaser can keep the world's media organisations enthused about using its "Real" technology to broadcast via the web then the sky is, quite literally, the limit. There are no national broadcasting regulators on the web and there is no-one to tell you which "channel" you have to appear on. No-one is forcing you to pay money for a TV licence and no-one is telling you that the content of your broadcasts must be culturally worthy or educational.

As a former vice-president of Microsoft, Glaser knows the potential of controlling the technology which makes fantastic things possible. And he already appears to be well on the way to making the most of that potential.

We caught up with Glaser to do this interview late last year in the midst of planning an initial public offering, changing the name of the company (from Progressive Networks to RealNetworks) and acquiring another internet company (Film.com). In that same week, he also

"Microsoft was such a vortex that it was reassuring to see something like the Egyptian pyramids. They existed for 4980 years without Microsoft"

struck deals with two of the world's biggest pop music groups to host their concerts in cyberspace.

This kind of activity is not that unusual for one of the world's fastest-track web companies. Last summer, Glaser not only announced a deal with Microsoft to have his company's RealAudio and RealVideo software built into Microsoft's new Internet Explorer 4.0, but also an agreement with MCI to create a high-speed "backbone" for broadcasting internet video signals.

But in late September, it was the calls from management of the Rolling Stones and U2 that were on Glaser's mind. The 35-year-old king of internet video and audio had done deals to broadcast the concerts of both bands — and had a chance to meet Mick Jagger in the process. The Rolling Stones were promoting their latest North American tour, while U2 was putting plans in place for a concert in Sarajevo.

"It was amazing to see the two biggest touring bands wanting to do the same thing at once," he says, as he recalls his conversation with Jagger on the subject. "I was surprised at how competitive Jagger was when I met him. It was a wild week — but it seems to be our destiny not to have any other kind."

Glaser's first foray into IT was at the ripe old age of 19 while he was with IBM, but he found that he and IBM did not compute. So, in 1983 he joined Microsoft as an eager but already experienced 21-year-old. He then saw Microsoft grow, from a 300-employee minor player in an industry that barely existed, into the world's most dominant software company by the time he left in 1993.

Driving force

Along the way he helped Microsoft achieve success with a number of key products, including Word, and gave birth to the company's early multimedia efforts. Glaser was also a driving force behind the establishment of the original Multimedia Personal Computer (MPC) specification for Windows-based PCs. But after ten years, it was time to go.

"After ten years I wanted to get out, for personal 'life goal' kinds of reasons," he explains. "I spent a couple of months just travelling, in Germany, Greece and Egypt. I tried to regain my perspective. Microsoft had been such a vortex that it was reassuring to see something like the Egyptian pyramids — they existed for 4,980 years without Microsoft."

Glaser also used this time to have a little fun. Microsoft had left him with enough money to try new things. He had taken a financial stake in the Seattle Mariners baseball team and joined the boards of several prominent non-profit organisations in the US, including the Electronic Frontier Foundation run by Lotus Development founder, Mitch Kapor.

"Mitch and I talked about the importance of the internet. I also worked with Dave Farber (University of Pennsylvania professor), the 'seer' of the internet, who said I should download Mosaic and try it," says Glaser, who immediately took this advice and, by doing so, made some profound discoveries.

To put those discoveries in context, it's worth noting that Glaser had spent much of his last year at Microsoft working on the company's early efforts in interactive television, the lessons of which he was then able to apply to the web. "This was in June or July of 1993 and I had been thinking about interactive television a great deal. As vice-president of multimedia and consumer systems at Microsoft I had looked at the conventional idea of interactive TV, and had put the first relationship together with Microsoft and [US cable TV giant] TCI," he recalls. "The first generation of set-top expectations were held by people like TCI's John Malone, who expected to have a million interactive TV set-top boxes by 1994. [After leaving Microsoft] I looked at that with a fresh eye and my mind was open as to whether it would happen. There was a high ratio of hype to substance."

But Glaser knew he wanted to build a new company and that it would have something to do with distributing, at least initially, audio over the internet. The question was, how to turn an idea into a business. Glaser also wanted at least part of the content he would make available using this new technology, to be socially responsible or at least "progressive" — hence the initial name of the company: Progressive Networks.

"In 1993, if you wanted to build an interesting company in the horizontal software business, it was a dumb thing to leave Microsoft," he says, explaining that it took a while to understand the business model that could evolve from his initial thoughts. "The thing that flipped us from a 'Let's look at the technology and see what happens' point, to actually producing it, was the belief that the internet was different and could be a bootstrap model which dramatically changed the dynamics, and that you really could do something different."

In addition, Glaser appears to have been under no illusions that his company would just be about creating radio for the internet. "We started with audio but knew that we could systematise it," he says. "If you get in the right kind of feedback loop you can get something that builds and can exceed any reasonable, and indeed unreasonable, expectation."

With hindsight, that all sounds wonderfully wise and forward-thinking. But Glaser admits this was very much a viewpoint he arrived at once RealAudio had begun to achieve some success. "At the time it didn't feel that way. I felt that I had walked away from this environment [at Microsoft] where I had a pretty good calling card," he says, recounting how he first discovered that people were more interested in his links to Microsoft than in his own ideas. He tells this story with passion and a real sense of having been redeemed by his achievements.

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"I remember when I was initially 'on leave' [from Microsoft and before resigning] and a venture capital company called a couple of times asking me to speak about multimedia development, at a seminar," he says, recalling that it was not unusual for him to field many such invitations as a vice-president at Microsoft. "At the end of the call, I said 'I can't speak for Microsoft because I am technically on leave of absence'. The phone went silent at the other end. Then the guy said: 'Can you recommend anybody at Microsoft?' Suffice it to say they were not people we looked up [when RealNetworks later wanted to investigate venture capital options]."

If his relationships with the venture capital community were testy at times, the same cannot be said of his friendships with other web pioneers, with whom he established close and early contact as RealAudio was moving from being an idea to a real product. "I met Marc Andreessen [Netscape co-founder] at a web conference in 1994 and Marc was one of the first people to whom I showed RealAudio," he explains, noting that it was therefore natural for Netscape and Progressive Networks to work together from the outset, despite Glaser's own history with Microsoft. "The Microsoft relationship was something that worked because of people I knew."

RealPlayer at work, playing a clip of Groucho Marx

But if this story was just about software it probably would not feature Glaser, who is just as passionate about the content of what he would deliver using the software, as he was about the idea of audio (and video) over the net itself. Glaser aimed high and started with big names.

"Early on, the first two media companies were the ABC (American Broadcasting Corporation) network and (NPR) National Public Radio. It was close to a cold call," he says. "I tried to think of who has great music and who had good rights to it. I was thinking about existing material such as books on tape and perhaps a wide variety of voice applications, news headlines when you wanted them and deep public affairs programming. This led us to ABC and NPR and on a cold call I hooked up with the chief operating officer of NPR."

The timing turned out to be quite serendipitous, for all concerned. "NPR [which is the publicly-funded US radio network] was trying to re-invent itself," he reveals. "At ABC, it came about through someone I knew at Apple. He advised me to talk to this person at ABC. So I flew out and showed them RealAudio and thought it would be helpful to ABC. Now, you always have to kiss a few toads, but if you talk to people, are smart and have a good product (and there is no risk to them on an economic basis) they can see what the new media would make possible. It was something that worked and something about which consumers could actually care."

Having seen this process at work at Microsoft (Windows enjoyed success because great applications and content were developed to run on it), Glaser knew that recruiting content partners was a key factor.

Political spin-off

A pleasant spin-off was that Glaser was also able to see some of his political and socio-economic interests addressed by RealAudio's popularity. He has spun a successful political web-based magazine, known as WebActive, off his company's main site and has even seen political groups in other countries use RealAudio to fight against government censorship.

"My biggest and most heartening surprise was when a group called ME92 in the former Yugoslavia…used RealAudio," he says. "The Milosovic government had tried to shut down the various broadcasts that were being done [by ME92] and so they downloaded our evaluation server software and started broadcasting using the net to avoid jamming and get the word out [about their political opposition to the government]. That was a heartening thing with strong philosophical underpinnings — it broadened access to media. Now, you couldn't have the middlemen lock out choice, whether it was the Milosovic government or anyone else."

Still, despite all Glaser's success, he seems to know that it could disappear as quickly as it came. So-called "standards" in the PC industry, and particularly on the web, have a habit of evolving fast. While there are advantages to being first in a particular area, you have to remain the best or you'll be quickly sunk by the competition. "We are two and a half years into the first product but we have a lot of respect for the competitive framework we are in. However, being first you have the opportunity to do [unique] things," he says. "We have done four systems in two years. So when we got into the video space [with RealVideo and the RealPlayer], we asked ourselves if we could pass this test: is it good enough to criticise?"

From Glaser's current lofty perch it is clear that his products *are* now good enough to criticise, and that he also will receive lots of that criticism. With Microsoft's move to take a ten percent stake in the company last summer, that criticism could end up being aimed more at the company Glaser chooses to keep than the products RealNetworks comes out with.

The US Department of Justice has expressed interest in Microsoft's investments in streaming audio and video technologies, of which the RealNetworks deal is just a part. Ironically, even this could work to Glaser's advantage. Further independence from Microsoft, even that which is legislated from without, could actually end up turning RealNetworks into the kind of company Microsoft itself was five or six years ago. And that would leave Glaser as the dominant figure in the emerging world of net TV and internet radio; a "bully pulpit" that this lover of politics and mass media would find hard to resist. ■

The Michael Hewitt Interview

Emma Solomon and Caroline Lambie

Golden years

The over-50s is an age-group often ostracised by technological advance. Michael Hewitt talks to two young women who've set up Hairnet, a firm which aims to familiarise the older generation with the internet and its opportunities.

You may recall that last year, Microsoft ran a TV commercial, the central character of which was a grey-haired, middle-aged woman starting a new job. Just as "thought criminals" end up stuck in Room 101 with a rat, so this unfortunate lady found herself abandoned in an empty office with a Windows 95 PC. Although at first quite intimidated by the thing, she soon succumbed to curiosity and began playing around with it. After 15 seconds, she'd learnt Word. Thirty seconds later, Excel. Then Access. If the MD hadn't suddenly turned up to welcome her, she'd probably have gone on to master programming and create a stable version of Internet Explorer. As it was, the boss appeared amazed at her unexpected hi-tech prowess. "How long have you been using computers?" he asked, open-mouthed. "All my working life," she proudly replied. Cue Microsoft logo and the "Tomorrow the world" legend.

OK, it was a silly ad. But forget its triteness and concentrate on the sub-text: computers, it implies, are supposed to be a "youth" thing. Therefore, anyone over the age of 50 who uses one is to be regarded in the same way that Dr Johnson regarded the idea of a woman preaching. But it is a sub-text that's accepted by many, much to the irritation of Emma Solomon and Caroline Lambie. So much so that, six months ago, the two of them set up an organisation called Hairnet, specifically intended to teach computers and the internet to the over-50s. It's the only such course in the country.

Emma Solomon, 27, hails from Suffolk. She once worked for the web design firm, Synergy. Caroline Lambie is 23 and comes from Dollar, near Stirling. She co-founded another web design company, the Virtual Publishing House, with her then boyfriend.

"Everywhere, there's this idea that once you reach a certain age, you are past it as regards being able to understand and use technology," explained Emma. "To an extent, the jargon used by the IT industry — all that gobbledygook — helps disempower a lot of older people. They don't understand what it all means so they automatically assume that the internet isn't for them. So part of our remit is to reverse that."

The idea for Hairnet was born round about the time, 12 months ago, when the two first met and set up Electra, yet another web design company. Their parents did not understand what it was all about, and so kept asking them when they were going to get a proper job. In particular, Emma's father took to turning up at Electra's premises (then in Clink Street, London) to find out exactly how his daughter was wasting her time. To put his mind at rest, she eventually decided to teach him what the internet was and how to use it. "He took to it quite well. Now he loves it — so much so that he bought a PC. Now he emails me every day. You can't stop him!"

Inspired by this success, Caroline and Emma reckoned there could be a few more over-50s out there who'd be interested in learning about things nettish. Accordingly, they decided to test the water by advertising a one-off course. "We put up flysheets and contacted organisations like Age Concern," said Caroline. "We also sent a press release to *The Times*, which subsequently ran an article. We expected perhaps a dozen or so responses from all of this. We actually got over 200."

What reasons do people give for wanting to learn about the internet? "Many of them just want to know what all the fuss is about," said Emma. "Others, because they have children who regularly use the net and they themselves are feeling left out because they don't understand what's going on. Some people, especially those who have been made redundant or taken early retirement, want the opportunity to reskill and re-enter the job market. There are more over-50s in society than there ever have been before and you can't throw them on the scrap heap. They have so much to offer."

The first course was held at the Backspace Internet café, near London Bridge. Although it turned out to be a success, the environment and the clientele proved a little distracting. According to Emma: "It was a fun place, but not ideal for teaching purposes. It was full of weird sculptures and graffiti on the walls. The other patrons looked pretty freaky: mohican haircuts, rings, studs etc."

It was either a case of go-with-the-flow and suggest that all course members get a navel ring and a death's head tattoo, or else decamp to a more suitable, learning-conducive setting. Caroline and Emma moved to a training centre just down the road which offered more of a "classroom" environment.

PHOTOGRAPH by Nick Dawe

Hair today: Emma Solomon (*left*) and Caroline Lambie (*right*). They have provided a means for the over-50s to get to know the internet and develop computing skills

At present, the course consists of ten two-hour classes, run over consecutive weeks. Each class costs £15. The first two weeks are optional, intended for people who have no computer training whatsoever. They deal with basic keyboarding techniques, mouse clicking, opening windows, and so on. Only in week three are participants gently introduced to the internet and its many marvels.

To ensure the maximum amount of attention, student numbers are limited to ten per class. Obviously, some people are going to make faster progress than others. In order that no-one gets left behind, Caroline and Emma continually monitor individuals' progress during the course of each lesson. If anyone experiences severe difficulty — and so far, it's only happened in two cases — they're prepared to offer an hour's one-to-one training at some mutually convenient time during the week.

Students have ranged in age from the early-50s through to 87. So far, the majority have been women, although this situation is beginning to change. "I think this is because women are more comfortable about giving new things a go than are men," Emma suggested. "It's a generation thing. Older men, especially professionals, are used to being in environments where they are in control. For example, they've always had secretaries to do the typing for them. So part of the problem is admitting to themselves and everyone else that they don't understand the technology. Women, on the other hand, are more prepared to start things from scratch and are more receptive to being told. I think they have better communications skills, too. And, of course, the internet is all about communicating."

But after perhaps some initial apprehension, most students apparently take to it like ducks to water and are highly enthusiastic. "They feel almost as if they've been let into a club," said Caroline. "Before, they'd felt that the net was this huge, mysterious thing that was always being talked about in the media, often negatively. They believed it was a youth thing, to do with games and weird science-fiction sites, yet they find that the net reflects a much broader section of society, with an all-embracing range of interests."

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A case in point

Hannah Wallace is retired and is currently studying with Hairnet. "I read about Hairnet a few months ago. I really hadn't had occasion to use a computer myself but felt perhaps now was the time. My husband has a PC, as do my grandchildren, and my daughter-in-law uses one. You read about the internet all the time and it occurred to me that I didn't know anything about it, so I wanted to see what all the fuss is about. Besides, I didn't want to be viewed as a thicko. You know: 'Mum doesn't know about the internet'. That sort of thing."

How does she find the course? "The girls, Emma and Caroline, are very good and make it all simple and easy to understand. Initially, the most difficult part was remembering the sequence of things you had to do to make everything work. But it's just a case of practice. At the moment, we're learning to build homepages. It's all very stimulating."

And having taken a look at the internet, what are her first impressions? Is it over-hyped? "No, it's actually quite fascinating. The more you get into it, the more impressive it seems. The possibilities are endless. In a way, it's almost frightening. It can be used for so many things: handicapped people, education, people in hospitals, and commerce."

How, if at all, does she think she'll use the internet on a day-to-day basis? "One of my sons-in-law is talking about going to Canada for a few years. If we're on the internet, email will make communication with the family so much easier. I'm also keen to join genealogy web sites as a fun sort of thing. Only recently, I managed to trace someone I knew 42 years ago at college."

Turning on to technology: Hannah Wallace surfs the net

Thanks to Hairnet, Mrs Wallace has been turned on to technology in a way she never was before. "I shall certainly now read *The Times Interface* supplement to find out what's going on and what the new developments are. Only the other day, it carried an article about how Bart's Hospital was using an intranet to help teach children in the wards. I thought to myself, a few months ago I wouldn't have known what they were going on about. Now, in the future, whatever the technological advances, even if I don't understand them fully, I'll at least have some idea. I'll no longer feel out of it, an 'old has-been'."

What if they encounter the more salacious range of interests that are out there? "You can't help but come across it. Inevitably, when you do an AltaVista search for something, among the hits you're going to bring up someone's kinky homepage. Whenever our group find anything like this, they usually fall about laughing."

Having learnt the basics and bypassed the cyberporn, what are older people then interested in doing on the net? "By the time people reach a certain age, they have very defined interests," said Emma. "So whereas a younger person might spend hours idly netsurfing for nothing in particular, our students tend to be more practically-minded and know exactly what they want from it. For instance, genealogy is quite popular. A lot of people want to get in touch with relatives or trace family trees. Everyone wants to use email, too. In fact, once they see it working, many actually go out and buy a PC just to be able to start emailing their friends and families."

Home page construction is popular, too. Not only from a practical point of view, but also because it allows students to learn about each other and former students. Seeing the expertly-produced homepages created by former Hairnet alumni helps boost everyone's confidence. They realise there isn't that much to it and that they, too, will soon reach that level of competence.

Hairnet isn't just about crouching over a PC. It also acts as a place to make friends and generally socialise. "Our students get to know each other very well," said Caroline. "The classes become something they look forward to every week. People bake cakes and bring them in. It's evolved into quite a natural network, which we hadn't envisaged happening. Those who've been through the classes want to meet current and past students. Consequently, we have regular reunions which are very well attended. What we'd eventually like to do is set up a Hairnet social club."

Caroline and Emma would also like to have their own permanent, dedicated training centre complete with wheelchair access and other facilities for the disabled, rather than having to rely on the generosity of local internet cafés and business centres. They'd like to be able to run more courses, perhaps on a nationwide basis. They'd like to be able to reduce their prices, too. Basically, they'd like Hairnet to become a lot bigger and thus able to help a lot more people. As ever, though, the bottom line is money. Or rather, the current lack of it.

At present, Hairnet's funding comes almost exclusively from Electra. You might suppose that Tony Blair's new happy-clappy Government would be interested in funding a project like this, but no. Caroline and Emma are particularly scathing about the DTI's so-called IT For All scheme. "It's rubbish," said Emma. "They're supposed to be supplying funds to hi-tech groups but where the money is actually going, I just don't know. We once asked them for a grant, only to be told that they don't give out loans. So what *do* they do? What they think they're about is raising public awareness of IT and demystifying it. But they haven't worked anything out in terms of specific schemes, offered training or anything like that. They won't even put us in touch with other businesses that might be able to help us out.

"We manage to keep Hairnet going because we will negotiate with training centres who are interested in and excited by what we're doing. Like us, they believe that there's room for every generation in cyberspace; that, when you become old, you don't become boring. So it's vital that something like Hairnet carries on. The problem is, we can't publicise it too much because the places are so limited. We don't want to have to disappoint people by turning them away. But, without the funding, what can we do?"

Perhaps it's about time that the UK's major software and hardware vendors woke up to what Hairnet is trying to do, so they can lend a hand. After all, not only do you not become boring once you pass 50, you don't suddenly become impecunious, either. And let's face it, by the year 2000, 40 percent of the population will be over 50. That's a heck of a lot of spending power. ■

Back to **school**

This is the Year of the Net for British schools. Andrew Charlesworth examines the issues surrounding the Government's National Grid for Learning. Will it provide a fresh teaching environment or just churn out IT-literate wage slaves?

Stop staring out the window, Thompkins, and pay attention. This is important to anyone who has a child in a British school, teaches in one, or cares a fig about education *per se*. IT in schools is undergoing a fundamental change which is long overdue. This change has nothing to do with increased spending or a new government. Rather it is a change in attitude among all those involved: government, teachers, local education authorities and parents. First, a little history lesson… don't groan Smith, I know you hate history, but it's important to set these changes in context.

In the mid-eighties, IT was added to the curriculum alongside history, geography, chemistry and the other old favourites. This trend continued through the nineties, obeying a simple equation: education is about preparing children for employment, plus an increasing number of occupations require the use of computers, equals children must be taught about them in school, thus preparing them for employment. QED. Or, put more cynically: governments need taxpayers, taxpayers need jobs, jobs need computers and computers need people to operate them.

Gradually, IT grew in prominence in schools, from a minority option to a compulsory subject. Despite our moans about the Tories' cutting, not all the money went into brown envelopes: they actually increased public spending on schools' IT, providing about £200m a year for school computers. Thus schools took on IT teachers who commanded budgets that were the envy of their colleagues teaching less-fashionable subjects.

Over the past few years there has been heated public debate over the extent to which IT should be taught in schools. At one extreme are those utterly transfixed by computers. They believe that society will be dominated

ILLUSTRATION BY: John Batten

by the web, or whatever evolves from it, and so we ought to immerse our children in it from an early age. The fact that this is a self-fulfilling prophecy — if we connect our children to the web from the womb, it will dominate society — seems to have escaped their reasoning.

In the other camp are those who believe that what society lacks is not more people who know about computers, but basic literacy and numeracy. Anti-technology Luddites and reactionaries against modern teaching methods have also pitched their tents in this camp, and their battle cry is "Books before computers".

In the middle, education policy makers have tried to reconcile the two extremes, recognising that basic literacy and numeracy are paramount but increasing the emphasis on IT. Thus, under the last Conservative government, technology was elevated to the status of maths and English as a core subject. Had the techies won the argument? Had IT in schools finally arrived at the top of the tree? Yes, but it was the wrong tree, because IT is not a subject — it is a tool.

Children don't need to become techies; rather, they need to know how to apply a software tool to the subject in hand — for example, for research, report writing or mathematical modelling. Just as numeracy and literacy are tools without which the other subjects are almost impossible, so IT is a tool which amplifies the learning experience. But the public debate centres around IT as a subject. Many teachers still regard it this way, too.

The realisation that IT is an educational tool is only just beginning to dawn in Britain's schools because the parallel lesson has only recently been learned in the business world in general. IT isn't an end in itself, it's there to do a job, be it an old job to be done more efficiently, or to make possible an entirely new job which hadn't previously been imagined.

The Grid gets going

End of history lesson. Now let's bring it up to date, or at least to the last general election which was fought, partly, on the battleground of education. "Education, education and education," said Tony Blair, then leader of Her Majesty's Opposition, outlining his party's three priorities. A month after Labour's landslide victory, Gordon Brown put our money where Blair's mouth is, pledging an extra £1bn funding for education plundered from reserves, and a further £1.3bn over the next five years for capital expenditure, plundered from the windfall tax on public utilities.

At the time, there were no specific details about how the money would be spent. No doubt those head teachers whose schools only had half a roof or few unbroken windows were hoping that some of this vast wad would be spent on basics like glazing and roof tiles. But there was also a vague indication that some of this money would be used to provide IT for schools.

The first big step in this process, the National Grid for Learning (NGFL), was formally announced with great fanfare last October, and 1998 has been designated the Year of the Net for British schools. Ever mindful of its PR, the government even roped in Bill Gates for the Grid's launch.

The NGFL aims to connect all of Britain's 32,000 schools to the internet by 2002 and carries an initial £100m budget. It makes provision for the purchase of new hardware, cut-price internet access for schools, the development of web-based content, teacher training, an indication as to how it will be funded once the £100m has been spent, and a timetable from its launch to 2002 (*see our boxout on p141*).

This hasn't just come out of the blue. At the January 1995 British Educational Technology and Training exhibition, Blair was behind an invitation to the telecommunications and IT industries to develop an education superhighway. Consultation documents were published, responses summarised and 18 one-year pilot projects launched with an investment of £9.4m.

In 1996, the Labour Party commissioned Dennis Stevenson, chairman of Pearson, to conduct an independent investigation into the potential of schools' IT. His report identified two requirements: training for teachers, and a market for high-quality British educational software.

The Grid, said the Prime Minister at its launch, is one step in the masterplan for a "lifelong-learning connected society" — which is a much grander version of IT For All, a scheme launched in December 1996 by the then Conservative president of the Board of Trade, Ian Lang.

IT For All was aimed at curing technophobia but had little to say for itself other than that IT is good, therefore we should all have some. The connected society is a larger vision growing from its rhizome, the NGFL, in education. The broad picture into which the Grid fits is to bring the sources of learning out from within the institutions which currently house them and make them available online to everyone who wants them.

Labour obviously believes that the key to a better society is education. The one thing the Government can't supply is the desire to learn. How many Grids does it take to educate a nation? Only one, but the nation has really got to want to be educated.

Of course, the internet is no stranger to educational establishments: the military founded it but universities exploited it in the shape of Janet (Joint Academic Network) because it was ideal for sharing research results. Indeed, the web itself was born in academia, developed by Tim Berners-Lee and others at the Cern particle accelerator in Geneva for just that purpose.

Poor relation

But primary and secondary schools have always been the poor relation when it comes to IT, with few PCs, proprietary software and little or no connectivity. For example, Gordon primary school in southeast London has just been told that its ten-node LAN of 286-based RM Nimbus machines is no longer worth repairing, leaving the 300-pupil school with four usable machines: two 486 RM WindowBox models, a Dell P166MMX and a P166 Gateway 2000, the only machine with net access.

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The National Grid for Learning could create an environment in which a large part of school pupils' work could be done on computer rather than paper

The most widely used software at Gordon is Talking Words, an English spelling and word-definition package that runs on the RM Windowbox machines. Publisher, Encarta and Hyperstudio are also popular. Some information is downloaded from the web and a few pupils send email to penpals in the US.

The good news is that Gordon's PTA has allocated £20,000 to purchase new computers. The bad news is that the money still has to be raised. Any computer company that wanted to generate some cheap local PR could do worse than to give a computer to a school.

Dave Pinard, maths and IT co-ordinator at Gordon, has set the modest target of one "decent" machine per classroom. Internet access is not a priority for each classroom because not all the teachers see the benefit of it. "The internet is the future, so we'll have to get children used to it," says Pinard. "But the first job is to get the teachers using it."

Gordon head teacher, Cass Farrer, says the blame for his school's lack of IT rests with the Greenwich Schools Inspectorate. "We've put in bids for more equipment and they fail every time," says Farrer. "The answer is always the same: 'You've got the budget, it's up to you how to spend it.' The Government white paper refers to maths, English and technology in one breath, but the help from Greenwich Borough has been pathetic."

Despite its battle with Greenwich education authority, Gordon is not so untypical of primary schools. All are faced with a stark choice of neglecting IT altogether or diverting funds from equally worthy purchases such as sports equipment, or lobbying hard for funds from other projects such as urban regeneration.

The Government's vision of the NGFL is one thing, but it has to filter down through many a layer before it arrives in the classroom. Gordon's case contrasts nicely with that of Bromfords School, an Essex comprehensive. Head teacher, John Poad, sacrificed other projects to take his school online in a big way. Bromfords signed up with cable provider Telewest in a scheme launched by the Cable Companies Association in January 1996 to deliver internet access to schools for £1 per pupil per year. Two thousand schools are in the process of taking up this offer.

Wired up and fired up

Poad has been in the business for decades and has seen teachers' morale pulled down by low pay, bad press and disruptive children. Plunging Bromfords head-first into the wired world has changed all that.

"Staff are motivated like I've never seen them before, and that's in 30 years of education," he says. "Staff are queuing up to get in the doors in the morning. The thing I hear most from pupils is, 'Do we have to go home now?' The car park is full of parents saying 'Where is he? I bet he's on that computer again.' I had to keep the school open during the summer holidays last year for the first time ever. No-one wants to leave it."

Bromfords has 150 Pentium PCs offering around-the-clock net access and it's not just limited to extended school hours. Some of the students' homes are linked to the school and they pick up and submit homework remotely, which is a great improvement on copying notes from a classmate when you are ill, and avoids that age-old problem of the neighbour's dog eating your homework on the way to school.

Bromfords' net fever is an indication of how the Grid will affect schools, not just creating new ways of learning but firing pupils and staff alike with a new enthusiasm. But there's a long way to go. The £100m "seedcorn" investment which the Government has promised would be wiped out three times over with hardware costs alone. To provide every school with ten PCs at £1,000 each would cost over £300m. To put every school on Bromford's footing would take billions.

Connectivity is the least of the problems: BT, Cable & Wireless and the cable companies are competing to offer cheap access to schools. How they will cope with the traffic if all seven million of the country's schoolchildren get online at once, is another matter. For schools which are already connected, suitable content is a headache. Even apart from the much-publicised pornography, so much of the web is twaddle. "They say there are lots of good sites, but where are they?" asks Pinard, who relies on search engines for the most part. Even at Bromfords, close supervision is the order of the day.

National Grid for Learning (NGFL)

Launched in October 1997, the NGFL is currently in its consultative stage. Teachers, education authorities, IT suppliers and parents have all been invited to present their feedback to the proposals published by the Department of Education and Employment (www.open.gov.uk/dfee/). The prototype grid will be launched in early 1998 and the full grid will be ready for the 1998/99 academic year. The initiative aims to put all of Britain's 32,000 schools online by 2002, providing 75 percent of teachers and 50 percent of pupils with their own email address.

The government expects an open market for managed educational services (mostly access and content) to develop around this and, beyond 2002, for the Grid to be linked to universities and further education colleges via Janet (Joint Academic Network) and then to libraries, museums and other institutions of learning.

The NGFL is the first step in a master plan to create a wired society: "Ultimately, the Grid will support my Department's commitment to lifelong learning and the creation of a learning society," says David Blunkett, Education and Employment Secretary. "It will create the 'connected society', improving the quality and availability of educational materials and increasing and widening access to learning for everyone."

Initial content for the prototype grid will be organised centrally with links to other sites and space for structured teacher discussion, for example: sharing of schemes of work; lesson planning; timetabling; benchmarking and target-setting; peer reviews of software; reviews of external school visits and training activities; and other teaching and administrative resources.

When the Grid launches fully it will provide on-line versions of the curricula operating in various parts of the UK, a Virtual Teachers' Centre focusing on the professional development of teachers, and information enabling pupils to participate remotely in, for example, science experiments involving space technology which would otherwise be too expensive for the school to carry out. It will also provide a bulletin board for senior school managers, inter-school video conferencing, information for parents, and the ability for the parents to send messages to school.

Getting connected: David Blunkett, Education and Employment Secretary

The Grid will enable schools in isolated parts of the country to link with their more resource-rich counterparts, and children to do homework with the same resources they have at school. It will also provide a unified market for British educational software and services — something which hasn't existed before and is an important factor for ensuring the involvement of industry and continued funding. The Government has provided "seedcorn" funding for the Grid, but having created a market, it will be up to industry to keep it going.

The Grid is not only about connecting schools to the internet. It also involves installing the infrastructure in classrooms for computer-based learning where the PC replaces the exercise book but not the teacher. Money will be apportioned from the National Lottery to train teachers accordingly.

By establishing the Grid, the government is taking the "build it and they will come" approach, relying on a network infrastructure to attract commercial providers to develop high-quality content for schools.

Last summer, Telewest and Research Machines launched a service called Ecademy, a content and access service package for schools. A pilot scheme in Scotland involved members of the Scottish Council for Educational Technology and teachers, who developed information-sharing software and course content. Five secondary schools in Edinburgh and West Lothian, with a population of 4,800 pupils, enjoy 10Mbps cable modem access to the net and are connected to one another as well as to the University of Edinburgh.

Much is made of the internet-enabled aspects of the Grid, but it will also create a computer-based learning environment in schools, whereby children perform a significant part of their daily work on computers rather than on paper. This represents a fundamental change. Currently, pupils do only a small part of their work using a computer, for two reasons: there are not enough machines to go around, and the teachers are not trained in using the computer for more than this small proportion of work.

Large-scale computer-based learning has been dismissed in the past mostly on financial grounds, coupled with the fear throughout the Tory years that someone in government would get it into her head that PCs could replace the troublesome pinko teachers who were letting her down.

A further part of this Government's plan is to train teachers in computer-based learning and use of the internet. Money for this, and similar training for librarians, will come from the Lottery. What passes for details on this subject are in the white papers on Excellence in Schools and the People's Lottery (aka National Lottery).

Provided the impetus is maintained, the Grid will have enormous effects on children's education. But it needs to do more than produce a generation of computer-literate children and teachers. If the NGFL is seen merely as a way of preparing children for jobs, ultimately it will have failed.

How will we measure the success of the NGFL? By the position of schools on a league table of exam results? Or by its ability to create a hunger for learning?

Surely this is the difference between education and training. Training is for a specific task, and when that task is completed, retraining is required. Studying for exams is training in presentation techniques to please examiners. Exams are not wrong; they are necessary, but limited.

Education expands the mind to accept new horizons and involves the imparting of wisdom, not just facts and techniques. That is why computers will never replace teachers. If the Grid makes education a richer experience for all children, we can deem it a success. If it is limited to churning out tomorrow's wage slaves it will be, to borrow Pink Floyd's analogy, just another brick in the wall.

Lesson over. Class dismissed.

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Dept. for Education and Employment
www.open.gov.uk/dfee/
Office for Standards in Education
www.open.gov.uk/ofsted/
National Council for Educational Technology
www.ncet.org.uk


THE CONCISE OXFORD DICTIONARY
Meeting with Phil 3-30 Thursday
Viglen
Viglen
Viglen

Creature comforts

If your office seems increasingly like a home from home, why not bite the bullet and invest in a home PC to cover all your needs? Lynley Oram gets down to business.

Wouldn't you just love to be able to bathe in your own personal money bath? For many people trying to run their own small business or working out of their spare room, a computer is a useful tool in their bid to become the next Richard Branson or Anita Roddick. But the average punter needs to get the most out of their money: you might be on the fast track to riches, but you're not a millionaire yet.

As a budget is essential when setting up or expanding a business, for this group test we asked for PCs based around £1,499 (ex VAT). While we gave companies a minimum spec of a 15in monitor, 32Mb RAM and a 3.2Gb hard drive, we expected to get more for our dosh — and we weren't disappointed.

Here, we reveal a wide range of PCs with something to suit everyone. Are you looking for something with which to reliably formulate spreadsheets and business documents day in, day out with never a complaint? Well, maybe we can't promise quite that much, but in an uncertain world we think we've managed to round up a few suitable machines.

Maybe you are working from home, possibly on a part-time or freelance basis? If so, the PC may have to moonlight occasionally as a family PC on which the kids can do their homework and for you to play a game or two. What you need from your computer will depend on the type of work you do.

In today's world, it's good to have access to the internet, even if it's just for the ease of communication in being able to email your clients. So we asked for all PCs to arrive in an internet-ready state. We also requested an office software suite.

Whatever your business needs, you should be able to find something to suit you on the following pages.

Mid-range PCs Contents

Ratings

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

PHOTOGRAPHY by David Whyte

p145 ➢

Choice Ultra Multimedia

Choice managed to install a few good components but the overall package lacked some items included with other, similarly-priced machines — additional storage devices, for instance.

Having got used to unwrapping 266 and 300MHz PCs, we were disappointed to find that a Pentium II 233MHz CPU lay at the heart of this PC. Another disappointment arose when we opened the box and found that the mouse and speakers had been left behind.

While its slower processor speed went some way to accounting for its performance during testing, to its credit, the Choice didn't come in last and beat some 266MHz systems in both the performance and Quake tests.

Opening up the system was a delight. There was so much room inside that it almost echoed. The entire 64Mb SDRAM is on one module, leaving three of the four DIMM slots empty. Sound is provided by an excellent AWE 64 sound card which, along with the 56K Flex modem, leaves one of the three ISA slots free. Choice has opted to install an ATI Xpert@Play card: more expensive than the business version, this card comes with a TV connector — handy if you or the kids like playing games on the TV. A SCART cable, used for transferring the signal from the graphics card to TV or video, has also been included in the box. It is debatable whether this is an advantage in what is primarily a business machine, although it could have some use if it is to double as a home/games PC.

The 6.1Gb hard drive has been fitted into the only 3.5in bay with external access, leaving an empty internal 3.5in bay. There are a couple of forward-facing 5.25in bays with external access available. The 24-speed Creative CD-ROM was very noisy, although the Choice was otherwise a quiet machine.

Monitor A respectable 17in model from Korean manufacturer, Hansol. Controls are on-screen and include adjustments for colour and colour temperature, and manual degauss. Under test conditions the screen regulation remained steady, useful for users working in multi-window environments. Crisply focused, there was little moiré and no real flicker.

PCW Details

Price £1,761.33 (£1,499 ex VAT)

Contact Choice Systems 0181 993 9003 (web site under construction)

Good Points Monitor. Large hard drive.

Bad Points Missing items. Slower processor. Placement of hard drive.

Conclusion A great machine, but there are higher-specced PCs available for the same price.

Build Quality	★★
Performance	★★
Value for Money	★★
Overall Rating	★★★

Dell Dimension XPS D266

Personal Computer World Editor's Choice

Dell's XPS D266 was one of only two machines to arrive with Internet Explorer 4.0 pre-installed. We expect this sort of thing to rapidly become the norm as the next version of Windows 95 hits the market and Microsoft tries to edge us all over to the Windows 98 platform.

Housed in a tall case, this PC's would-be stylish look is spoilt by the vents cut into the front. For backup purposes, Dell has included an internal Iomega Zip drive, although you won't be needing this for quite some time: even the most industrious of business users will find it takes some time to fill up the 8.4Gb Maxtor hard drive. The inside is dominated by a huge gold heatsink on the 266MHz Pentium II processor. The cables were not folded as neatly as other manufacturers managed, but they didn't obstruct access to anything. Two DIMM slots are occupied, but with only three available we'd have preferred to have the 64Mb of SDRAM fitted on a single module for more upgradability.

Graphics are powered by an STB Velocity 128 AGP card. This card popped up three times in our round-up and managed to come both last (in this and the Gateway machine) and first in the Quake test (in the Syntec). From a performance point of view, the Dimension was about mid-way in the group.

We got online without difficulty using the 56K US Robotics Winmodem. With sound provided by an onboard Yamaha OPL3-SA chipset, users are left with one free ISA slot. If you've any full-length add-in cards which you want to make use of, beware, as there's only enough room for three-quarter-length cards.

There are two free 3.5in and one 5.25in bay with external access. Dell gets additional gold stars for including an Microsoft Intellimouse, MS Office 97 Small Business Edition and a pre-installed virus checker.

Monitor The 17in Dell 1028L monitor is well suited to users who like working on a number of worksheets and other documents simultaneously. And, it's great for games. The picture quality was the best in this group, with no evidence of flickering or moiré, and screen regulation that was as steady as a rock. Superb.

PCW Details

Price £1,761.33 (£1,499 ex VAT)

Contact Dell 01344 724 000 www.dell.com

Good Points Monitor. Large hard drive.

Bad Points We expected faster performance.

Conclusion A great workhorse PC which does the job.

Build Quality	★★★
Performance	★★★
Value for Money	★★★★
Overall Rating	★★★★

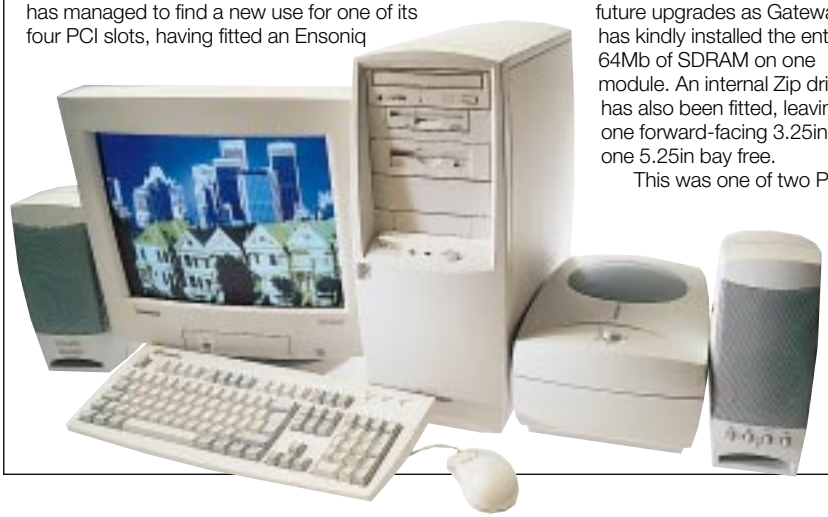
Gateway 2000 G6-233

Personal Computer World Highly Commended

The G6-233 from Gateway was one of the least expensive PCs in the group. It is powered by a Pentium II 233MHz, putting it at a slightly lower spec than most of the other manufacturers managed, and explaining the slower performance of this computer in both the benchmark and Quake test. It's a respectable machine, though, and the backing of a company as big and as stable as Gateway may prove to be a major attraction to a buyer whose business is relying on its PC. Nicely styled, the system is housed in a contoured box. It's easy to get inside and you don't even need a screwdriver. Gateway has managed to find a new use for one of its four PCI slots, having fitted an Ensoniq sound card in there. Graphics are powered by an STB Velocity 128 AGP card, with 4Mb of SGRAM memory. The USR Sportster Winmodem 33.6 takes up one of the two ISA slots. We had no trouble getting online and the modem manager software loads at startup. This is a fairly intuitive piece of software, and includes fax, answerphone and phonebook facilities. Any user new to email and the internet should be able to get the hang of it in no time.

The cables could have been tidied up a bit, but they didn't obstruct access to anything. Two of the three DIMM slots are available for future upgrades as Gateway has kindly installed the entire 64Mb of SDRAM on one module. An internal Zip drive has also been fitted, leaving one forward-facing 3.25in and one 5.25in bay free.

This was one of two PCs to come with Internet Explorer 4.0 preloaded. The rest of the software package includes MS Office 97 Small Business Edition, McAfee Virus Scan and MS Works, as well as a few games.



Monitor The 17in Gateway 2000 Crystal Scan produced a reasonable image, although the focus was a bit fuzzier in the corners than we would have liked. Controls are on-screen and include adjustments for tilt and manual degauss. There was very little moiré and the monitor conforms to the TCO-92 standard

PCW Details

Price £1,673.20 (£1,424 ex VAT)
Contact Gateway 2000; 0800 552000
www.gateway2000.co.uk
Good Points Price. Stylish case. Software package. Upgrade potential.
Bad Points Slower processor than the others.
Conclusion A good, reliable, machine suited to the business environment.

Build Quality	★★★★
Performance	★★
Value for Money	★★★★
Overall Rating	★★★★

Linear Diamond Plus

This is only the second outing for Linear Computers in a *PCW* group test: previously, it received our Editor's Choice award, so naturally our expectations were high this time around.

Linear had a tougher time of it than the other manufacturers, who all had two weeks in which to put their systems together. Due to unforeseen circumstances, however, we found ourselves one PC short, so we threw Linear a challenge — just two days in which to get a system to us. At first glance there appeared to be no evidence that this was a rush job. But when we came to try out the modem, we found that the cable had been left out of the box. Like most other PCs in this group test, no additional help was offered for users to get online other than the ubiquitous round-up of free online trials, but once the cable had been sorted out we hooked up to AOL on our first attempt.

The Linear is a fast machine. It came out ahead of Mesh's 300MHz-based unit in the performance test and managed to outdo two 300MHz systems in the Quake test. While the Matrox Millennium II AGP card would not have been our first choice for games, it will provide excellent support for all business applications.

Installation is straightforward. All the necessary bits are well labelled and a laminated A4 instruction sheet is included.

Inside, the CPU is located beneath the power-supply unit, making it difficult to get at. With sound on-board, there's one free ISA slot and all the PCI slots are free, and there's room for any full-length PCI or ISA cards you might have lurking about.

The 64Mb of SDRAM memory has been fitted into two of the three DIMM slots. The MMS-702 15W speakers are a little on the puny side, but should be adequate for most purposes.

Monitor If we had actually been buying this PC, the 17in Smile monitor would have gone back by return courier. Compared to the others, its image quality was poor. Also, the first time we switched on, the controls refused to work and the picture was strangely elongated. Switching it off and on again fixed it, but the problem occurred again.

PCW Details

Price £1,757 (£1,495 ex VAT)
Contact Linear 0800 622094
(web site not available)
Good Points Fast performance.
Bad Points Monitor. No additional storage.
Conclusion A good machine, but without any of the extras which other manufacturers managed to include.

Build Quality	★★★
Performance	★★★★
Value for Money	★★
Overall Rating	★★★

p150 ➢

Mesh Pegasus 300LX

It might not be fun, and it doesn't come with any exciting bits, but if you are looking for a solidly-built, nicely-specified business machine, the Pegasus 300LX from Mesh may well be what you need.

This was one of three PCs to arrive based around a 300MHz Pentium II processor. But in our performance test, Mesh came fourth, beaten not only by the other two 300MHz systems, but also by Linear's 266MHz-based machine.

Mesh has taken the consumer-friendly ideal to the extreme, with everything clearly labelled and a well laid-out A3 wall chart included, to help you during setup. The user manual deserves a special mention as it is spiral bound, making it easy to use and read.

The front of the bland case is enlivened only by Mesh's traditional diamond-shaped power and reset keys. Even the colour of the Iomega Zip drive is the same as the case, which is a shame — we are rather partial to the striking purple Iomega usually uses.

There is stacks of room inside, with cables kept to a minimum and tucked well out of harm's way. The Intel AL440LX motherboard has four PCI slots, all empty. Sound is provided by an on-board Yamaha OPL3-SA chipset, leaving one free ISA slot. Two of the

three DIMM slots are occupied by 64Mb of SDRAM. Up front, there are spare 5.25in and 3.5in bays, both with external access.

Getting online wasn't easy. When we tried to get hooked up to AOL, the software couldn't find the modem. A call to Mesh's technical department further confused the issue, as they failed to come up with a satisfactory solution. The problem was finally sorted after a call to 3Com/USR.

There's a microphone included in the box, which is handy if you want to make use of the IBM Simply Speaking voicetype software provided.

Monitor We could find little to criticise in the 17in ADI Microscan 5P. Its focus was crisp, even in the corners, and there was almost no moiré. Colours were deep and vibrant. There's a range of on-screen controls and although you cannot adjust the colour temperature, manual degauss is available.

PCW Details

Price £1,761.33 (£1,499 ex VAT)
Contact Mesh 0181 452 1111
www.meshplc.co.uk
Good Points Monitor. Zip drive. Ease of setup.
Bad Points Getting online.
Conclusion Nicely-specified business machine.
Build Quality ★★★★
Performance ★★★
Value for Money ★★★
Overall Rating ★★★

MJN 266-2 Special

This PC screams "fun" from the word go. Each time you power-up MJN's 266-2 Special, you are presented with a choice of startup options. You can either launch directly into Windows or choose a number of specialised game startups, depending on whether you want to play an older game like Xwing, or a new one such as Quake.

This could prove a major distraction if you work at home and are partial to playing the odd game or three on your PC. There is also a TV card fitted, which will give users the opportunity to catch up with *Neighbours* during coffee breaks! While ATI's Xpert@Work AGP graphics card dominated this group test, MJN was the only one to fit the full 8Mb of SGRAM that this card will handle.

Should you get a bit lonely working at home, MJN has also included a copy of VDO Phone, along with a camera and headset with microphone, so all you'd need do is find another user with a camera for a bit of face-to-face interaction. If you want to get any work done, make sure you've raised a bit of self-discipline before investing in this PC .

As its name suggests, the MJN is powered by a 266MHz Pentium II which is

supported by 64Mb of SDRAM fitted into two of the four DIMM slots, and a 6.4Gb Seagate hard drive.

We asked for these PCs to arrive internet ready, but the MJN didn't even have the usual Online Services envelope we're used to seeing on the desktop. IE4 was included in the box, but MJN said it would be shipping this PC with it pre-installed. It was nice to see anti-virus software pre-loaded, though.

Monitor A CTX 1569 15in with a viewable area of 13.8in. On this system we managed to reach a maximum refresh rate of 85Hz, non-interlaced, at a resolution of 1,024 x 768. Controls are on-screen. You can adjust the colour temperature, and this will come in handy if your work requires a certain amount of colour matching. The image is excellent, well focused and with very little moiré.

PCW Details

Price £1,761.33 (£1,499 ex VAT)
Contact MJN 01282 777555
(web site not available)
Good Points Graphics memory. Monitor.
Bad Points No additional storage device.
Conclusion A nice machine, more suited to home use than business.
Build Quality ★★★★
Performance ★★★
Value for Money ★★★
Overall Rating ★★★

p152 ➢

Northwood Sovereign Multimedia

Northwood is owned by Software Warehouse, a chain of 17 retail outlets selling software, PCs, peripherals and just about anything IT related, although most of the company's business does still come from the mail-order side.

The blandness of the Sovereign Multimedia's case is only barely mitigated by the familiar tree logo. The keyboard is ideal for home use: it has a few quick-access controls for the CD-ROM, including a mute button, so no fumbling about when an important business call comes through. The other external bits of the system include a MS Intellimouse, connected via a serial port, and a nice pair of Labtec speakers.

Setting the Sovereign up is easy and everything is well labelled. Northwood even trusts its clients enough to attach a sticker to the back of the PC with clear instructions on how to open the system up. This is fairly easy to do, although it takes some elbow grease to remove the bezel at the front.

The first thing that strikes you is how much room there appears to be inside — even the 266MHz Pentium II processor fails to dominate. With the ATIXpert@Work graphics card installed in the AGP slot, all four of the PCI slots are empty. While there are no free 3.5in bays, there are three empty 5.25in bays with external access. Should the 4.3Gb Fujitsu hard drive not prove big enough, Northwood has included an Iomega Zip drive. An array of software has been pre-installed, including a virus checker and Lotus SmartSuite 97.

Unfortunately, Northwood didn't fare too well in the performance test, coming near the bottom of the chart.

Monitor There was a time when nearly every PC that arrived in our office had a liyama monitor. Now, we are lucky to see any at all. Out of the 15in models, this one produced a superb image. Focus was crisp, and colours were rich and vibrant. There's the usual on-screen controls, plus a manual degauss.

PCW Details

Price £1,761.33 (£1,499 ex VAT)

Contact Northwood Laboratories 01675 468333 www.northwood.co.uk

Good Points Monitor. Anti-virus software.

Bad Points Slow performance.

Conclusion A solid machine with some good features.

Build Quality ★★★★

Performance ★★

Value for Money ★★★

Overall Rating ★★★

Paragon Super-W-300

Paragon has changed the case on this machine, ditching the bland off-the-shelf look we have been used to seeing. Instead, it has gone for a plumper style, enlivened with Paragon's logo and a kitsch mint-green strip. This was the cheapest machine in the test, and Paragon has managed to squeeze in quite a few features for the price. However, the company has fallen down somewhat in its quality-control department.

A PS/2 mouse should have been included, but wasn't. The mouse's PS/2 port had been disabled in the BIOS, a situation that a less experienced user would have found difficult to resolve. The rear of the PC isn't labelled and, to add insult to injury, the keyboard supplied used an older-style 5-pin DIN plug. A bit of a letdown, really, as Paragon hadn't thought to include an adapter and the system accommodates PS/2 connectors only.

This was the most difficult machine to get into. The side panel took some coaxing to remove. Cables were neatly tied up, but some were resting snugly against the CPU. While the processor wouldn't get hot enough to do any damage, you would have to move some power cables to get at the CPU. Paragon was one of three manufacturers to use a 300MHz Pentium II CPU.

As a glance at the charts will show (*p162*), this machine came out on top in the performance test, scoring ten points ahead of its closest rival.

An AWE 64 sound card and a 33.6Kbps modem occupy both ISA slots, with the ATI Xpert@Work card fitted into the AGP slot. There are five PCI slots, all of which are empty. A sizeable 6.4Gb Seagate drive has been installed, and for additional storage purposes there is an Iomega Zip drive. None of the 3.5in bays are free, but there are two vacant forward-facing 5.25in bays, both with external access.

Monitor While the Pro-View 15in is OK, the image quality isn't as crisp as that managed by some of the others in this group. It also suffered badly from moiré. Controls aren't on-screen. The colour registration was slightly out, but we were able to adjust that using the ATI controls in the display properties box.

PCW Details

Price £1,643.83 (£1,399 ex VAT)

Contact Paragon 0181 478 8700 www.paragoncomp.co.uk

Good Points Fast performance. Affordable price.

Bad Points Missing items. Having to go into the BIOS.

Conclusion Potentially a good machine, but the build quality is a bit of a worry.

Build Quality ★★

Performance ★★★★★

Value for Money ★★★

Overall Rating ★★★

p156 ➢

Synteq FS-P300M

Personal Computer World Highly Commended

Synteq's FS-P300M is ideally suited to home business use, especially if it might get a bit of use by the kids for homework, and the occasional game. The company also offers a business leasing option and a financing deal, whereby payments can be made over a period of between one and five years. This could prove attractive to those on limited budgets. A fairly good warranty is on offer, with three years Return to Base (RTB) as standard, and an on-site option that carries a four working-hours response. The latter option will appeal to small-business users whose company may depend on the PC for its day-to-day running.

The Synteq has a rather classy exterior, spoiled a little by the 24-speed Goldstar CD-ROM being a different shade of beige.

Performance-wise, this beast reached second place in our benchmark test. It topped the Quake chart, helped somewhat by an STB Velocity 128 AGP card and a 300MHz Pentium II CPU. This is backed by 64Mb of SDRAM fitted in two of the three DIMM slots, and a reasonably large 6.4Gb IBM Deskstar hard drive. No additional storage devices were included, but there's stacks of space for any future upgrades. Up front we have two free 5.25in bays and a free 3.5in bay, all with external access.

The Supermicro ATX motherboard has three ISA slots, two occupied by the 56K Flex modem and an AWE 64 sound card, and four PCI slots. The cables were exceptionally tidy.

Synteq doesn't offer anything other than the usual roundup of Online Services but there was no problem getting hooked up to AOL. Along with MS Office Small Business Edition (SBE), PC Doctor and a few fax and answering-machine utilities were preloaded.

Monitor The ADI Pro Vista 15in is generally good, but this one suffered horribly from moiré and the focus wasn't as crisp as we'd like. Controls aren't on-screen but are accessed via a panel of buttons at the front.

PCW Details

Price £1,761.33 (£1,499 ex VAT)
Contact Synteq 0181 537 0037
www.synteq.com
Good Points Finance and warranty options. Software package.
Bad Points No extra storage device.
Conclusion An above-average PC.
Build Quality ★★★★
Performance ★★★★
Value for Money ★★★
Overall Rating ★★★★

Viglen Ultimate Home Office

With the size of the Pentium II processor and the amount of products available to be stuffed into today's PC, we hardly ever see a desktop-style case these days. Viglen's Ultimate Home Office was the only desktop to appear in this group test.

Surprisingly, lifting the lid on this system revealed a considerable amount of space. Cables were tidy and neatly clipped out of harm's way, a necessity when making the most of a desktop's limited room. If you like, you can even fit full-length cards into either the PCI or ISA slots. Both the ISA slots are occupied by a Yamaha OPL3-SA sound card and a K56flex modem.

Graphics are powered by an ATI Xpert@Work AGP card, leaving all five of the PCI slots free. Viglen has thoughtfully installed the 64Mb of SDRAM on one module, leaving two of the three DIMM slots free and ready for future use. Even with a 266MHz Pentium II at its heart, the Viglen did not do well in the performance test, coming last behind three 233MHz-based systems.

Getting online was a cinch as we were able to hook up to AOL first time. There's also a free Pipex Dial trial pre-installed should you wish to give it a whirl. We were disappointed not to find any additional storage devices, but if you want to fit an internal device at a later stage there is room, especially with a 5.25in and 3.5in bay free.

On the plus side, Viglen has included the excellent Microsoft Intellimouse. None of the manufacturers in this group went overboard with software, but Viglen managed to put together a comprehensive selection, including the sort of stuff any small-business manager might want such as MS Office SBE and Microsoft Works.

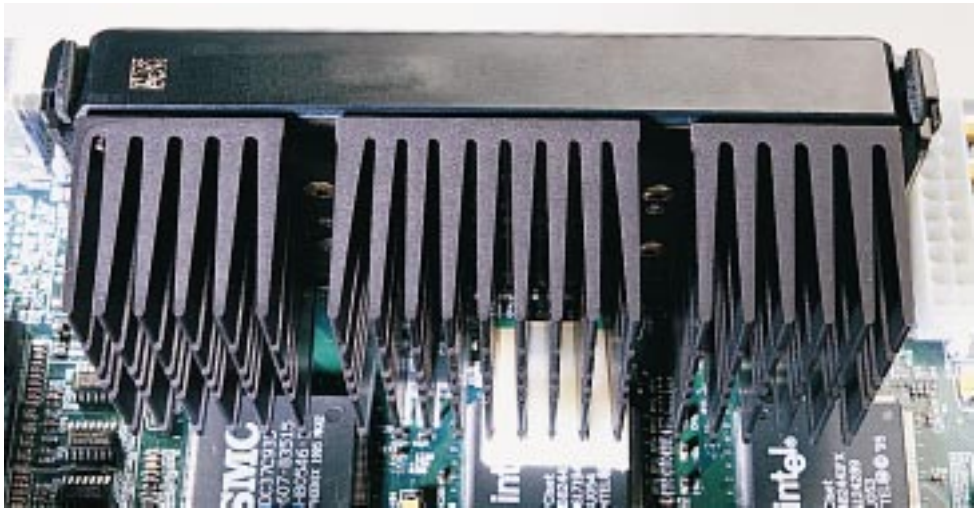
Monitor The Viglen-branded Envy 15DS 15in monitor is stylish, if you like the early eighties retro look. Controls are on-screen and include the usual size, positioning and geometric controls. While there is no manual degauss, users can adjust colour temperature. We'd have preferred a crisper focus, which would have been easier on the eyes.

PCW Details

Price £1,761.33 (£1,499 ex VAT)
Contact Viglen 0181 758 7000
www.viglen.co.uk
Good Points Software package. Spacious interior.
Bad Points Monitor. Slow performance.
Conclusion A respectable home office machine, but it's not the "ultimate".
Build Quality ★★★
Performance ★
Value for Money ★★★
Overall Rating ★★★

p158 ➢

What does it all mean? Technological terms explained



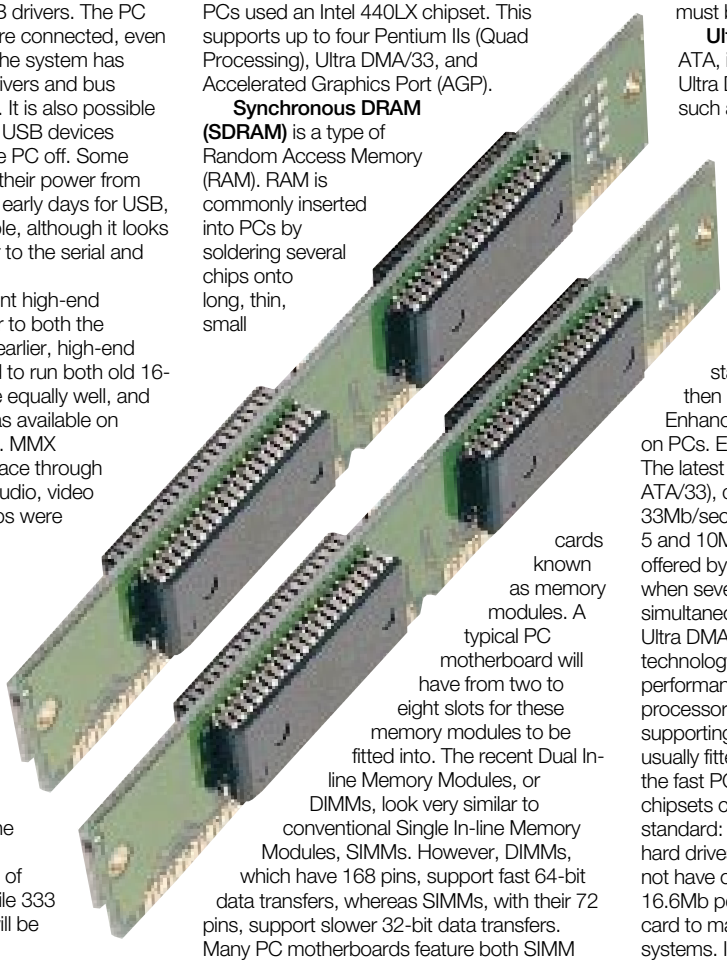
The Pentium II chip. It's fast and very big: note that the cartridge sits upright

The **Universal Serial Bus (USB)** is the long-awaited replacement for the PC's serial bus and parallel ports. Today, your keyboard, mouse, printer, scanner, modem and almost every other peripheral connect to different plugs on the back of your PC. USB allows all these devices to be chained together and connected to a single USB port. USB hubs can be connected to a USB port, supporting up to seven further USB devices including another hub — so up to 127 USB devices can be chained off one port. Monitors are ideal for housing hubs, since the ports are in front of you and mains power is always available. Several monitor manufacturers are fitting USB ports as standard or providing the option. USB drivers come as standard with Windows 98, or as a patch on the latest version of Windows 95. If you are unsure, check the front of your Windows 95 CD-ROM where there will be a statement to the effect that it carries USB drivers. The PC senses which peripherals are connected, even if they are plugged in after the system has started, and will manage drivers and bus resources for each of them. It is also possible to connect and disconnect USB devices without having to switch the PC off. Some peripherals can even draw their power from the host PC or hub. It's still early days for USB, with few peripherals available, although it looks to be the natural successor to the serial and parallel port.

Pentium II, Intel's current high-end processor, is the successor to both the standard Pentium and the earlier, high-end Pentium Pro. It is optimised to run both old 16-bit and new 32-bit software equally well, and features MMX technology as available on recent Pentium processors. MMX technology is designed to race through multimedia tasks such as audio, video and graphics. Previous chips were fitted into standard square sockets on the PC's motherboard, allowing users to easily upgrade, but Pentium II processors now sit on large cartridges connected to the motherboard using a new slot, incompatible with the older sockets. The processor's 512Kb Level 2 cache memory is also on the cartridge. Pentium IIs are available with clock speeds of 233, 266 and 300MHz, while 333 and 366MHz processors will be released soon.

Chipset is a term used to refer to any collection of chips that work together to perform a particular set of functions. When reviewing PCs, the word is generally used to describe the chips that control the traffic on the PCI bus to and from the main processor. Other groups are referred to by the function they perform: audio chipsets, graphics chipsets and so on. In this group test, all the PCs used an Intel 440LX chipset. This supports up to four Pentium IIs (Quad Processing), Ultra DMA/33, and Accelerated Graphics Port (AGP).

Synchronous DRAM (SDRAM) is a type of Random Access Memory (RAM). RAM is commonly inserted into PCs by soldering several chips onto long, thin, small cards known as memory modules. A typical PC motherboard will have from two to eight slots for these memory modules to be fitted into. The recent Dual In-line Memory Modules, or DIMMs, look very similar to conventional Single In-line Memory Modules, SIMMs. However, DIMMs, which have 168 pins, support fast 64-bit data transfers, whereas SIMMs, with their 72 pins, support slower 32-bit data transfers. Many PC motherboards feature both SIMM and DIMM slots, but you can't use both at the same time. DIMMs can carry either Dynamic RAM (DRAM) or SDRAM chips, with each module typically having 32Mb or 64Mb fitted. SDRAM is quicker than other types of RAM and its use will increase your PC's performance. It works by synchronising signal input/output, so the memory chips work at the same speed as the CPU. Your motherboard must be structured to work with SDRAM.



Ultra DMA/33, also known as Ultra ATA, is the latest version of the IDE bus. Ultra DMA hard disks and other devices such as CD-ROM drives, tape drives and Iomega Zip drives transfer information to and from your PC over a bus. The faster or wider the bus, the more information can be transmitted at a time. The speed of the bus is described as its bandwidth, and is usually measured in megabytes per second (Mb/sec). IDE was developed as the bus and interface standard for the first PC hard disks, then IDE was improved with the release of Enhanced IDE (E-IDE), now commonplace on PCs. E-IDE can transfer up to 16.6Mb/sec. The latest version of IDE, Ultra DMA/33 (or Ultra ATA/33), doubles this to a maximum 33Mb/sec. As hard disks can muster between 5 and 10Mb per second, the large bandwidth offered by Ultra DMA comes into its own only when several drives or other devices are simultaneously connected and working flat-out. Ultra DMA/33 supports Bus Mastering technology, which improves system performance by reducing the load on the main processor. E-IDE and Ultra DMA are capable of supporting up to four internal devices. They are usually fitted direct to PC motherboards, using the fast PCI bus. Only Intel's two most recent chipsets currently support the Ultra DMA/33 standard: the 430TX and 440LX. Ultra DMA/33 hard drives will work in your system if you do not have one of these chipsets, but only up to 16.6Mb per second. You can fit an additional card to make use of Ultra DMA/33 in such systems. In this group test a number of manufacturers linked two devices, commonly the CD-ROM and the Ultra DMA hard drive, plugging both devices into the motherboard using the same Ultra-DMA channel.

Gordon Laing and Lynley Oram

p162 ➢

Editor's Choice

Asking for a PC based around a pricepoint is always more interesting than when components are specified. This time we didn't receive as much of a mixed bag as we have done in the past, although there were a few surprises.

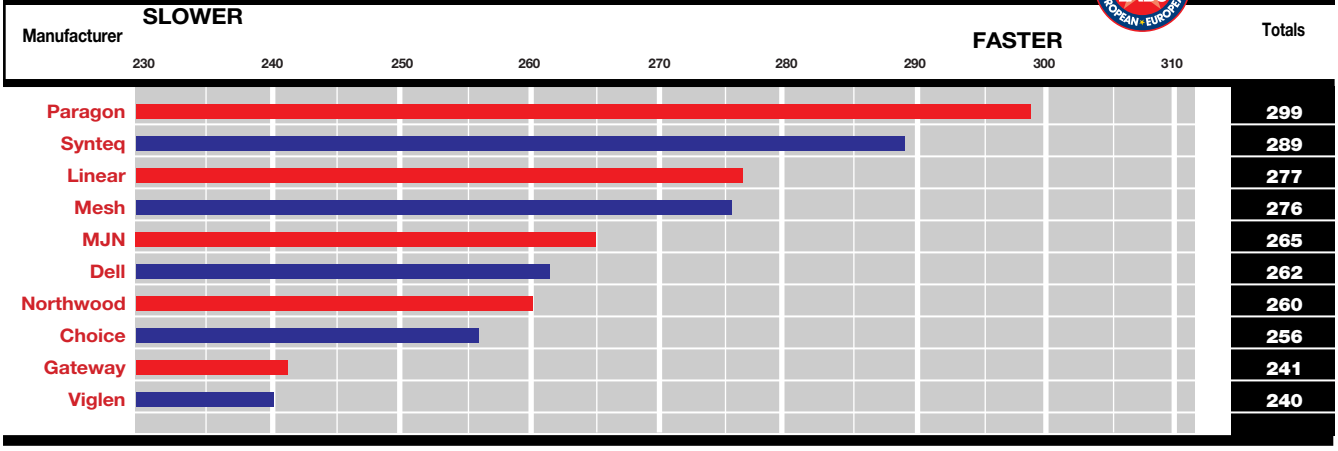
Mesh, Synteq and Paragon all based their PCs around a Pentium II 300MHz processor, not bad going for £1,499 ex VAT. MJN included a video-conferencing camera. However, the most popular hardware extra proved to be an additional storage device — a sensible option for what will primarily be a business machine. In the battle for storage space, the Iomega Zip drive, now that it can be internally fitted to the E-IDE channel, has edged it ahead of the SuperDisk which proved to be a no-show in this group. We specified a minimum of 32Mb of RAM but none of the PCs had less than 64Mb, and all used fast SDRAM.

By the time this issue of *PCW* hits the shops, a standard for 56K modems should have been agreed. Without a single standard, a 56K modem will only reach top speed provided that the ISP is using the same type of modem. As a glance at the features table will show, eight of the ten machines were fitted with 56K modems, with the K56flex standard favoured over the 56K x2. It will be worth asking whether it will be possible to upgrade the modem to the new standard, currently known as V.pcm.

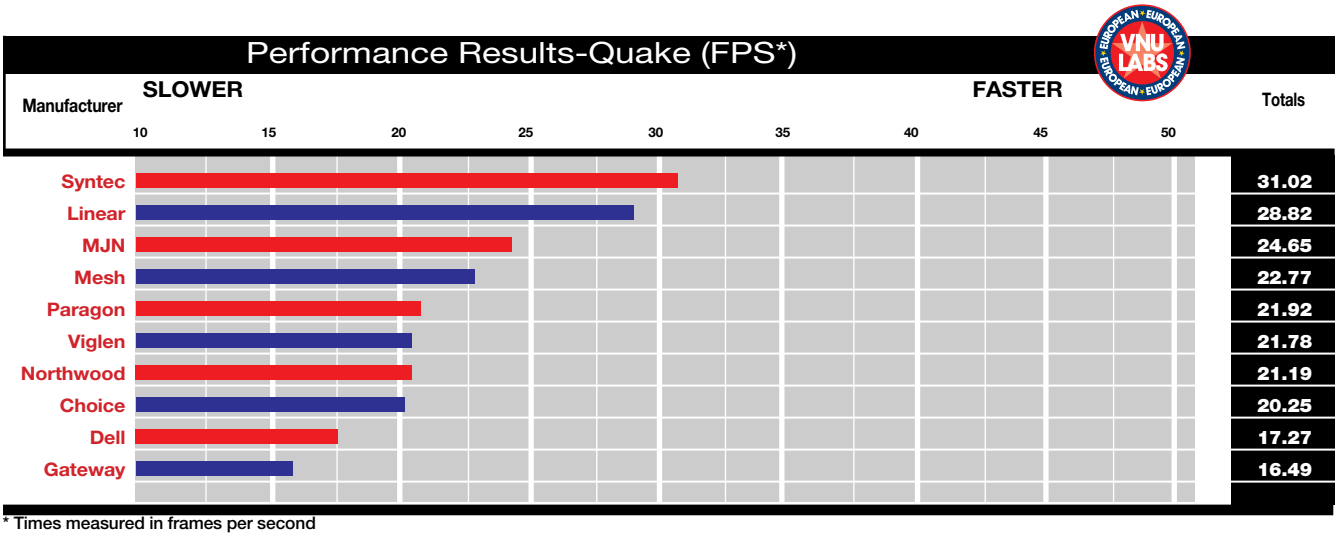
Our first **Highly Commended** goes to the G6-233 from Gateway. Although it only used a 233MHz processor, it was one of the cheapest in the round-up. It also came with a reasonable software package, a Zip drive and a decent 17in monitor. Bundled with a 15in monitor, our other **Highly Commended**, **Synteq**, did manage to get a Pentium II 300MHz processor into its system.

Picking a winner was difficult, especially with the high calibre of some of the entrants. **Dell's Dimension XPS D266** did stand out, be it ever so slightly. But its choice of quality components, including the 17in monitor and software bundle, means that it receives this month's **Editor's Choice**.

Performance Results-Sysmark



Performance Results-Quake (FPS*)



* Times measured in frames per second

Table of Features

Personal Computer World Editor's Choice

Personal Computer World Highly Commended





Manufacturer	Choice Systems	Dell	Gateway 2000	Linear Computers	Mesh Computers
Model Name	**Ultra Multimedia**	**Dimension XPSD266**	**G6-233**	**Diamond Plus**	**Pegasus 300LX**
Price (ex VAT)	£1,499	£1,499	£1,424	£1,495	£1,499
Price (inc VAT)	£1,761.33	£1,761.33	£1,673.20	£1,757	£1,761.33
Telephone	0181 993 9003	01344 724 000	0800 55 2000	0800 622 094	0181 452 1111
Web address	under construction	www.dell.com	www.gw2k.co.uk	n/a	www.meshplc.co.uk
Standard warranty	2yrs (1st yr P&L)	1 yr collect&rtn	1yr onsite/2yrs RTB	1yr onsite/2yrs RTB	1yr RTB
Warranty options	1-3 yrs onsite	3 yrs onsite	3yrs onsite	2 yrs onsite	1 yr onsite
Technical support	9.30-5.30 Mon - Fri	8-8 Mon-Fri	8-10pm Mon-Sat	9-7 Mon-Fri/9-3 Sat	9-5.30 Mon-Fri
Hardware Spec					
Processor	Pentium II-233MHz	Pentium II-266MHz	Pentium II-233MHz	Pentium II-266MHz	Pentium II-300 MHz
RAM/RAM type	64Mb/SDRAM	64Mb/SDRAM	64Mb/SDRAM	64Mb/SDRAM	64Mb/SDRAM
Hard disk	IBM	Maxtor	Quantum Fireball ST	Maxtor	IBM
Size(Gb)/interface	6Gb/EIDE UDMA	8.4Gb/EIDE UDMA	4.3Gb/EIDE UDMA	5.1Gb/EIDE UDMA	4.3Gb/EIDE UDMA
Motherboard Components					
Motherboard manufacturer	TMC	Intel	Intel	Intel	Intel
Chipset/L2 cache	Intel 440LX/512Kb	Intel 440LX/512Kb	Intel 440LX/512Kb	Intel 440LX/512Kb	Intel 440LX/512Kb
Expansion and I/O					
Spare bays 3.5/5.25in	1x3.5in/2x5.25in	2x3.5in/1x5.25in	1x3.5in/1x5.25in	2x3.5in/2x5.25in	2x3.5in/1x5.25in
PCI slots/ISA slots/shared	3PCI/3ISA/1 shared	4PCI/2ISA/1 shared	4PCI/2ISA/1 shared	4PCI/2ISA/1 shared	4PCI/2ISA/1 shared
USB/serial/parallel/PS2	2USB/2S/1P/2 PS/2	2USB/2S/1P/2 PS/2	2USB/2S/1P/2 PS/2	2USB/2S/1P/1 PS/2	2USB/2S/1P/ 2PS/2
Multimedia					
CD-ROM manufacturer	Goldstar	NEC	Mitsumi	Toshiba	Teac
CD-ROM speed/interface	24x EIDE	14/32x EIDE	12x/24x EIDE	24x EIDE	24x EIDE
Sound card manufacturer	Creative	Yamaha	Ensoniq	Yamaha	Yamaha
Sound card model	AWE 64	OPL3/4	Wavetable PCI	OPL3-SA	OPL3 on board
Speakers	50w unbranded	Altec Lansing	Altec Lansing	MMS-702 15w	Yamaha YST-M20
Graphics & Monitor					
Graphics card	ATI Xpert@Play	STB Velocity 128	STB Velocity 128	Matrox Millennium II	ATI Xpert@Work
Bus type/AGP or PCI	AGP	AGP	AGP	AGP	AGP
RAM/Max RAM/type	4Mb/8Mb/SGRAM	4Mb/4Mb/SGRAM	4Mb/4Mb/SGRAM	4Mb WRAM	4Mb/8Mb/SGRAM
Monitor model	Hansol 700A	Dell 1028L	Crystal Scan 700	Smile	ADI Microscan 5P
Monitor size/viewable area	17in/15.7in	17in/15.9in	17in/15.9in	17in/15.7in	17in/16in
Max refresh rate @ 1,024 x 768 (NI)	85Hz	85Hz	75Hz	80Hz	85Hz
MPR II complaint	●	●	●	●	●
Other information					
Modem speed (Kbps)	K56flex	56K x2	33.6 Kbps	K56flex	56K x2
Internet ready (Yes/No)	●	●	●	●	●
Other extras		Iomega Zip-Internal	Iomega Zip-Internal		Iomega Zip-Internal
Office suite	Lotus SmartSuite 97	MS Office 97 SBE	MS Office SBE 97	MS Office Pro 97	Lotus SmartSuite 97
Other software			McAfee Virus Scan Microsoft IE 4.0	FProt (antivirus)	IBM Simply Speaking
Annual company turnover	n/a	$11 billion	n/a	£8 million	£20 million
Number of employees	12	3,000 UK & Ireland	n/a	20	115

Key: ● Yes ○ No

p164 ➢

Table of Features

Personal Computer World Highly Commended





Manufacturer	MJN Technologies	Northwood Laboratories	Paragon Computers	Synteq	Viglen
Model Name	MJN 266-2 Special	Sovereign Multimedia	Super-W-300	FS-P300M	Ultimate Home Office
Price (ex VAT)	£1,499	£1,499	£1,399	£1,499	£1,499
Price (inc VAT)	£1,761.33	£1,761.33	£1,643.83	£1,761.33	£1,761.33
Telephone	01282 777 555	01675 468 333	0181 478 8700	0181 537 0037	0181 758 7000
Web address	www.mjn.com	www.northwood.co.uk	www.paragoncomp.	www.synteq.com	www.viglen.co.uk
	online in 1998		co.uk		
Standard warranty	1yr RTB	1yr onsite/3yr RTB	5yrs RTB	3 yrs RTB	1 yr RTB
Warranty options	3-5 yrs RTB	n/a	onsite	1-3yrs onsite	onsite
Technical support	8.30-7Mon-Fri 9-1Sat	9-6 Mon-Fri	9-6 Mon-Fri 10-4 Sat	9-6 Mon-Fri	9-5 Mon-Fri 9-1 Sat
Hardware Spec					
Processor	Pentium II-266MHz	Pentium II-266MHz	Pentium II-300MHz	Pentium II-300MHz	Pentium II-266MHz
RAM/RAM type	64Mb/SDRAM	64Mb/SDRAM	64Mb/SDRAM	64Mb/SDRAM	64Mb/SDRAM
Hard disk	Seagate	Fujitsu	Seagate	IBM	IBM
Size(Gb)/interface	6.4Gb/EIDE UDMA	4.3Gb/EIDE UDMA	6.4Gb/EIDE UDMA	6.4Gb/EIDE UDMA	6.4Gb/EIDE UDMA
Motherboard components					
Motherboard manufacturer	Elite	Micronics	Microstar	Supermicro	Microstar
Chipset/L2 cache	Intel 440LX/512Kb	Intel 440LX/512Kb	Intel 440LX/512Kb	Intel 440LX/512Kb	Intel 440LX/512Kb
Expansion and I/O					
Spare bays 3.5/5.25in	2x3.5in/2x5.25in	3x5.25in	1x3.5in/2x5.25in	1x3.5in/2x5.25in	1x3.5in/2x5.25in
PCI slots/ISA slots/shared slots	4 PCI/3 ISA/1 shared	4PCI/2ISA/1 shared	4PCI/2ISA/1shared	4PCI/3ISA/1 shared	5PCI/2ISA/1shared
USB/serial/parallel/PS2	2USB/2S/1P/2 PS/2	2USB/2S/1P/2 PS/2	2USB/2S/1P/2 PS/2	2USB/2S/1P/2 PS/2	2USB/2S/1P/2 PS/2
Multimedia					
CD-ROM manufacturer	Goldstar	Panasonic	Aopen CD-924E	Goldstar	Hitachi
CD-ROM speed/interface	24x EIDE	24x EIDE	24x EIDE	24x EIDE	32x EIDE
Sound card manufacturer	Creative Labs	Yamaha	Creative	Creative	Yamaha
Sound card model	Vibra 16 On-board	OPL3-SAX	AWE 64	AWE 64	OPL3-SA3
Speakers	Soundforce 600	Labtec LCS 1025	Arowana 80w	Yamaha YST-M7	Yamaha M25
Graphics & monitor					
Graphics card	ATI Xpert@Work	ATI Xpert@Work	ATI Xpert@Work	STB Velocity 128	ATI Xpert@Work
Bus type - AGP or PCI	AGP	AGP	AGP	AGP	AGP
RAM/max RAM/type	8Mb/8Mb/SGRAM	4Mb/8Mb/SGRAM	4MB/8MB/SGRAM	4Mb/4Mb/SGRAM	4Mb/8Mb/SGRAM
Monitor model	CTX 1569	Iiyama VisionMaster 350	ProView	ADI Provista E40	Envy 15DS
Monitor size/viewable area	15in/13.8in	15in/13.6in	15in/13.7in	15in/13.8in	15in/13.7in
Max rsh rate @ 1,024x768 (NI)	100Hz	75Hz	70Hz	85Hz	75Hz
MPR II complaint	●	●	●	●	●
Other Information					
Modem speed (Kbps)	K56flex	K56flex	33.6Kbps	K56flex	K56flex
Internet ready (Yes/No)	●	●	●	●	●
Other extras	PCI TV Card	Iomega Zip-Internal	Iomega Zip-Internal		
	Camera				
Office suite	Lotus SmartSuite 97	Lotus SmartSuite 97	Lotus SmartSuite 97	MS Office SBE 97	MS Office SBE
Other software	IBM Anti Virus &	Landesk Client Manager		Trio Communication	MS Works
	Simply Speaking	PC Cillin 95		Suite 5.1	
Annual company turnover	£100 million	£80 million	£3.5 million	n/a	£100 million
Number of employees	800	240	15	n/a	300

Key: ● Yes ○ No

Nifty notebooks

For a budget of around £2,000 you can get yourself a mid-range notebook with some surprisingly high-end components. *PCW* tests ten totable machines.

The old complaint about notebooks is that they lag far behind their desktop counterparts in terms of technology. Well, they do have to squeeze large components into a tiny space, the whole thing has to be light enough to carry around and sufficiently power-efficient to run on its batteries for around two and a half hours.

But the gap between notebooks and desktop PCs is closing fast and there have been great improvements since our last notebook group test a year ago, especially with the latest round of Intel Tillamook processors and the new range of audio and video chips. However, these machines still come with a high price tag: a top-of-the-range IBM notebook, for example, can be yours for £5,000.

We have chosen to look at notebooks which will cost a more reasonable £2,000. Because we were asking for mid-range-price machines, we expected mid-range notebooks to arrive. But we were pleasantly surprised to see some high-end components like 13.3in screens, bundled modems, big hard disks and plenty of RAM, while one machine even had the latest 233MHz Tillamook processor. As always, our heads were not turned by the power of the components and we subjected all the notebooks to rigorous testing to see not only how they performed in our benchmark tests, but also how they performed when being used on the move.

As always, when buying a notebook it is important to ask yourself some searching questions about precisely what you need, so we have put together a few tips on how to choose a notebook (*p187*). We have also covered some of the new technologies due to appear this coming year (*p186*) so you can make an informed decision on whether to buy now or put off your purchase until a later date.

Notebook PCs Contents

Ratings

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

Reviewers

Adele Dyer and Paul Trueman

NOTEBOOKS Photography by David Whyte

p173 ➢

Acer Extensa 670CD

Let's begin with a little explanation. While the notebook we had in for review came from Acer, it was actually a Texas Instruments (TI) machine. Acer bought the mobile computing division of TI last year and although the company will in future merge the development and manufacture of the two brands, the Extensa we saw had been developed solely by Texas Instruments, pre-merger.

The Extensa range was originally brought out by TI as a lower-cost option to their well-regarded TravelMate range, which comprises high-end, expensive desktop replacement models. The Extensas were aimed at users such as sales forces and all came with CD-ROM drives, which did not then exist in the TravelMates. The Extensa 670 CD first appeared about a year ago; it failed to impress this reviewer at that time and is now looking decidedly dated. It has a P150 processor (not the MMX version) and just 16Mb of RAM, which no doubt goes a long way towards explaining its abysmal score in our tests.

By far the most offensive component, however, is the terrible DSTN screen which bleeds (i.e. it has a very washed-out look) and is uneven. Compared with some of the other TFT screens in this group test, it looks simply dreadful.

When you switch the Extensa on you are in for more nasty surprises. Our model sounded like an old vacuum cleaner and made an even worse sound when the CD-ROM drive started to turn: rather like the sound of a dried pea being shaken about in an old tin can. Even the Duracell battery uses the older and less efficient NiMH technology.

There were only two utilities loaded: SafeOFF, which stops you turning your machine off accidentally, and TranXit. In fact, just about the only thing in its favour is that the floppy can be connected externally to let you run it and the rattling CD simultaneously.

Acer itself has made some very good notebooks over the past couple of years and continuing to sell this old TI unit does the company no credit at all. At least it should be replaced by a better notebook when the product refresh rolls around.

PCW Details

Price £1,850 (£1,575 ex VAT)
Contact Acer 01628 533422
www.aceruk.co.uk
Good Points Floppy can be connected externally.
Bad Points Too many to mention here.
Conclusion Acer should replace this model with one of its own notebooks.
★★

ACi Icon

ACi's Icon is manufactured by the Taiwanese company, Compal, and is the same model as those which ANR and Systems 2001 sent us. Anyone looking to buy a notebook should bear in mind that several of the smaller companies will be offering their own badge, on the same machine, in different packages and prices.

Where the specifications for the Electron (*p175*)and Minstrel's (*p182*) RAM and the hard drive size were identical, with a generous 48Mb and 3.2Gb respectively, with ACi's Icon there was 32Mb of RAM to go with a decidedly stingy 1.6Gb hard drive. This smaller allocation of RAM also meant that the Icon didn't score as well as the other two machines on our Quake or Bapco tests.

All three, rather disappointingly, use the older Intel desktop processor — the hotter, slower, more power-consuming P55C. In the other reviews we have pointed out the difference in the complete packages between the other two machines, but as the Icon demonstrates, it is important to realise that simply because there are numerous identical models being sold, it is still up to the companies who buy the machines to decide on the generosity of the specifications. If the Icon had been significantly cheaper than the other two models, then this paucity of memory would have been understandable; in fact, the Icon RRP price was £150 more expensive after tax.

The Icon has a good, clear screen with a maximum resolution of 800 x 600 in 16-bit colour. Like the Electron from ANR, it is unable to produce the 1,024 x 768 virtual desktop that System 2001's Minstrel could. It does have a fairly good keyboard, although the Icon's is considerably less bouncy than those of the other two models. It doesn't have a USB or TV-out port but it does have a connection to an external monitor for presentations.

Unfortunately the sound level on the Icon probably isn't sufficiently loud for a presentation, and there are no sound jacks to connect to other speakers.

PCW Details

Price £2,344 (£1,995 ex VAT)
Contact ACi 0181 830 1958
www.aciweb.co.uk
Good Points Good screen.
Bad Points Small hard drive. No extras.
Conclusion Not an impressive proposition.
★★

p175 ➢

ANR Electron P166

Those paying attention will notice the striking similarity between the ANR (Advanced Notebook Research) Electron notebook pictured here, the Systems 2001 Minstrel and the ACi Icon, also reviewed in this group test. They are all the same machine, manufactured by the Taiwanese giant, Compal, and shipped to the companies who then give them their own badge.

This review makes several comparisons with the Systems 2001 machine in particular because, as far as the hardware goes, both machines have identical specifications. These are the same BIOS, the P166 P55C desktop processor and the same generous allocations of RAM and hard drive space: 48Mb and 3.2Gb respectively. Both even come with the same carry-case and excellent technical manual.

There are differences worth noting, though. The ANR notebook screen did not have any of the dead pixels we noted on the Minstrel but it did have display problems of its own. Despite having the same graphics card and similar 1.1Mb VRAM, whereas the Minstrel could provide a 1,024 x 768 resolution in virtual desktop mode, the Electron was only capable of 800 x 600. If you like the idea plugging in headphones and listening to music while working on your notebook and if your CD of choice is remotely bass-heavy, you will be sorely disappointed by the distorted crackle from these machines. It was unclear what caused it, because the sound produced by our test game, Quake, was fine.

As a result of their specifications, the two machines performed almost identically in our Quake and Bapco tests, but there were differences in the complete package.

It is worth noting that, while the price of both machines differs by just £5, the Minstrel came with the impressive Lotus SmartSuite installed and the US Robotics PC Card modem, while the Electron came with no additional software other than some online sign-ups and two empty PC Card slots. Nevertheless, ANR does offer an impressive one-year warranty which guarantees your notebook back either repaired or replaced within 72 hours of first contacting the company, wherever you are in the world.

PCW Details

Price £2,195 (£1,865 ex VAT)
Contact Tech Direct 0181 286 2222 (web address not available)
Good Points Good warranty offer. Generous hard drive and RAM allocation.
Bad Points Limited screen resolution. Poor keyboard.
Conclusion Would have benefited from a more generous overall package.
★★

Bull Zenith Z-Note 1000

Personal Computer World Highly Commended

Launched in August 1997 along with the Z-Note 900, the 1000 was a bulkier machine than most of the others we looked at, weighing in at a hefty 3.5kg and powered by a Lithium Ion battery. It uses an excellent touchpad and a good springy keyboard, in tandem with the labour-saving Windows key, although it is a shame that the small shift key couldn't have been enlarged, making it a little less finicky to use.

There is a large area on which to rest your wrists while typing, which is handy for working in cramped conditions where one might not have that much elbow room. This notebook was particularly good at keeping its cool, too.

The CD drive opens towards you as you type, which is ideal when working in tight spaces where you don't want to disturb those sitting next to you with a sideways-opening CD tray. There are some neat touches like the external volume control on the side of the notebook, and the suspend button which makes power-saving so much easier.

The Z-1000 is equipped with an excellent TFT screen that gives a sharp picture across 12.1in of viewable screen, with rich colour and an impressively wide viewing angle. It ships with quite a good bundle for a notebook: Word 97, IE 3.0, cordless data transfer software LapLink, and two anti-virus programs.

The Z-1000 is firmly aimed at the corporate market: it can be hooked up to a port replicator and can take either two PC Card IIs or one PC Card III. It has the impressive NeoMagic 128 graphics card and was one of the few machines to be equipped with a generous 2Mb of VRAM, which meant it scored well in our Quake graphics test. What let down the Zenith's performance on our Bapco test was its 16Mb of RAM, as opposed to the 32Mb of most of its rivals. Otherwise, this is a handsome machine.

PCW Details

Price £2,344 (£1,995 ex VAT)
Contact Zenith Data Systems 01442 211811 www.zds-europe.com
Good Points Good usability. Impressive screen. It didn't get too hot.
Bad Points It loses a star for only packing 16Mb.
Conclusion A classy performer.
★★★

p178 ➢

Dell Latitude LM 166ST

The Dell Latitude LM is a sleek machine with a classy matt black finish and LCD above the keyboard. The bright, sharp display can support a resolution up to 1,024 x 768 pixels in 256 colours. Dell is in fact planning to release an updated version of this LM machine as part of its Inspiron range, targeting individuals and small businesses rather than large corporates, and the sense that this model was slightly behind the times was hard to ignore.

The Latitude LM was one of the few notebooks here to have just the one bay for swappable CD-ROM and floppy drives. Although the two swapped smoothly, it was necessary to turn off the notebook beforehand — a real pain. Very few notebooks even warm-swap and Windows itself does not support hot-swapping, so when working with CDs and floppies it is preferable to have them both on-board. Despite only carrying the one drive at a time, the LM was rather weighty (3.1kg). Also, it was one of the few not fitted with a USB port.

The Dell package as a whole was more impressive. It came with a large bundle of technical information, a great carrying case and the best software package of any notebook we saw. Dell included titles like MS Publisher, Netmeeting, Outlook, Photo Editor, as well as every sales rep's favourite, AutoRoute Express 98. One of the main attractions about the Dell model was its price — even after VAT it was still under £2,000. This is probably indicative of a gap in Dell's notebook range around the £2,000 mark, and it is worth noting that even adding a global modem card to the package still leaves it cheaper than most of the other models in this group test.

PCW Details

Price £1,995 (£1,699 ex VAT)
Contact Dell 01344 720000 www.dell.com
Good Points Good software. Attractive price and design.
Bad Points Swappable drives can be a real pain.
Conclusion Best to wait for the souped-up version later this year.
★★★

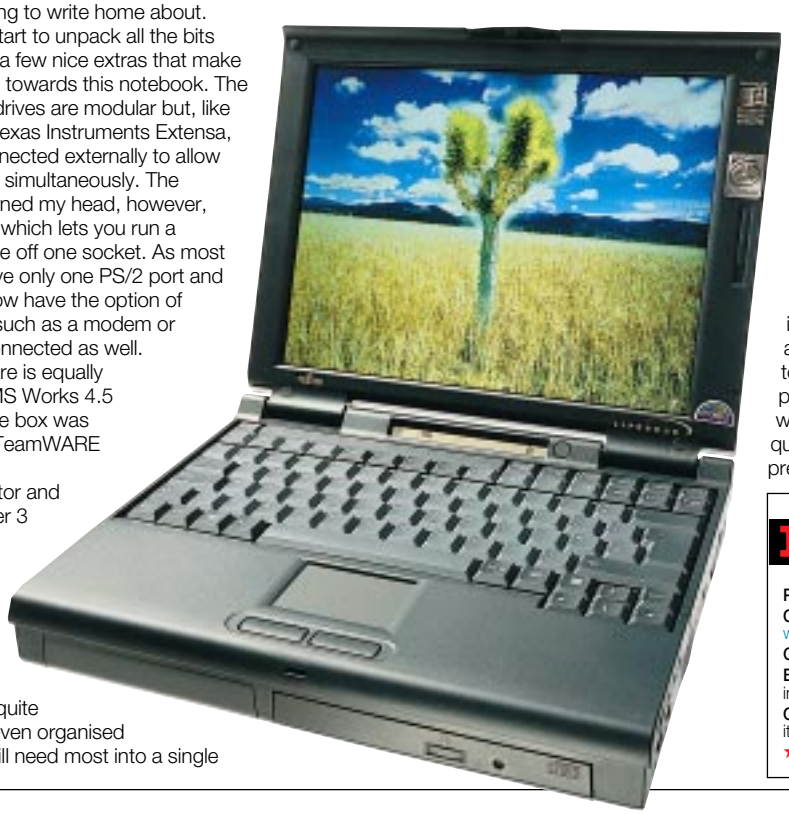
Fujitsu Lifebook 755TX

The most striking feature of the Lifebook is its colour, a rather attractive bluish black. Other than this, the design is nothing to write home about. However, when you start to unpack all the bits from the box you find a few nice extras that make you feel well disposed towards this notebook. The CD-ROM and floppy drives are modular but, like the Toshiba and the Texas Instruments Extensa, the floppy can be connected externally to allow you to run both drives simultaneously. The gimmick that really turned my head, however, was the PS/2 splitter, which lets you run a keyboard and a mouse off one socket. As most notebooks usually have only one PS/2 port and one serial port, you now have the option of having a third device such as a modem or document scanner connected as well.

The loaded software is equally impressive. There is MS Works 4.5 (although the CD in the box was version 4.0), TranXit, TeamWARE Crypto 95, F-PROT Professional, PC-Doctor and Adobe Acrobat Reader 3 — all very useful to a notebook user. The PowerCentre utility that comes with it, for controlling the power management, is also quite effective. Fujitsu has even organised all the software you will need most into a single folder and put it at the top of the Start menu so you don't have to look so far for the menu to create a new fax, for instance. Another useful utility creates backup disks for all your drivers.

The 12.1in screen is a SVGA (800 x 600) TFT display. The screen itself is good and there is a brightness control beside it, so you don't have to ferret around finding the right keystrokes with which to adjust it. The surrounding border makes the screen seem smaller than it actually is, though.

The trackpad, made by Alps, is one of the best we have used and comes with excellent drivers to control every aspect of its performance. Sadly, the speakers were a let-down: they were too quiet to be of much use in a presentation.



PCW Details

Price £2,344 (£1,995 ex VAT)
Contact Fujitsu 01344 475555 www.fujitsu-pc.com/
Good Points Great extras and utilities.
Bad Points Speakers were almost inaudible.
Conclusion A good, solid notebook, even if it is not going to set the world alight.
★★★

p182 ➢

Pico Mobile President

Personal Computer World Editor's Choice

The oddly-named Pico Mobile President was the only machinein the group that was fitted with the new Tillamook MMX chip, Intel's quickest notebook processor with a clock speed of 233MHz. It is Intel's new 0.25-micron manufacturing process that produces the Tillamook, and the company is claiming power-saving and increases in performance (see our boxout, "New developments", p186).

While the President is impressively slim, the plastic casing looked rather rough, and the empty patch on the casing where Pico (unlike most other companies) hadn't put its own badge gave an unfinished look to the notebook's appearance.

The President had one of the best touchpads we saw in this group test. It was sensitive enough that it provided complete control of the cursor with only the lightest of touches; unlike some pads, the cursor's movement did actually bear some resemblance to what was traced out on the pad. With the Tillamook racing at 233MHz, it outperformed the other machines in both our BAPCo and Quake tests.

The President was capable of an impressive 1,024 x 768 resolution in 16-bit colour and there was no tiresome virtual desktop because of this machine's 1,024 x 768 XGA monitor. In a similar vein, the President was one of the few notebooks to be fitted with 32Mb of SDRAM rather than the slower EDO RAM. After this, the absence of any pre-installed software was rather a let-down.

But where Pico has really shot itself in the foot is in its use of poor screen drivers: the screen display seemed capable of providing only a lower resolution, such as 800 x 600, without having difficulty with the fonts.

The screen itself looked huge in the confines of the slim notebook, although it had quite a narrow viewing angle. Although the 13.3in screen afforded a clear, sharp picture, it was rather darker in tone than most and the hot-key that brightened the display didn't make all that much difference.

PCW Details

Price £2,345 (£1,995 ex VAT)
Contact Pico Direct 01345 202022 www.picodirect.com
Good Points The fastest notebook chip available. Excellent keyboard and touchpad.
Bad Points A real shame the 13.3in screen wasn't quite up to the job.
Conclusion If you don't mind the screen problems, it's a winner.
★★★★

Systems 2001 Minstrel IX P966CDT

A sense of *déjà vu* had pervaded the *PCW* office by the time all our notebooks had arrived: three of the group of ten were identical machines from manufacturing giant, Compal.

The Minstrel is not a particularly chunky notebook but Compal's designers have still managed to sandwich a wafer-thin diskette drive over an equally anorexic CD drive, saving valuable time turning off the machine to swap over modular drives. What is slightly less impressive about the design is that despite packing the same P166 desktop chip, there is considerable heat generated to the left of the glidepad, whereas the ANR and ACi units were cooler. This is doubtless exacerbated by resting one's palms on the area either side of the glidepad while typing, but it becomes quite irritating when using the notebook for any real length of time. No fellow train passenger is going to be impressed by the design of this particular style offender, least of all by the loose-keyed keyboard which visibly shudders under the strain of energetic typing.

The 12.1in TFT screen provided a sharp but flawed picture, and the background wallpaper didn't really look uniform in tone across the desktop. But unlike the other two machines (ANR and ACi), the Minstrel produced a resolution of 1,024 x 768 in 256 colours. Annoyingly there were a few faulty pixels, coloured red, which were on the screen when the machine arrived: one towards the top right of the screen, the other more irritatingly placed in the centre of the screen and glaring against the blue Windows wallpaper. While we are sure that this fault is a random aberration, it doesn't engender confidence in a new machine since dead pixels cannot be repaired.

The Minstrel comes with SuperVoice software but very little else to fill the generous 3.2Gb hard drive. There were two expansion slots for PC type II cards and Systems 2001 was the only company to offer a modem as part of its overall package: the Minstrel arrived with the impressive US Robotics Sportster modem card occupying one of the slots.

PCW Details

Price £2,199 (£1,870 ex VAT)
Contact Systems 2001; 0181 830 1300 www.systems2001.com
Good Points The Sportster modem card. Large hard drive.
Bad Points Gets rather hot under the collar.
Conclusion A generous package which offers value for money
★★★

p183 ➢

Toshiba Satellite Pro 440CDT

Toshiba sells a lot more notebooks than any other manufacturer in the UK. In fact, it sells almost three times as many as its nearest rivals. Looking at the Satellite Pro 440CDT, you begin to understand why. Although it only has a P150MMX and a rather sparse 16Mb of RAM, and the 12.1in screen is SVGA not XGA, it is the build quality that makes this notebook shine.

The CD and floppy are modular, but you can opt to keep the CD drive in the machine all the time and connect the floppy drive via an external cable. The two Type II PC Card slots have a small door to cover them, as well as the usual flaps, rather than being open to the elements, helping them to keep free of crumbs, grit and dirt. In the same way, there is a cover for the on/off switch so you do not accidentally switch on the notebook and drain the batteries when you're not using it.

The volume knob and the headphone, microphone and line-in jacks are conveniently located on the front and the two large speakers by the screen do give a reasonable sound. This is aided by the sound chip, a Yamaha OPL3-SAx which gives 3D sound and stops some of the problems of tinniness suffered in most notebooks.

As with all Toshiba notebooks, the pointing device is a trackpoint — a tiny rubber knob that sticks up from the middle of the keyboard. Some people find these difficult to manipulate, but other users find them easier to use than a trackpad.

The screen is driven by a Chips & Technologies HiQVideo graphics controller with 2Mb EDO DRAM. Even though the highest resolution, apart from 1,024 x 768 in virtual desktop, is 800 x 600, the TFT screen will display millions of colours. In terms of quality it cannot be faulted, as it is bright and clear. To complete the equation, the battery is Lithium-Ion and there is one USB port.

The supporting software is good, especially the Toshiba utilities which help you control power management more effectively through Windows.

PCW Details

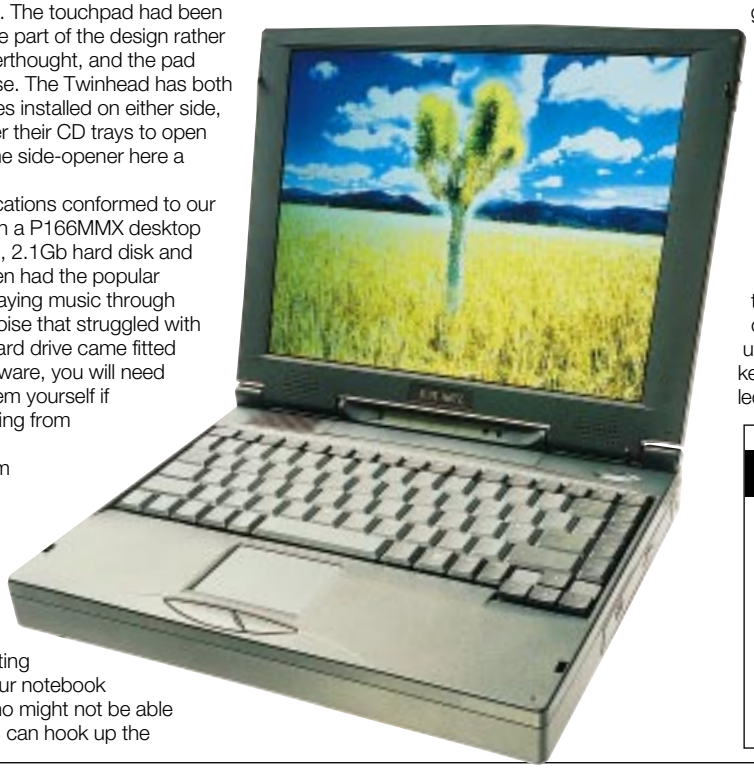
Price £2,225 (£1,895 ex VAT)
Contact Toshiba 01932 828828
www.toshiba.co.jp/index.htm
Good Points Excellent build quality.
Bad Points Not the highest spec or the highest performer.
Conclusion If you are looking for build quality and reliability, you could do much worse.
★★★★

Twinhead SL9T- 166TZ

The aesthetics of the SL9T-166TZ were a welcome relief after some of the slabs we looked at during this group test. The Twinhead model had a stylish fascia with an excellent two-tone black-and-grey keyboard. The touchpad had been styled so that it looked like part of the design rather than an asymmetrical afterthought, and the pad itself was a pleasure to use. The Twinhead has both CD-ROM and floppy drives installed on either side, although those who prefer their CD trays to open towards them may find the side-opener here a little annoying.

The Twinhead specifications conformed to our average configuration with a P166MMX desktop processor, 32Mb of RAM, 2.1Gb hard disk and 256Kb of L2 cache. It even had the popular notebook sound when playing music through the speakers — a tinny noise that struggled with any bass. Although the hard drive came fitted with Bitware modem software, you will need to buy the PC Card modem yourself if you plan on faxing or surfing from your notebook.

Unlike the models from some of the smaller companies, the SL9T has both a USB port and a TV-out port that will connect up to either TV or video. The advantages of the TV-out are that if you are putting on a presentation with your notebook to a roomful of people who might not be able to hear the speakers, you can hook up the (Composite Video) TV-out leads to a larger-screen television and the audio jack to much better speakers.



With 2Mb of VRAM to go with its Trident 9385 graphics controller, it was probably a driver problem that meant the Twinhead couldn't provide the standard 640 x 480 resolution we usually run the Quake graphics test at. Although graphics capability isn't a major consideration for most notebook users, we were disappointed by the maximum resolution in Quake of 320 x 480.

This machine also generated a tremendous amount of heat, which collected on the underside of the unit and filtered up until the keyboard was hot. Obviously, this led to some discomfort.

PCW Details

Price £2,160 (£1,840 ex VAT)
Contact Twinhead 01256 300300
www.twinhead.com
Good Points Great looks. Ideal notebook for presentations.
Bad Points It gets very hot, and the graphics chip was a let-down.
Conclusion An attractive notebook for the serious-minded.
★★★

p186 ➢

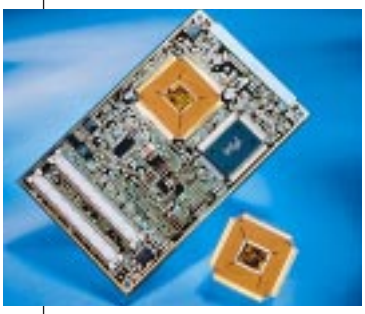
New developments

From the time the very first notebooks were produced, there have been three main criticisms about them: they are too heavy, the batteries run down too quickly, and they are not as powerful as desktop PCs yet are expected to run the same software. For many users the latter has always been the most frustrating, for you can put up with a heavy machine and can always keep a second battery with you ready and charged to go.

For many of the larger notebook manufacturers, not having a specific mobile chip with the same clock speed as the latest desktop processors has been a real bugbear. Intel now seems to be addressing this problem, but there is still around a six-month wait between the release of the desktop chip and the mobile equivalent. Many of the smaller notebook sellers have responded to the problem by putting desktop processors into their machines, but these run hot and so are not ideal for the squashed surroundings of a notebook. They consume far more power than mobile processors, draining your battery faster.

New processors

However, Intel has two new processors which should address these complaints. One, codenamed Tillamook, was released last autumn and the other, codenamed Deschutes, is to appear this summer. Both are based around Intel's new 0.25-micron fabrication process, which reduces the size and the voltage of the processors — good news for a notebook. The Tillamook chip, or the Pentium Processor with MMX technology for Mobiles, to give it its proper name, is currently available in clockspeeds of 200MHz and 233MHz, although some sources say Intel will introduce versions of the processor running at 266MHz and 166MHz very soon.



The Deschutes processor takes mobile processors one step further and finally catches up with desktops. Intel has already released the latest version of its Pentium II processor at a clockspeed of 333MHz, which is manufactured using the 0.25-micron process (down from 0.35 microns). A mobile version of this chip is due to appear in the middle of 1998.

Deschutes gives notebooks the same processing muscle as desktops, but some commentators are worried by the amount of power this processor is said to consume: 8W on the Deschutes mobile processor, compared to 19W on the desktop version, but this is still much higher than the 4W quoted for the Tillamook chips. Intel is aware of the problems of power consumption and has issued Mobile Power Guidelines, hardware and software specifications for reducing the power consumption of everything from screens to applications.

But Intel does not have everything its own way. AMD's K6s are Socket 7 chips which give smaller notebook sellers the chance to carry on providing these types of notebooks, but also to provide an alternative to Intel's PII. AMD is planning to switch its production from the current 0.35-micron process to a 0.25-micron process, and to produce a 300MHz processor soon, providing a real challenge to Intel.

Mobile modules

As Intel moves away from Socket 7 on its desktop chips, so it is creating new ways of attaching processors to motherboards in notebooks. Traditionally, most mobile chips have been attached using TCP (tape carrier package), which involved soldering the chip on to the motherboard. Not only does this make upgrading difficult, but for smaller manufacturers it means having to buy the whole bundle of notebook, motherboard and chip bundled together. Overstocking a notebook with an unpopular chip can be an expensive mistake, so Intel has made everyone's life a little easier by introducing mobile modules — small cards which connect to the motherboard via a single-array slot of 280 pins. On the card is a bridge to the chipsets, the memory bus on the motherboard, the processor itself, and a voltage regulator to prevent the chip from being damaged by the higher voltage on the motherboard and L2 cache.

In theory these make upgrading easier, as one module can be taken out and another fitted in its place. While some manufacturers are advertising notebooks with mobile modules as upgradable, Intel itself is uneasy about this description as there is a great deal of complicated engineering involved in this swap.

The older-style 0.35-micron process 166MMX mobile chips, all the Tillamook processors and the new Deschutes processors are available on the mobile module. This arrangement does not suit all notebooks, however, especially the ultra-thin ones, so Intel is also introducing a cartridge which will contain many of the same components but will have a pin-out array which looks a little like an Ultra Wide SCSI connector. The idea of the cartridge is that although it will require more engineering to install it, the cartridge will fit into ultra-thin notebooks such as the Digital Ultra 2000 and the IBM 560.

Lithium Polymer batteries

Batteries have always been a problem with notebooks, not surprising when you think about everything they have to power. With screens getting larger, and with faster CD-ROM drives, more RAM and larger hard disks gobbling power, it is no wonder that the best notebooks can manage is around four hours of use. Over the past few years there have been improvements in power management technologies which have eked more out of batteries, but the actual batteries themselves have improved little in this time.

There are developments afoot which should change this. The greatest change is likely to be with the introduction of Lithium Polymer batteries, which have several advantages over the older Lithium Ion. Firstly, they will have a much higher energy density and a lower self-discharge, so they will last much longer. Secondly, they can be made to fit into any shape, so you do not have to make them into blocks as with current batteries. The calls can be made as little as 1mm thick and these can be stretched out, like a rubber mat that can be rolled or pushed into any spare area of the notebook. This means you can put the batteries almost anywhere on the notebook, such as behind the screen and around the casing, thermal considerations permitting.

Lithium Polymer batteries will most likely be deployed in about 18 months' time, and will be especially useful in ultra-thin notebooks where space can be saved by their use. But there are still two main problems: they run too hot, and manufacturers have not overcome the usability issues of swapping a battery which is not a rectangular block.

ACPI

However good batteries get, they still need some kind of power management to get the most out of them. Windows has some power-management facilities, but these are not as flexible as most notebook users need. As a result, Intel, Microsoft and Toshiba have got together to produce a new standard known as ACPI (Advanced Component and Power Interface) which will be part of Windows 98 and NT 5.0.

At its most basic level, ACPI takes control of the amount of power devices consume within any notebook, server, PC or workstation. Power-management features are now controlled by the OS, not the BIOS, as are plug-and-play features, which should make this particular technology more robust and more flexible. A user will be able to decide which devices are to receive power and can actually switch off any devices they do not need at any particular time. So if you are not using your CD-ROM drive or your internal modem, these can be switched off. Alternatively, ACPI will be able to interrogate your system, decide which devices are not being fully utilised and reduce the power being given to them. If it detects that the system is not being used at all, it will put the processor itself into low power mode, so it will not complete any instructions and will wake up only when it receives a signal from a device or application.

There are also a few clever little extras ACPI can do. As it is part of OnNow, you can instruct your machine to be ostensibly off, but to wake up on certain actions — for instance, when the modem receives a fax, or when it is accessed remotely. It also senses when certain components are becoming overheated and will either trigger cooling devices such as fans to come on, or will reduce the power consumption of that device to cool it down passively. It will also be able to manage your batteries properly, giving warnings if they are getting low and even calculating how much battery life you have left.

Top ten tips for buying a notebook

If you have read through the whole of this group test and are still unsure about what to buy, the following tips should help you through the decision process.

1 What kind of notebook do you need? Most of the larger notebook manufacturers now divide their ranges up into three distinct sections. Firstly, desktop replacements are meant to be used only in the office and occasionally taken home or to another office. Secondly, ultra-portables which are for the "road warrior" — usually someone who travels a great deal and needs a machine which is light to carry about, but who does not need all the bells and whistles such as CD-ROM drives or even floppy drives. Thirdly, there is the low-cost option where you do not necessarily get a lightweight machine, but neither do you get the latest technology.

Is the notebook going to be your only machine, or is it going to be used as a supplement to a desktop? Is it going to be used as a standalone, or are you going to connect the notebook to a LAN to download data and applications? Is down to the car park the furthest you will be lugging it long distances?

If you cannot live without the very latest components and technologies all crammed into one box, you will end up paying dearly for them. IBM's top-of-the-range ThinkPad 770 costs a not insignificant £5,000, or thereabouts. However, if you are swayed by the attractions of a light and portable machine, then be aware that some models, such as the Compaq Armada 400, have come in for criticism for being insufficiently robust, although Compaq now claims to have sorted out such problems.

It may even be worth asking yourself if you need a full notebook. If all you need to carry around is something to store and enter contacts, jot down a few notes and catch up on your email, a Windows CE PDA or a Psion might be a much lower-cost solution.

2 To help you decide what kind of notebook you need, you could start by thinking seriously about what components you need. A CD-ROM drive might seem essential, but if you are only going to use it to load software; can you do this over the network or by using LapLink software instead? If you are going to use it primarily for presentations, you probably do need a CD-ROM drive and speakers, and you might even consider a DVD drive.

3 A good-quality screen on a notebook is as important as a good monitor on a PC, especially if it is going to be your only machine. There are two basic types: active matrix (TFT) and passive matrix (STN). In active matrix screens, each pixel is controlled by an individually addressed transistor which is either on or off. In passive matrix screens, the pixels are controlled by the current passing along wires and it is almost impossible to turn on one pixel without it affecting the other pixels around it, leading to a washed-out appearance known as bleeding, and ghosting. Most notebooks now have active matrix (TFT) screens, but there have been some recent developments to STN screens to create low-cost, high-quality alternatives to TFT, such as Toshiba's FastScan screens.

4 Sound on notebooks is generally pretty dreadful, mostly due to the tiny speakers which are crammed into too small a space to work effectively. If you are doing presentations, it might be worth investing in a pair of external speakers, especially if your notebook has a decent audio chip like the Yamaha OPL3-SAx.

5 Many manufacturers offer deals on PC Card modems. These do not always offer the best value because PC Card modems are notoriously difficult to configure. It is best to go for a modem you know is compatible with your notebook, as it might save you hours of frustration over the installation. If you are going to be travelling abroad a lot, make sure your modem is approved for use in the countries you will staying in. There is no single standard for telephone networks around the world, so if your modem cannot talk to the network properly you will, at best, get a series of dropped connections and, at worst, you could damage your hardware.

You might also consider a data card to work with your mobile phone, or a combination modem and network card if you need to use your notebook out and about, but also need to get onto the network fast when back in the office. There are combination cards, too, which include ISDN and/or GSM connections.

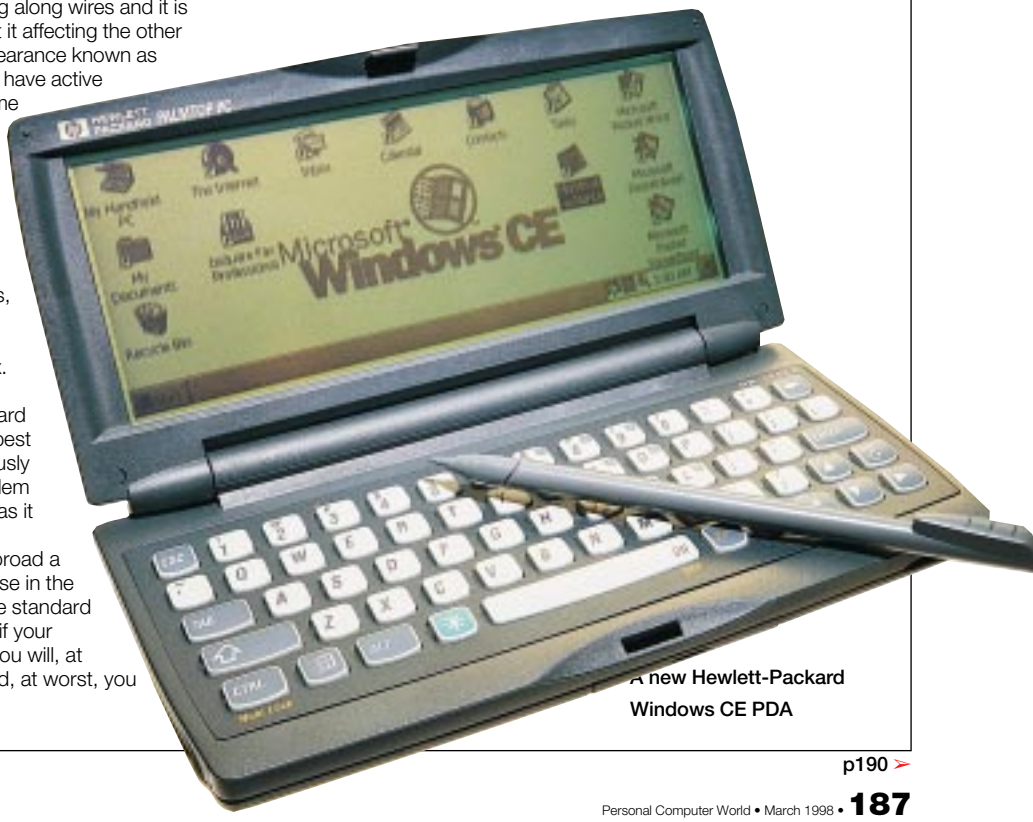
6 Battery life should match your needs. If you expect to use the notebook away from a power point for long periods, you may need it to take more than one battery at once to save you swapping them over. Look for a notebook with flexible bays where you can replace the CD-ROM drive, for example, with a second battery. Nickel-Metal Hydride (Ni-MH) batteries are cheaper than Lithium-Ion batteries, but run down quickly and have to be completely spent before recharging, to avoid degradation. Also look out for SmartBattery technology, which is designed to make power management easier and to make the battery last longer.

7 Weight is one thing you will have to live with once you have bought your notebook. An 8lb machine may not seem too heavy when you first pick it up, but it is still a lot of weight to carry around. High-end desktop-replacement machines are typically the heaviest, so it may be worth going downmarket a little for a lighter machine.

8 When you have decided how much money you have to spend, subtract a few hundred pounds before looking at adverts. The prices in adverts will doubtless be for minimum configurations, and by the time you have allowed for more RAM and a larger hard disk, you are adding significantly to the basic price.

9 Where you should buy depends very much on the manufacturer you choose to buy from. If you buy retail, you will only get a limited choice and you pay a premium for buying on the high street. By buying direct you cut out the middleman and so can buy cheaply, but without the chance to try the notebook out for yourself. Meanwhile, resellers can usually offer good deals if you are buying in large quantities, and can provide their own extended warranties and technical support.

10 Shop around for the best warranty deal. Your notebook will, after all, take more of a pounding than any other piece of computer equipment you possess. Many manufacturers now offer a three-year warranty as standard and extended warranties are also worth considering, but shop around on these as prices vary dramatically.



A new Hewlett-Packard Windows CE PDA

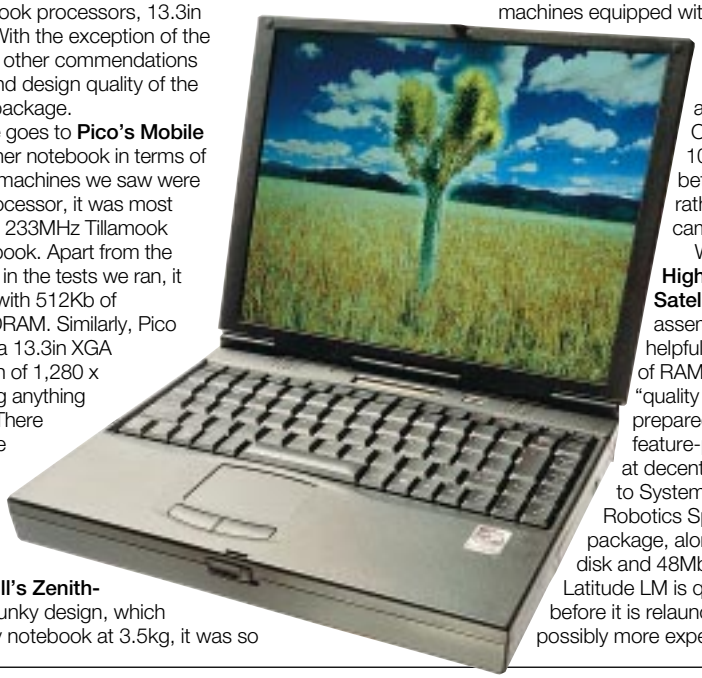
p190 ➢

Editor's Choice

As befits the mid-range price tag, there were only a few must-have components to be found in the notebooks in this year's group test — Tillamook processors, 13.3in screens, and bundled modems. With the exception of the winner of our Editor's Choice, the other commendations have concentrated on the build and design quality of the machines, along with the overall package.

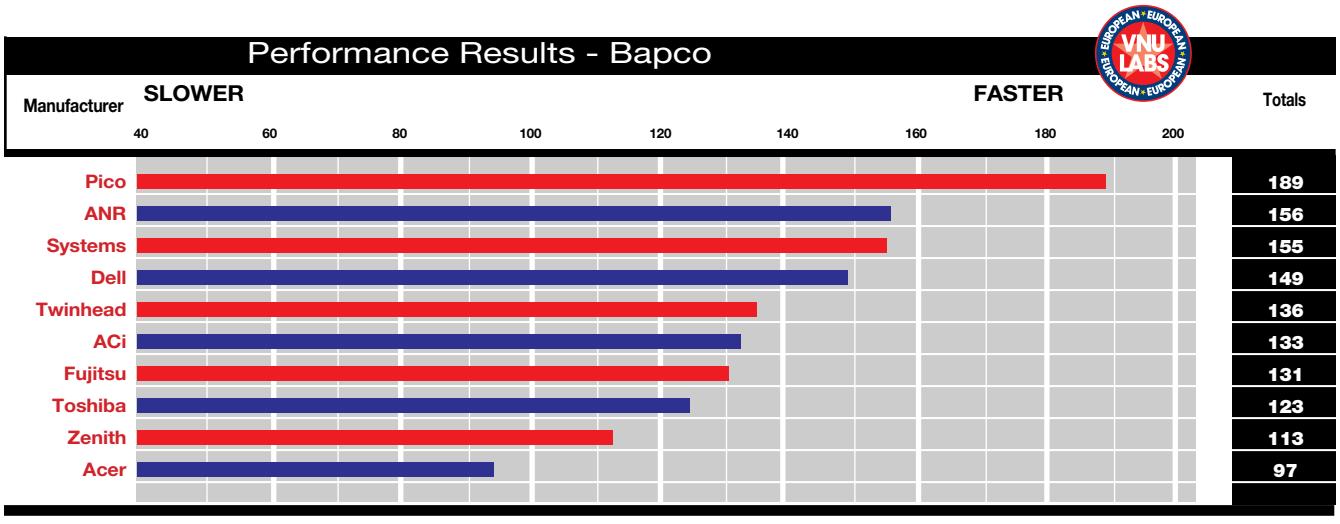
The **Editor's Choice** time time goes to **Pico's Mobile President**. It outstripped every other notebook in terms of performance, and when so many machines we saw were still using Intel's desktop P55C processor, it was most impressive to see a top-of-the-line 233MHz Tillamook installed in a medium-priced notebook. Apart from the advantage this gave the President in the tests we ran, it was also the only notebook fitted with 512Kb of secondary cache and 32Mb of SDRAM. Similarly, Pico was the only company to provide a 13.3in XGA screen, with a maximum resolution of 1,280 x 1,024 in virtual desktop, exceeding anything the other models could produce. There were one or two problems with the drivers when we ran the screen in lower resolutions, but the Pico President still represents excellent value for money.

The first of our **Highly Commended** awards goes to **Bull's Zenith-1000**. We particularly liked the chunky design, which although it made for quite a heavy notebook at 3.5kg, it was so well put together that this sturdiness was almost reassuring. It was one of the few machines equipped with 2Mb of VRAM, one of the few to be able to do 1,024 x 768 in virtual desktop, and it had the excellent Yamaha OPL3-SAx audio chip. The Z-1000 would have scored even better had it not been for the rather meagre 16Mb of RAM it came with.

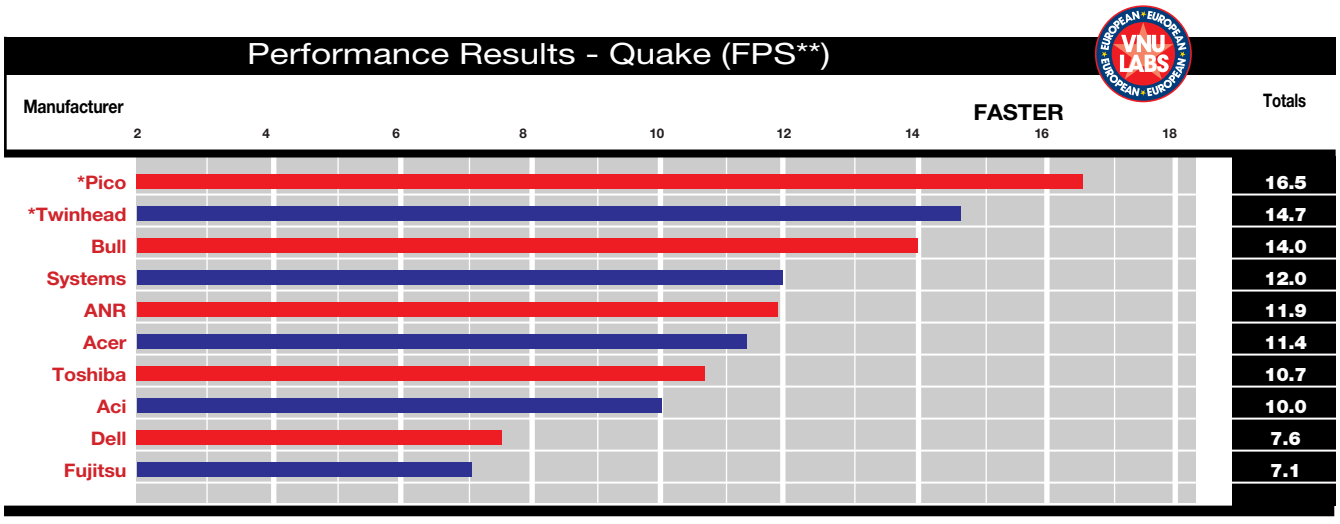


We decided to award the other **Highly Commended** to the **Toshiba Satellite Pro**, an excellently assembled piece of kit with some helpful features. It, too, had only 16Mb of RAM, but we decided to go with "quality not quantity". If you are prepared to look around, then there are feature-packed notebooks to be found at decent prices, and mention should go to Systems 2001 which included a US Robotics Sportster modem as part of its package, along with a generous 3.2Gb hard disk and 48Mb RAM. Similarly, the Dell Latitude LM is quite a bargain at its current price before it is relaunched as a super-charged, and possibly more expensive, Inspiron notebook.

Performance Results - Bapco



Performance Results - Quake (FPS**)



* In mix resolution of 320x480 ** Time measured in frames per second

Table of Features

Manufacturer	ACi	ANR	Dell	Fujitsu	Pico
Model	**Icon**	**Electron P166**	**Latitude LM 166ST**	**755Tx**	**Pico Mobile President**
Price (ex VAT/inc VAT RRP)	£1,994.89/£2,344	£1,868.09/£2,195	£1,697.87/£1,995	£1,994.89/£2,344	£1,994.89/£2,344
Tel no.	0181 8301958	0181 286 2222	01344 720000	01344 475555	01483 202022
URL	www.aciweb.co.uk	N/A	www.dell.com	www.fujitsu-computers.com	www.picodirect.co.uk
Processor	P166MMX	P166MMX	P166MMX	P150MMX	P233MMX
Desktop/Mobile/Tillamook	Desktop	Desktop	Mobile	mobile	Tillamook
RAM supplied as standard	32Mb EDO	48Mb EDO	40Mb EDO	32Mb SDRAM	32Mb SDRAM
Maximum RAM	80Mb EDO	80 Mb EDO	72Mb EDO	96Mb SDRAM	144Mb SDRAM
L2 cache	256k	256k	256k	256k	512
HD size	1.6Gb	3.2Gb	2.1Gb	2Gb	2.1Gb
Swappable components	N/A	N/A	FDD, CDD, Batt	CDD/FDD	FDD/CDD
CD-ROM speed	12x	12x	20x	20x	20x
CardBus supported?	●	●	●	●	●
Zoomed Video supported?	●	●	❍	●	●
Video Memory size and type	1.1Mb	NeoMagic 128 1.1Mb	NeoMagic 128 1.1Mb	Trident Cyber9382-1/2Mb	NeoMagic 128 2Mb
Pointer type	TouchPad	TouchPad	TouchPad	TouchPad	Touchpad
Audio chip type	ES 1868	ES1878	ES1688	ES1879	Crystal Audio
IrDA	v1.0	v1.0	v1.0	v.1.1	v1.1
Screen size and type	12.1TFT	12.1in TFT/SVGA	12.1in TFT/SVGA	12.1inTFT	13.3in TFT XGA
Maximimum resolution	800 x 600	800 x 600	1,024 x 768	800 x 600	1,280 x 1024
On-screen colours (800x600)	65,000	65,000	65,000	65,000	65,000
Battery type/claimed hours	Li-Ion/3hrs	Li-Ion/3hrs	Li/Ion/3-5hrs	Li-Ion/3hrs	Li-Ion/3hrs
Dimensions (WxDxH)mm	299 x 226 x 51	299 x 226 x 51	490 x 298 x 226	298 x 245 x 58	303 x 234 x 51.5
Weight (inc.battery and HD)	3.1kg	3.1kg	3.2kg(with FD fitted)	3.5kg(with CDD)	3.1kg(with CDD)
Software bundle	Win 95	Win 95	Win95MS Office 97	Works/Crypto95	Win95
Basic warranty/options	1st yr RTB pts & lab/●	1yr 72hr swap-out/●	1yr CAR/●	3yr international CAR/❍	1st yr pts+lab. 2nd yr lab./●
Technical support	●	●	●	●	●
Optional extras	●	●	●	●	●

Table of Features

Manufacturer	Systems 2001	Texas Instruments (Acer)	Toshiba	Twinhead	Zenith Data Systems
Model	**Minstrel XP966CDT**	**670CD**	**Satellite Pro 440CDT**	**Slimnote 9T-166TZ**	**Z-1000**
Price (ex VAT/inc VAT RRP)	£1,871.49/£2,199	£1,574.00/£1,849.45	£1,612.77/£1,895	£1,838.30/£2,160	£1,994.89/£2,344
Tel no.	0181 830 1300	01628 533422	01932 828828	01256 300300	01442 211811
URL	www.systems2001.com	www.acer.com	www.toshiba.co.jp/index.htm	www.twinhead.co.uk	www.zds-europe.com
Processor	P166MMX	P150MMX	P133MMX	P166MMX	P166MMX
Desktop/Mobile/Tillamook	Desktop	mobile	Mobile	Desktop	Desktop
RAM supplied as standard	48Mb EDO	16Mb EDO	16Mb EDO	32Mb EDO	16Mb EDO
Maximum RAM	144Mb EDO	64Mb EDO	144Mb EDO	128Mb EDO	96Mb EDO
L2 cache	256k	256k	256k	256k	256k
HD size	3.2Gb	2.1Gb	1.3Gb	2.1Gb	2.1Gb
Swappable components	N/A	CDD/HDD/Batteries	FDD/CDD	N/A	N/A
CD-ROM speed	12x	10X	10x	20x	16x
CardBus supported?	●	●	●	●	●
Zoomed Video supported?	●	●	●	●	●
Video Memory size and type	NeoMagic 128 1.1Mb	Chips&Tech 65550/2Mb	Chips&Tech. 65554/2Mb	Trident 9385 2Mb	NeoMagic 128 2Mb
Pointer type	TouchPad	TouchPad	Mousepoint	TouchPad	TouchPad
Audio chip type	ES1878	ES1878	Yamaha OPL3-Sax	ES1887	Yamaha OPL3-Sax
IrDA	v1.0	v1.0	v1.1	v1.0	v1.1
Screen size and type	12.1in TFT/SVGA	12.1in DSTN	12.1in TFT	12.1in TFT/SVGA	12.1TFT
Maximimum resolution	1,024 x 768	800 x 600	800 x 600	800 x 600	1024x768
On-screen colours (800x600)	65,000	65,000	65,000	millions	65,000
Battery type/claimed hours	Li-Ion/3hrs	NiMH/2hrs	Li-Ion/3hrs	Ni-MH/2 hrs	Li-Ion/ 3hrs
Dimensions (WxDxH)mm	299 x 226 x 51	303 x 238 x 518	304 x 239 x 51	297 x 225 x 46	306 x 241 x 49
Weight (inc.battery and HD)	3.1kg	2.6kg (with CDD)	3.2kg (with CDD)	3.4kg	3.3kg
Software bundle	Win95/ Lotus SmartSuite	N/A	Win95	Win95	Win95/LapLink
Basic Warranty/Options	3yrs lbr(1styr lbr+pts)RTB/●	1yr 72hr /●	3yrs pts+lab. RTB	1yr RTB/●	3yr RTB/●
Technical support	●	●	●	●	Offered by retailer
Optional extras	●	●	●	●	●

● Yes ❍ No

Show time

Old overhead projectors just don't cut the mustard nowadays. *PCW* takes a look at software guaranteed to give you the upper hand in meetings.

It is said that in business, as in politics, presentation is everything. This has never been more true than in today's world of the high-tech multimedia presentations you see at conferences, in meeting rooms — even in your own living room. Like almost everything in this world, first impressions are the most important, especially if money is on the line. If you have a smooth-looking, smooth-running presentation on a notebook then it is likely you will come across as organised and professional. But woe betide anyone using an old slide projector to get their message across; it's just so *passé*.

Sadly, there has been something of a cull of presentation software over the past few years so there are now fewer players. But this still hasn't stopped innovation. Features such as animation, video and sound clips and saving to HTML have now become *de rigeur* for most of the major presentation packages. In this year's annual round-up we take a good look at the four leading packages as well as some of the smaller ones, to see how they compare.

Once you have got your software and created your presentation masterpiece, you will need something on which to show it. For the travelling businessman or woman a notebook will usually suffice. But if you are presenting to medium or large groups you will have to use more serious hardware, whether it is a large monitor or a top-of-the-line 42in gas plasma display: on page 205, Gordon Laing hands out some good advice on what hardware to use.

But no review would be complete without looking at the internet. Everyone knows the impact the internet is having on communications (from email to video conferencing) and presentation packages are no exception. You can give a multimedia presentation to one person or a thousand and you don't have to leave your office. Ian Wrigley tells you how on page 206.

Presentation software Contents

Contributors

Tim Nott, Ian Wrigley, Gordon Laing

Ratings

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

ILLUSTRATION by Mark McConnel

p196 ➢

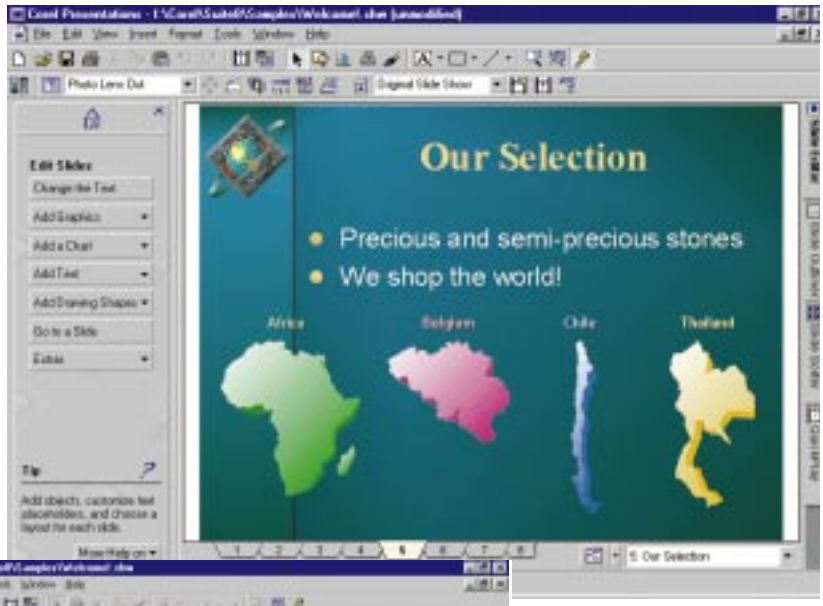
Corel Presentations 8

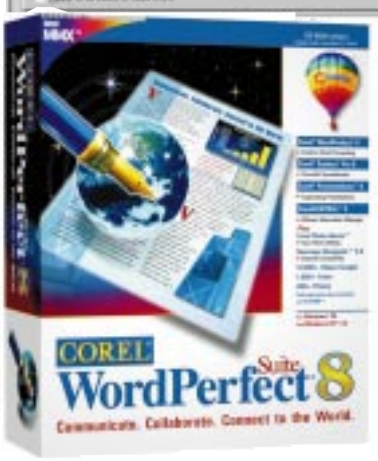
Corel Presentations 8 is the most recently launched of the major contenders, with support for Intel MMX processors to speed the drawing of slides and transition effects. It is only available as part of the WordPerfect Suite.

Although there's no guided tour, there is plenty of online and printed documentation. The best way to get the feel of Presentations, though, is to run the sample slide show. This shows off the capabilities well and provides a useful "How did they do that?" reference for you to deconstruct, slide by slide. To get you started, there are 28 content-rich templates circling from Annual Report to Year-end Report, taking in Budgets, Business plans and Product launches along the way.

Four tabs at the side of the screen let you switch between Outline, Slide Sorter or Slide Editor view and QuickPlay (which is the slide show). In all views you have a standard toolbar with a context-sensitive property bar below and an (optional) panel to the left of the work area; the PerfectExpert. This, too, is context sensitive. In slide-editing view, you initially have the choice of choosing a look, selecting or editing slides and adding special effects. Choose the first and the choice changes to editing your own master scheme or choosing from the 90 pre-defined versions. Connoisseurs of such things will be saddened to learn that WordPerfect's answer to Lotus's "Waffle" scheme (the more forthright "Balls") is no longer included. At any time you can return to the PerfectExpert "Home Page" but the choices available, together with the context-sensitive property bar, means you seldom need recourse to the conventional menus. It's cunningly implemented and despite the lack of animated paper clips and suchlike, it does the job more effectively than MS Office Assistant.

For those wanting more creative freedom there is an immense amount of resources in the Suite: 1,000 fonts and 10,000 clipart images. There are also fully-featured bitmap-editing and vector-drawing components. Although the latter suffers from a rather poorly laid-out tool bar, there are some splendid effects including multi-coloured fills and Bézier-curved arrows. There are 92 basic chart types, but the degree of variation (2D or 3D, single or multiple pies etc) increases the possibilities considerably. Both spelling and grammar checkers are included. Although there's no "on-the-fly" checking, there is an autocorrect feature for common misspellings and typographical errors. A useful feature enables you to create custom versions of the same presentation for different audiences without having to save as separate files.





Above What do you want to do today? Context-sensitive advice from the PerfectExpert
Left A huge range of transitions with live previews

In terms of animation and multimedia, Presentations sports an impressive set of bells and whistles with some excellent tricks for controlling the entry of objects on a slide. It's worth examining the demo file to discover the possibilities.

There is a small collection of sounds and movies included and you can assign keystrokes to jump to slides, launch programs and go to web sites during a show. You can also assign these events to on-screen buttons or other objects via "QuickLinks", although this is rather hard to find and poorly documented in the help file (the CD-based manual makes it clearer). Another criticism is that the QuickPlay is anything but: its competitors all start playing a slide show almost immediately, yet with Presentations there is an alarmingly long blank-screen delay before the first slide grinds into action.

Corel scores well in internet support and electronic output generally. First off is straight HTML output with a choice of separate pages, thumbnails or a frame-enhanced view. A wizard takes you through the process, giving you choices of what to include, graphic file format and the style of navigation buttons. Next comes Corel Barista-enhanced HTML: the slide show displays in a Java window within the host browser, with support for multiple columns and fonts, text wraps, transitions and sound. Next, publishing to Corel Show It format produces the full multimedia monty, but the viewer will have to first download the appropriate browser plug-ins from the Corel web site. Show On The Go creates portable versions of a slide show which can be played on a PC without Presentations installed.

PCW Details

Price As part of WordPerfect Suite 8, £216.20 (£184 ex VAT); upgrade £128.07 inc VAT

Contact Corel 0800 581028 www.corel.com

Good Points Well-implemented PerfectExpert gives timely advice. Good multimedia and internet support.

Bad Points Unavailable on its own.

Conclusion An excellent product but not worth buying the whole suite for.

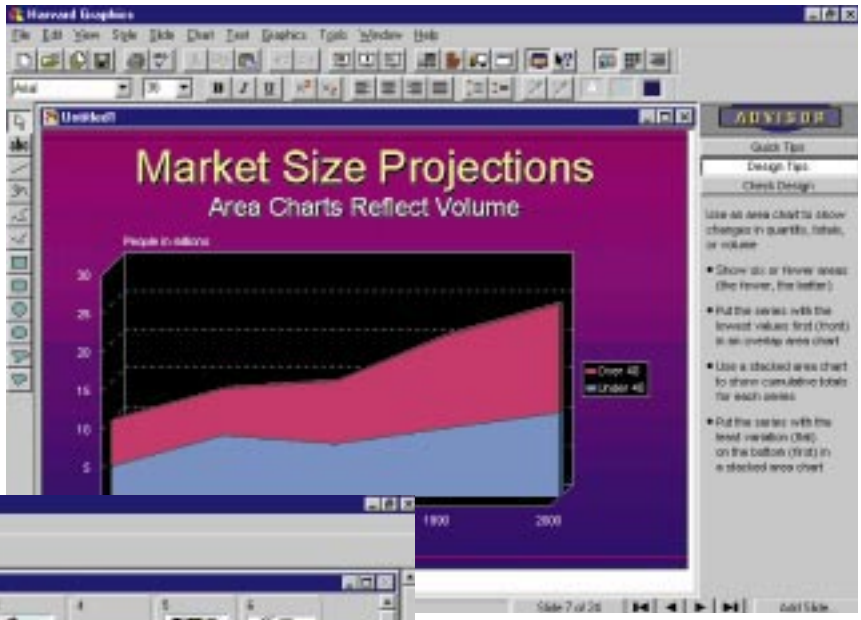
★★★

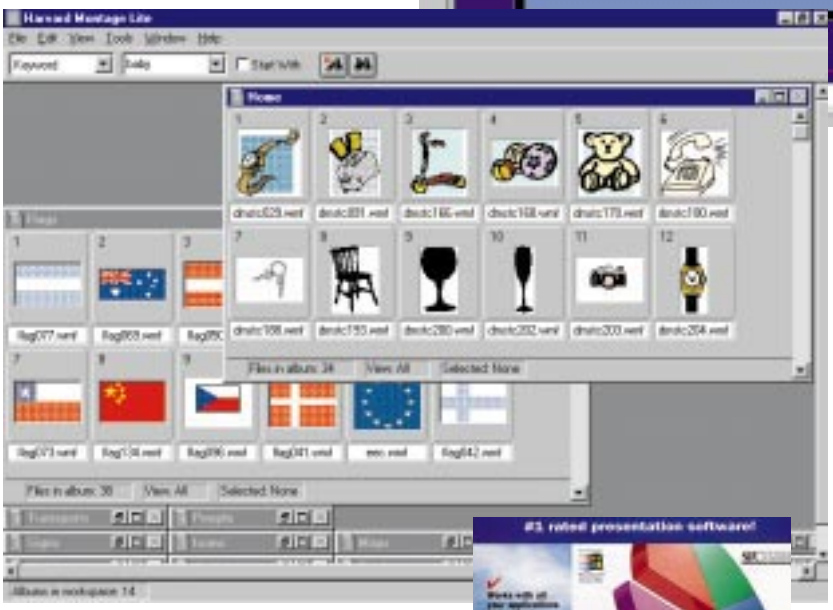
p198 ➢

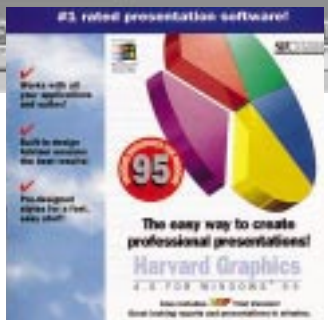
Harvard Graphics 4

The introductory tutorial "Five-minute Coach" proudly states that it is "Made with Macromedia" and provides a valuable start to understanding the look and feel of the software. A worrying point was that it refused to start in 1,024 x 768 in 24-bit colour, although it seemed happy enough if we changed the resolution and colour depth after launching the program.

You have the choice of starting from scratch or selecting from 12 "Quick Presentation" subjects ranging from Brainstorming, through Marketing, to Training. At this stage you choose the output format: screen, printer, plotter or slide recorder. This choice is specific to devices installed on your PC, so there is no generic 35mm slide output format, for instance.







Above Design tips help to get that chart looking right
Left Harvard's hideous browser makes few concessions to Windows 95

Once the first slide appears you can change the default visual style for the presentation from a range of 31 colour and layout schemes or edit the master template. A good feature here is that you have a choice of what master items appear on a particular page, so for each slide you can include or exclude the title, subtitle, background and so on. The sorter, slide view, outline and slideshow preview modes are controlled from a standard toolbar which also contains the tools for inserting clipart, charts and other objects.

At the right of the screen is the Advisor offering tips, design advice and a checker to spot potential layout problems. At the bottom of the screen are the navigation buttons and to the left is a set of drawing tools. This is sufficiently well-equipped for the artistically inclined although the lack of instant "smart" shapes will hamper the less graphically talented user. There are creative effects like multiple shadows, curved text and fancy fills but these seem to slow down the display in slide-editing view.

For those wanting more artistic opportunity, the F/X applet is a separate drawing program. Even though it has a different (antiquated-looking) interface, it offers impressive effects such as text shaping, extrusion, complex fills and neon outlines.

There's a 500-piece clipart collection managed by an inelegant browser. Not only does this swamp the screen but its controls don't comply with the standard Windows 95 interface. Double-click on a thumbnail and you get a full-size preview in a separate application. Dragging and dropping from here, rather than the thumbnails, was painfully slow and using either method we had a long and undocumented struggle to get clipart to import with a transparent background, rather than placed in a white rectangle.

Moving on to charting, things brighten up, with 63 chart types including nested organisational charts and exotic pie/bar combinations. Data entry is by the usual spreadsheet-style table and you can import Excel and Lotus 1-2-3 files (although given the program's 1995 vintage, not the latest versions). The Advisor also gives relevant advice and tips when charting and there is ample opportunity to fine-tune everything; from the height of 3D pies to the length of the title arrows.

Animation is basic. You can build a bulleted list point-by-point over time and create a similar effect with chart segments. You can insert an .AIM movie in a slide and a small selection is provided but you have little control over its sizing or position. There is a variety of transition effects between slides, but that's about it. In terms of hyperlinks, the presenter can use hotspots and keyboard shortcuts to jump to other slides, start other programs or play sounds, but no sound files are provided. There is no HTML output or other internet-related feature but you can set up a conference screen show across a LAN or use the mail command to attach a presentation to a message in your email application. While giving a slide show, you can have an on-screen panel of controls, and also draw on the slides in 64 colours.

PCW Details

Price £59.95 (£51.02 ex VAT)

Contact SPC 0115 914 2000 www.spco.com

Good Points Inexpensive. Good charting and drawing features.

Bad Points Poor clipart management. No web support.

Conclusion An early Windows 95 contender which looks in need of an upgrade.

★★

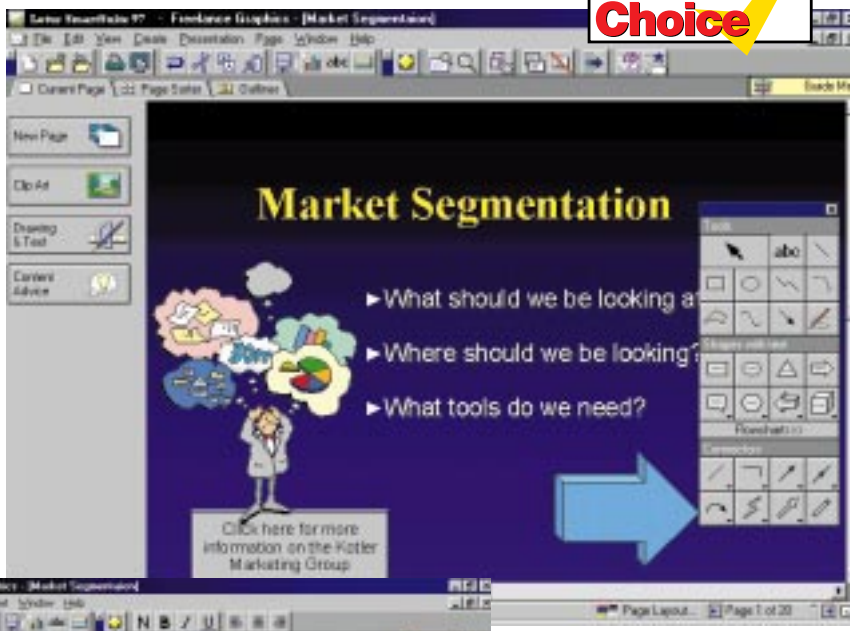
p200 ➢

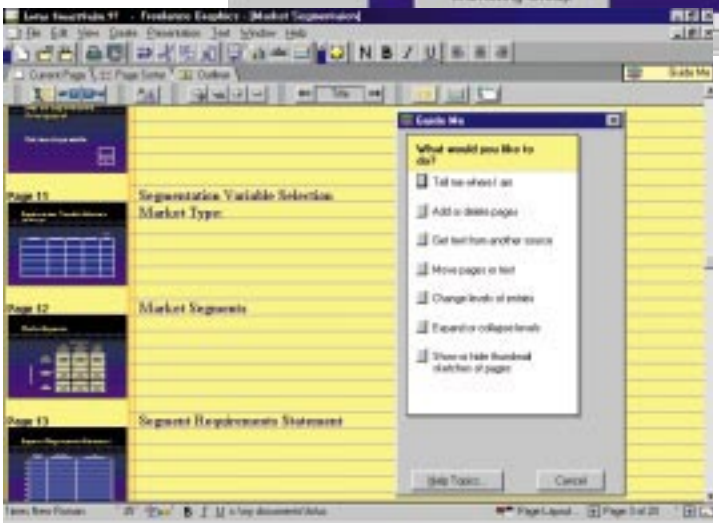
Lotus Freelance 97

Personal Computer World Editor's Choice

Having taken the guided tour (a series of Freelance presentations) the startup choice is simple: you can choose from one of 30 SmartMaster presentation content types. These range from Brainstorming and Marketing to Training, and there is a profusion of advice from such colourful presentation gurus as Kotler Marketing, Trout and Ries, Ken Wax and Zig Ziglar.

Each presentation type has a "look" stored with it but you can choose from 120 others with a neat little player that cycles through mini slide-show previews of each until you hit the stop button. (Freelance veterans will be pleased to know that the Waffle scheme is still available for presentations that merit it). After that, it gets more complicated. Instead of plunging straight into the outliner, a dialog offers a choice of slide titles from which you can select one or more slides. Having done this you get the choice of three views, accessible from page tabs at the top of the screen.





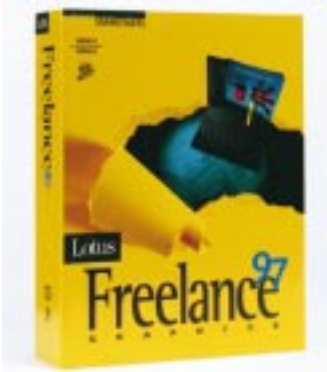
Above Content advice and a good range of shapes and connectors

Left Guide me through the outlining process

Outline view combines slide thumbnails in a choice of sizes with hierarchically structured text; what you type in here will appear as headings and sub-headings on the slide. In slide view, there's a lot going on. At the foot of the screen are the familiar Lotus status bar controls, with lists of fonts, formatting, colours, slide style and navigation. More comprehensive control comes from the equally legendary Infobox which provides a one-stop tabbed property sheet for all text and object properties including animation and transition effects. Top right of the screen is a Guide Me button which provides a context-sensitive help panel. These features are also available in slide-sorter and outline view, but slide view also has three large buttons to the left of the screen.

The New Page button inserts a slide, prompting for a choice from those available in the chosen SmartMaster; the Clip Art button summons the browser, which sports the same auto-paging preview as the Looks dialog. The Drawing and Text button summons the toolbox. As well as offering conventional Bézier and shape tools, this also provides a range of shaped text containers like 3D arrows or flowchart symbols and a set of smart connectors which stretch to suit when the connected objects are moved.

Finally, some SmartMaster pages feature a Content Advice button which pops up a small text panel offering just that, together with fairly blatant publicity for the books and services of Messrs Kotler, Trout, Ziglar *et al*. More help is at hand when you edit text: a word processor-style frame opens around the text item, with a Tips button telling you how to add bullets, indent and format text. There are 37 basic chart types, each available in a variety of styles, but you can customise colour schemes and effects. Although there isn't a separate speaker's notes view you can add these via a pop-up window and print them out with the slide image on the same page.



As with PowerPoint, you can attach multimedia events and hyperlinks to objects, so when you give a presentation you can click an object to play a sound or movie, jump out of sequence to another slide, run another program or connect to a web site. You cannot, however, combine sounds and jumps, and unlike PowerPoint, there's no "mouse over" event; it's click or nothing.

A welcome touch for designing professional-looking buttons or other controls is the "make same size" command. If you don't want to design your own buttons there's a block of basic controls you can add to a presentation at run-time for user-controlled navigation.

Lotus has always prided itself on its support for teamwork. Freelance is no exception. You can distribute draft presentations for co-workers' comments over a local network, by email or on disc, then consolidate and view their comments all together. You can run a presentation from a remote location to single or multiple destinations, although the recipients must be running either the Windows or OS/2 version of Freelance, and you can also convert a presentation to HTML then upload it to a web site. There's a portable screenshow player which will replay a presentation without having Freelance on the host machine.

PCW Details

Price £49.35 (£42 ex VAT)

Contact Lotus 01784 445808 www.lotus.com

Good Points Good range of Smartmasters and other aids.

Bad Points More complicated to use than PowerPoint.

Conclusion Why pay more?

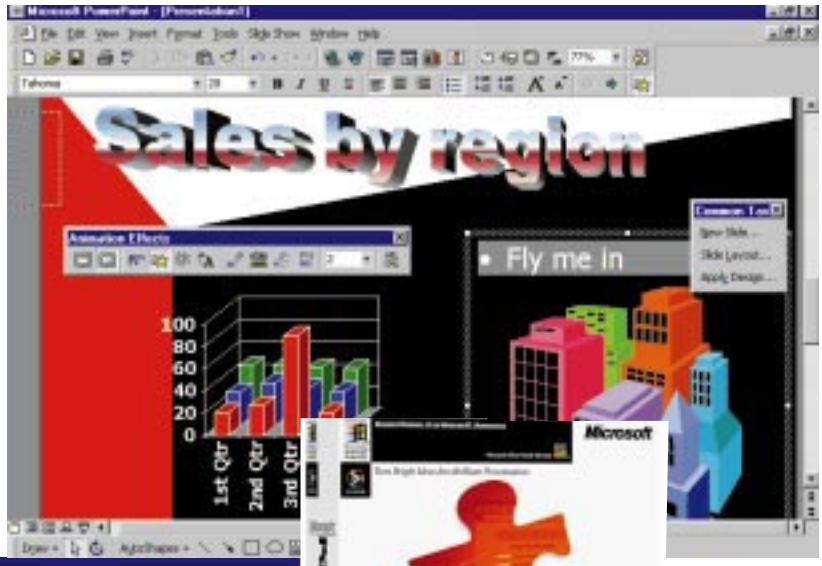
★★★★

p202 ➢

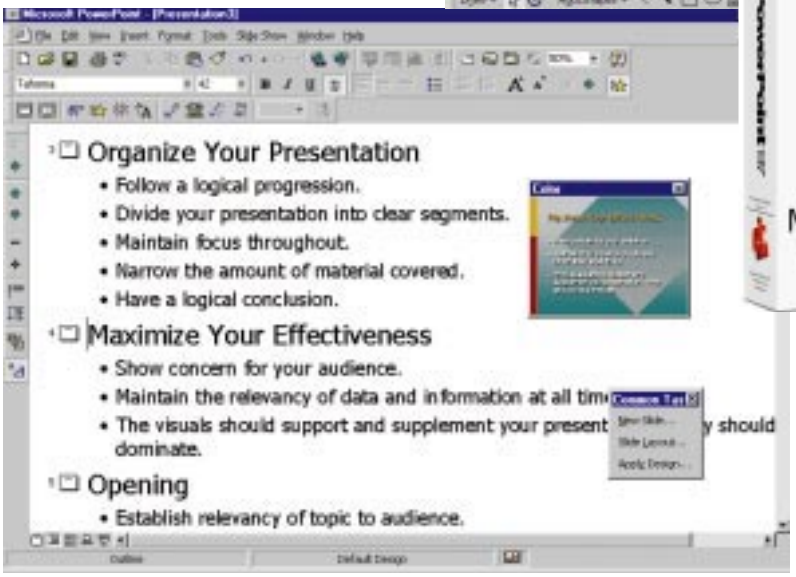
Microsoft PowerPoint 97

On starting up, you have the choice of starting from scratch with a blank slide using a template, or the AutoContent Wizard. The latter leads to purely stylistic choices with a range of layouts and colour schemes, including "Dad's Tie" (garish stripes) to "Whirlpool" (fractal-style clouds). Next, you're prompted for a layout for the first slide: title, bulleted list, chart, text and so on. The slide then appears with dummy text and graphic placeholders and you double click on these to add your own text and insert charts or graphics. Add a new slide, and the process is repeated.

The AutoContent Wizard offers much more hand-holding. You start by choosing a presentation content type: Recommending a Strategy, Financial Overview, Motivating a Team and Technical Report are a few of the more conventional choices, but you can also choose to create a web page or a self-running Information Kiosk sequence. Then you choose output options: on-screen, overhead projection, 35mm slides, colour/monochrome or internet.



Above **Plenty of fancy text effects and animation**



Left **Outlining in PowerPoint: the thumbnail slide updates as you edit**

Finally you give your presentation a title. The Wizard then leaps into action and you are shown an outline view of your presentation, with more or less relevant key points to get you past the "Where do I start?" hurdle. A thoughtful touch is that as you move through the outline, editing the text which appears on each slide, an updated thumbnail view of the relevant slide is shown in a floating window.

This approach makes it easy to create an off-the-shelf presentation and there's a lot of useful advice from Dale Carnegie Training on getting your message across. Many users, however, will want more creative scope and this is where the fun starts. At the bottom of the screen are four buttons to switch between outline, slide design, slide sorter, and notes views. In slide design view you can let your creative impulses rip, either by customising the template-given slides or starting from new.

In addition to clipart and charts (73 types and sub-types) you can add sounds, video and animated GIFs. You can make text and other objects, "fly-in" in a variety of entertaining ways, and even appear word by word, or letter by letter. Many animation effects can be applied with one button-click from the Animation Effects tool bar but you can also fine-tune your own. For the more ambitious, there is a superb set of drawing tools offering Bézier curves, Autoshapes, 3D text effects and more. "Hot spots" are well-implemented. You can specify different actions which will occur during a slide show either when you click the mouse or merely pass it over an object. Actions can include playing a sound or video clip, jumping to another slide, running a separate program or jumping to a URL on either a corporate intranet or the web.

Moving to slide-sorter view, this gives a purely visual overview of the presentation. Like all presentation software, you drag-and-drop slides around and specify transition effects (fancy fades and wipes) between slides.

Notes view enables you to attach comments which can be printed out, together with a shot of each slide, for the benefit of the presenter. Paperphobes can take a more high-tech approach by cabling two PCs together, so that one displays the actual presentation on the big screen while the other displays the slide, plus notes, for the speaker's eyes only.

As for creature comforts, there's on-the-fly spell checking, auto-correction and a style checker to spot things like unnecessary punctuation (e.g. you do not usually put full stops after short phrases in a bulleted list) and paragraphs with too many lines.

The Office Assistant, which people will either love or hate, is on hand to answer queries in plain English. It makes helpful suggestions, too. For example, if it notices that you are using the same graphic on several slides it will suggest you include it on the master slide so it appears on each new slide by default. There's also a neat Expand feature: if you have tried to cram too much information onto one slide, it will split it into several.

PCW Details

Price £325.47 (£277 ex VAT)

Contact Microsoft 0345 002000
www.microsoft.com

Good Points Easy to use. Plenty of creative scope.

Bad Points Expensive when bought as a standalone product.

Conclusion Only makes financial sense if you buy the whole of MS Office.

★★★★

Best of the rest

SPC ActiveOffice

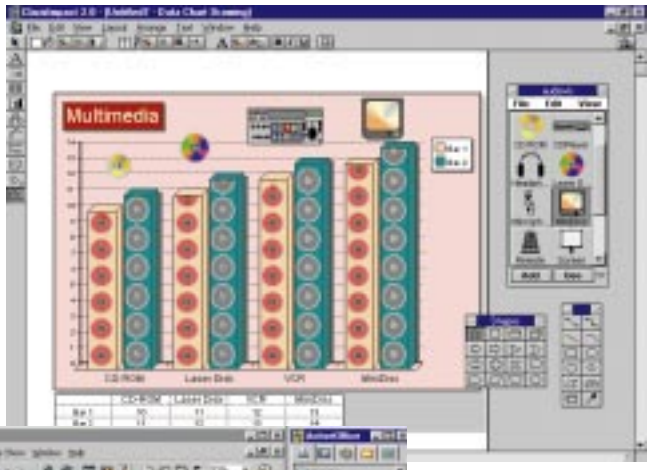
This is not a presentation package in itself but is designed to add new business graphic capabilities to both the 95 and 97 vintages of Microsoft Word, Excel and PowerPoint.

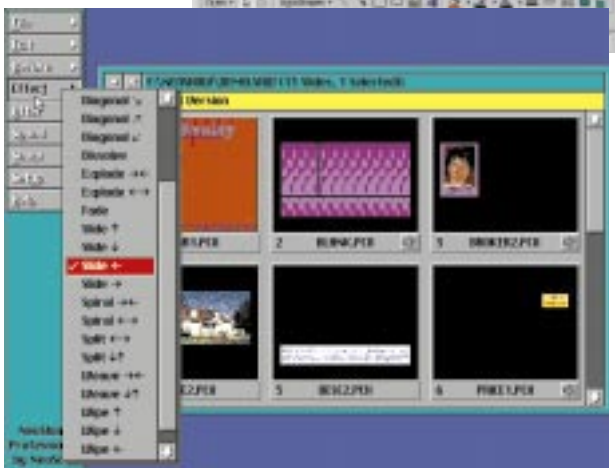
The idea is that you have the tall, thin, Active Office window open beside (or "always on top" of) your application. These are not merely clipart but text placeholders too (rather like the callouts and speech bubbles in Office 97), so you can add your own text.

The Layouts tab is impressive, with a range of charts categorised under Groups, Processes, Comparisons, Tables, Charts and Lists. You'll find all sorts of diagrams including 3D pyramid, Gantt charts, Orbits and Jigsaw pieces. You can drag these into the host application and replace the placeholder text manually but if you first highlight some text in the host, this will automatically be imported into the new object.

There's more smartness when you double-click on an embedded chart. Click on a column in a bar chart and the underlying value will pop up for editing. Click on a task in a Gantt chart and you'll have drop-down ActiveX controls for the duration of the task. It's a wonderfully clever idea but unfortunately not without problems.

You can end up with unexpected results: if you create a list with main headers and tabbed sub-points in Word, the "Accent" group will format these correctly into groups. Doing the same thing in PowerPoint produces a single list. We also found some objects became completely invisible in PowerPoint. A further bug was that with multiple documents open in Word, and an ActiveOffice object active, it is possible to switch documents and then be stranded with no menus or toolbars.





Top Clever charting and loads of creative opportunity
Middle Into orbit: one-click chart creation from existing text
Bottom I can't believe it's DOS! And all under one megabyte

Claris Impact

Nostalgia fans might appreciate that Impact comes on 14 floppy disks. Better news is that it runs on both Win3.1 and Win95 (Win32s extensions are provided for the former). However, there is no uninstall routine provided for Win95 users.

Impact is not only designed for creating presentations, but is also a standalone general business graphics program offering 120 types of diagram, including tables, organisational charts, quality management, timelines, flowcharts, maps, pictogram charts and more. You can work from scratch by choosing a chart type or a blank document, or use the DataDraw feature to import data direct from a tab or comma-separated text file into the chosen chart type.

If you don't want to start with a data file, the preset chart types offer many possibilities and they are "smart". Create an organisational chart, say, and you'll have a choice of five types, each with five colour schemes.

Impact shows its 1995 vintage, with no right button functionality nor tooltips. It is well endowed, however, with plenty of clipart, drawing tools, smart connectors for flow charts, and plenty of artistic possibilities with shaded fills, patterns and shadows. The slide show features have fewer multimedia bells and whistles than the major products (there are no hyperlinks nor web support) but there is a good range of transitions and the facility to build bulleted lists one point at a time.

Neoshow Pro

It's small at just over 1Mb (including sample files), its system requirements are minimal and it is available free for a 30-day trial.

This DOS-based program, despite its tiny footprint, has a full GUI interface, support for sound, and an impressive array of transition effects. What it doesn't have are any slide-editing features; you first need to create each slide as a PCX or BMP file. The clever bit is that you can layer the bitmaps, building up composites from small components.

It is simple and fun to use, but the $35 registration fee represents poor value compared with the some of the fully-equipped packages reviewed here.

PCW Details

SPC ActiveOffice

Price £39.95 (£34 ex VAT)

Contact SPC 0115 914 2000 www.spco.com

Good Points Clever idea for quick business graphics.

Bad Points Buggy. Duplicates some existing Office features.

Conclusion Needs work, so wait for version 2.

★★★

Claris Impact

Price £151.57 (£128.99 ex VAT)

Contact Claris 0345 413060 www.claris.com.uk

Good Points Great charting and drawing tools.

Bad Points Low on multimedia and connectivity.

Conclusion Not great value for money.

★★

NeoShow Pro

Price Shareware registration $35

Contact PDSL 01892 663298; www.ozmail.com.au/~portsoft/ns.html

Good Points Lightweight. DOS compatible.

Bad Points Very limited functionality. You have to register in US currency.

Conclusion Not a serious contender.

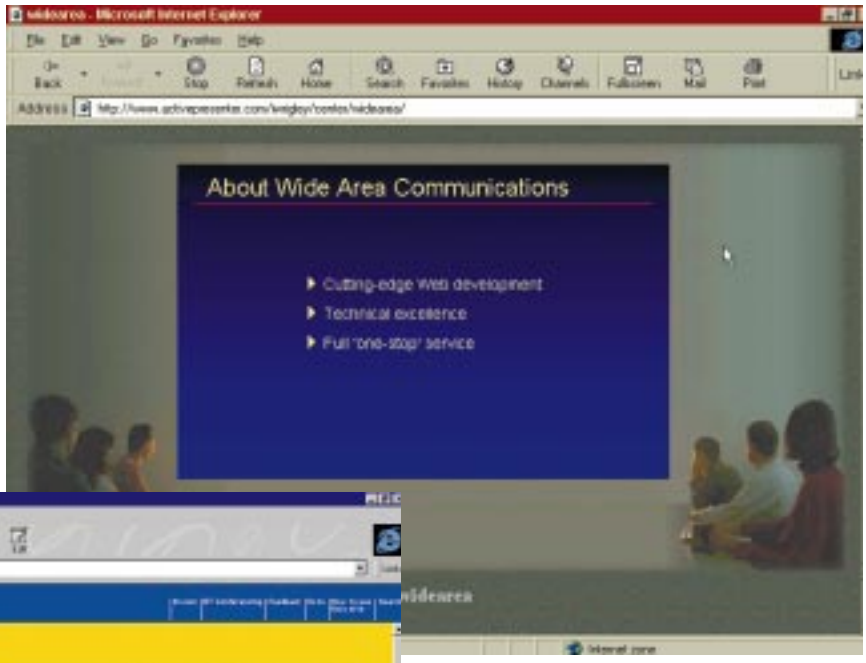
★

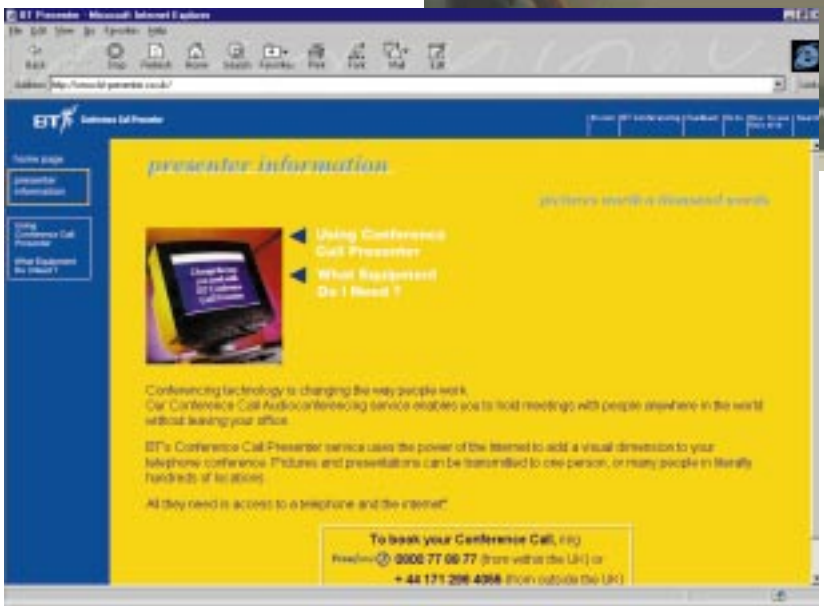
p204 ➢

Presentations on the web

You've decided to create a presentation but you know what that means: either carting around a notebook, or hoping that your customer has a PC with the same presentation package you used to author your masterpiece.

What you really need is a cross-platform method of delivering your presentation which can be accessed remotely from wherever you are. The internet can be the perfect platform for creating and delivering presentations. Web browsers are usually cross platform and most companies now have access to the net via dial-up connection or, increasingly, a leased line. Even if you only intend to present your work in-house, you might consider using the corporate intranet to deliver your presentation so you don't have to carry machines, or floppies, from office to office.





Above SPC's Active Presenter
Left British Telecom's BT-Presenter

The options

What should you use to produce your presentation? Surprisingly there are few dedicated packages around right now. The only full online presentation creation package is SPC's ActivePresenter (*see below*). But there are many other ways around the problem, some of which could end up giving you more functionality in your presentation than a standard package.

The first method is to use standard HTML (hyper text mark-up language). All you do is create a set of web pages with "forward" and "back" hyperlinks on each page. The advantage is that HTML is completely cross-platform: unless you insist on using lots of JavaScript, a standard web page will look similar whether it's viewed on a PC, a Mac, an Archimedes or a Unix workstation. So, if you intend to create a generic presentation to be viewed by almost everyone, basic HTML is your best bet.

Another option is to use something like Macromedia Flash, or Director. They require dedicated web browser plug-ins, which are only available for PC and Mac browsers (although Java-based players for both are imminent). Flash is particularly well-suited to creating presentations. It allows you to use cool transitions between pages, play sounds, have pop-ups when the cursor moves over particular areas of the screen, and more, without the overhead of huge file downloads, or a complex authoring process. Director is more sophisticated but can be tricky to learn.

The packages

■ SPC's ActivePresenter is a dedicated presentations suite which, using its WebShow Publisher section allows you to publish your presentation on the web.

After a slightly involved installation procedure you can use the main ActivePresenter part of the program to create your presentation. This section is reasonable although not quite as fully-featured as, say, Microsoft PowerPoint. The beauty of it is that once your presentation is complete, a simple process allows you to "publish" it on the web. You can use your own web server, or a free 30-day account on SPC's own server; password-protected so only you can put up presentations in your area. You decide whether to publish as an "on demand" presentation, where anyone can connect in and view it, or "live", where *you* control who can connect in, and *you* determine when the slides are changed. This is great if, say, you are teleconferencing. People view your presentation using their usual web browser along with the webShow plug-in, which is freely distributable. And if you would rather use PowerPoint than the ActivePresenter slide creation program, that's OK; the package lets you publish PowerPoint presentations, too. ActivePresenter is an excellent way to distribute presentations over the internet, even if you want control over who can see it.

■ You could use the BT-Presenter solution, which incorporates conference calling and FarSite, a package which takes slides from any package and shows them on-screen, under your control. The advantage is that the whole process, including the conference call, is organised for you; the disadvantage is that it isn't really a solution if you just want to put up a presentation on the web for all to see.

Ian Wrigley

PCW Details

SPC ActivePresenter

Price £69.95 (£59.53 ex VAT)

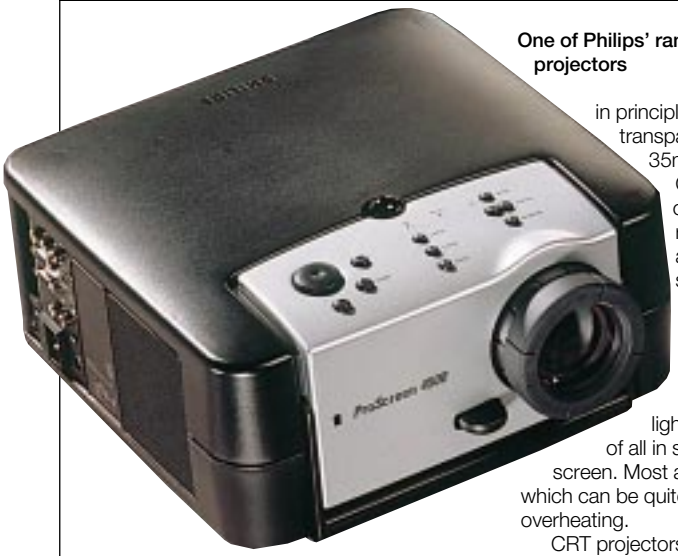
Contact Serif/SPC 0800 3767070
www.spco.com

BT-Presenter

Price (No price details: this is a teleconferencing service)

Contact BT www.bt-presenter.co.uk

Presentation hardware



One of Philips' range of ProScreen LCD projectors

Creating a presentation, using software, is only half the story: you've then got to show it to people. There is a huge number of devices to help you make your presentation. We are only going to deal here with electronic presentation hardware which connects to a PC (directly or indirectly).

Overhead projectors (OHP) and 35mm slide projectors have been around for almost half a century and are showing their age. Both require potentially expensive, and often inconvenient, means of output which have to be repeated for any changes of information. Overhead and slide projectors can suffer from mechanical problems, non-smooth transitions and non-square images. People's attention span is shortening and the use of multimedia (sound and video) may tip the balance. All these issues can be addressed by electronic presentation hardware.

What device?

The choice of device is down to your budget, surroundings and the size of your audience. In a group of less than ten people, a large monitor may do the trick. A plain 21in running at 800 x 600 pixels can be clearly seen from a distance, but some may want to opt for a bigger set. The largest conventional cathode ray tube (CRT) monitors weigh in at around 37in diagonal: bear in mind that a glass tube this size weighs a lot and can hardly be described as compact or portable.

Colour glass plasma technology points to the future. Already several companies are selling 42in 16:9 widescreen monitors with 160° viewing angles which measure only 4ins thick; however, they currently cost just under £10,000. At the other end of the scale are VGA to TV converters, allowing humble sets to be used as computer displays. The image quality is not great and resolution is best limited to 640 x 480 pixels but it's a handy low-budget solution (Lindy Electronics offers a VGA converter for only £139 ex VAT).

The biggest images require a projector, which in most cases will be significantly smaller than a large screen CRT set. There are two main varieties: LCD (Liquid Crystal Display) and CRT. Modern LCD projectors are closest to conventional 35mm slide projectors in principle, placing a small transparent colour panel where the 35mm film would have gone.

CRT projectors use three circular tubes, one each for red, green and blue light, and with phosphor glowing so bright that it can project an image.

Both have their pros and cons, although it's worth mentioning that all projectors require subdued lighting at least, and work best of all in semi-darkness with a good screen. Most also employ fans (some of which can be quite loud) to prevent overheating.

CRT projectors have been around since the seventies and still offer the best image quality, with multi-scanning facilities allowing them to display a range of resolutions or video signals: top of the range models can even support high resolutions up to 1,600 x 1,200 pixels. The big down side is that each of the three tubes must be focused and aligned for a sharp image. This can take an engineer several hours and even the tiniest knock will require re-adjustment. Thus, most CRT projectors find themselves permanently ceiling mounted. Image sizes range from 60ins to 300ins diagonally, but are dependent on how far away the projector is from the screen.

LCD projectors were first seen in the late eighties, and with a single lens to focus they can be up and running in seconds. They can also be fitted with a zoom lens, offering variable image size without moving the projector back and forth. Potential image sizes vary between 19ins and 300ins diagonally. Being small and easy to set up, a whole array of portable LCD projectors are now flooding the market.

LCD image quality is, unfortunately, not as good as that of CRT projectors, especially in terms of dynamic brightness, although this only really impacts on video and photographic images. And, LCD panels only look best when driven at their true resolution. The panel's grid-like pixel nature can also be quite obvious and sometimes off-putting at large sizes, especially if there are "dead" pixels present. This is hardly an issue in most situations though, making the LCD projector one of the most convenient, versatile and popular solutions today.

What's on offer?

Price is a major consideration: LCD projectors cost more than large monitors and CRT projectors cost most. NEC has a wide range of electronic presentation hardware. Its four MultiSync monitors range from 29 to 37ins, handle resolutions of 1,024 x 768 and higher, costing between £2,599 and £8,399 (ex VAT). NEC's latest LCD projectors, the MultiSync MT810 (£5,999 ex VAT) and MT1000 (£7,999 ex VAT), support 800 x 600 and 1,024 x 768 pixels respectively and weigh 7kg.

InFocus has made a big name for itself in portable LCD projectors. It's LitePro 730 (5.4kg, £7,795 ex VAT) and the tiny LP 420 (3Kg, £4,995 ex VAT) support 1,024 x 768 and 800 x 600 pixels respectively.

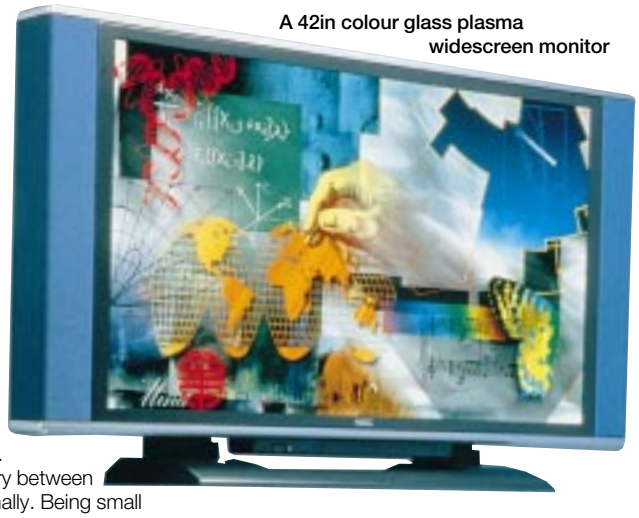
Proxima is well established in presentation hardware, offering a variety of projectors and even a range of large LCD panels for use with conventional overhead projectors.

Sony has a range of presentation products including the CPJ-D500: a rather nifty VGA LCD projector which weighs 3.5kg and costs £1,395 (ex VAT).

Philips' great-looking ProScreen range of LCD projectors have recently been joined by the 4600 Impact and Endurance models: each weighs 8kg, costs £5,495 (ex VAT); and boast very high brightness and very long lamp life respectively.

Projectors vary enormously in terms of brightness, so make sure you buy the model that's most suitable for your environment: many can operate under quite bright conditions, while others require semi-darkness.

Also bear running costs in mind, since many LCD projectors use bulbs which can cost around £50 to replace.



A 42in colour glass plasma widescreen monitor

Gordon Laing

PCW Details

InFocus 0181 213 2100; www.infs.com
Lindy Electronics 01642 754000
NEC UK 0645 404020; www.euronec.com
Proxima 01628 481555; www.prxm.com
Philips 0181 689 4444; www.philips.com
Sony ITG 0990 424424; www.sony-cp.com

Editor's Choice

It has been a long time since we last reviewed presentation software. In that time the market has diversified, with fewer products offering traditional presentation slide shows, and others branching off into specialist fields such as multimedia authoring and web-only design.

The mainstream products, however, have seen three major areas of development. First, ease of use. Most users won't be design professionals, so it's reassuring to see more templates, wizards and other comforts. Next, despite the competition from bespoke web authoring software, there's a continuing trend of support for plain and enhanced HTML output for putting presentations on web sites, or presenting across corporate networks. The third trend has been towards concentrating on the content as well as the look of a presentation. This is especially welcome, as all the colour schemes and multimedia gizmos in the world don't help if you're stuck for words.

The four major products reviewed here are all good at what they set out to do. Certainly, if you've already invested in one of the major office suites, there is no compelling reason to change.

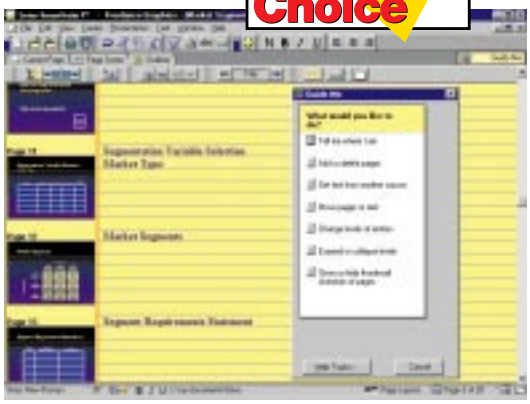
If you're looking for the strongest performer, with a view to purchasing a suite, Microsoft PowerPoint is the best choice, with the right balance of usability and power features. But as a standalone product, it prices itself out of the market.

WordPerfect Presentations is also a strong product, and its PerfectExpert is a vast improvement on the MS Office assistant. But as it is only available as part of a suite, it falls down on price.

Since this is a presentation graphics rather than a suite group test, this narrows down the choice to Harvard Graphics and Lotus Freelance. Of the two, Harvard, with its creaky clipart browser and lack of HTML output, is in dire need of an upgrade, which leaves **Lotus Freelance 97** as our outright **Editor's Choice**.

Of the other products, **Claris** offers superb business graphics facilities but fewer slide show and multimedia facilities — and it's not particularly cheap. If you're working on a shoestring budget and can produce slides in PCX or BMP format, **Neoshow** is worth a look even if only out of curiosity.

Were there a prize for the "most promising newcomer" it would go to ActiveOffice. It is a clever idea which shows great promise, but the present version needs some tidying-up. ■



Putting on a winning show: Lotus Freelance 97

Table of Features

	PowerPoint 97	Freelance 97	Harvard Graphics 4.0	Corel Presentations 8 *
Contact	**Microsoft 0345 002000**	**Lotus 01784 445808**	**SPC 0115 914 2000**	**Corel 0800 581028**
URL	www.microsoft.com	www.lotus.com	www.spco.com	www.corel.com
Price ex VAT	£277	£42	£51.02	£184 *
Price inc VAT	£325.47	£49.35	£59.95	£216.20 *
Platform	Windows 95	Windows 95	Windows 95	Windows 95
Minimum processor/RAM/disk space	486/8Mb/33Mb	486/8Mb/22Mb	486/8Mb/13Mb	486/8Mb/50Mb
Content templates	38	30	12	28
Style templates	87	120	31	90
Chart types	73	37	63	92
Multimedia support	●	●	●	●
Animated text and objects	●	●	❍	●
Pictogram charts	●	●	●	●
Dual-screen output	●	❍	❍	❍
Real-time spelling check	●	❍	❍	❍
Autocorrect	●	❍	❍	●
Multiple versions	❍	●	❍	●
Standalone slideshows	●	●	●	●
HTML output	●	●	❍	●
Fonts supplied	150	63	0	1,000
Clipart supplied	3,000	800	500	10,000

** in WordPerfect Suite*

Key: ● Yes ❍ No

Trousertronics

Toby Howard briefs you on the bits and pieces in Steve Mann's underpants. His style of 'smart clothing' brings a whole new meaning to getting into computers.

Professor Steve Mann, of the University of Toronto, is walking around with a computer in his underpants. Academics have a reputation for eccentricity, but Mann is quite normal, and deadly serious. His wired undergarments are just one example of his concept of "wearable computers" which he believes will one day revolutionise the way we live.

Mann's underpants are what he calls "smart clothing". They contain a number of biological sensors which monitor his respiration, heart rate, ECG and sweat production. When he enters his house, the readings of the sensors are analysed by his in-pants computer. It then radios instructions to a base station in the bedroom which adjusts the heating in the room accordingly.

In our picture (*right*) Mann is wearing a pair of modified sunglasses with a built-in LCD display, connected to a flat-pack Pentium PC and cellular modem concealed in his clothing, all powered by a tiny battery pack. To the casual observer he's just a dude wearing sunglasses strolling around town. In fact, while he walks he can be sending and receiving email, surfing the web, broadcasting and receiving video, checking his location using GPS, and talking to his wearable computer.

People are now constructing fully-fledged wearable systems and wearing them all the time they're awake. Mann proposes a new way of using such technology, which he calls "the eudaemonic, constant and existential" computer <n1nlf-1.eecg.toronto.edu/personaltechnologies/>. By "eudaemonic", he means that the user regards the computer as a part of himself (or herself): the computer ceases to be a separate entity. Likewise, the system is "constant" because, quite unlike today's machines, it must be guaranteed not to crash. Only constancy will cement the link between human and machine. And the system is "existential" in that the user remains in full control at all times.

A typical system might have the following components: the workhorse is a fast Pentium processor. The video display is a small LED or LCD screen contained within lightweight eye shades or as a monocular display suspended over one eye (see www.reflection.com and www.vio.com for examples). Clearly, the less obtrusive the visual display, the better, and display technology is improving fast: the MicroOptical Corporation, for example, has already produced a prototype "Eyeglass Display" which resembles an ordinary pair of prescription spectacles, except they have a 320 x 240 pixels greyscale display built-in <www.microopticalcorp.com>. When the display is inactive, the spectacles revert to their normal transparency. And as for communicating with your wearable, the standard text input device is the "Twiddler" <www.handykey.com>. This is a combined chordal keyboard and mouse designed for one-handed operation.

You can't yet buy complete wearable systems off the shelf, but if you want to try some experiments for yourself, the Wearable Computing group at the MIT Media Lab have a web page with suggested hardware and assembly instructions <wearables.www.media.mit.edu>.

The applications of wearables are limited only by the imagination. Mann makes many predictions: you might visit a shop, for example, looking for something specific. You tell your wearable, and your shoe sensors read the shop's floorplan to guide you with vocal cues to the right place. Or perhaps you meet someone whose name escapes you: a sly button-press or secret codeword whispered to your wearable will video-grab their image, then search a face database. If a match is found, a name label will be overlaid on your display.

Prof Mann's "existential computer" invention: a complete multimedia computer with cameras, microphones, and earphones, built into a pair of glasses, with some electronics items in a small box in a shirt pocket. It is running Linux 2.0, with XFree86 (a variant of X Windows)

Closely related is the Factoid system <www.research.digital.com/wrl/projects/Factoid/>. Invented by Bob Mayo, a researcher at Digital Equipment Corporation's Western Research Laboratory in Palo Alto, California, the Factoid is a tiny wearable computer that might be fixed to a key-ring or concealed in an earring. It has no buttons and no display and appears to the user to be completely passive. In fact, it's constantly on the lookout for facts broadcast by other Factoids that come within the 30 feet radius of its built-in radio. When you next walk near an Internet Factoid server, all the facts recently received by your personal Factoid are transmitted for permanent storage on your PC at home. There, they're checked, indexed, cross-linked, and incorporated into your personal "Facts of a Lifetime" database. Available, of course, to you at any time via your wearable.

Highly personal technology of this kind comes with a darker side, and although he believes wearable computing will revolutionise our futures, Steve Mann has reservations, especially over the possibility of manipulating people by manipulating their wearables. "The thing that scares me is the possibility of using it to make people more productive to the extent of controlling them," he says. "You are what you wear", goes the saying. But if you start wearing computers, what might you become? ■

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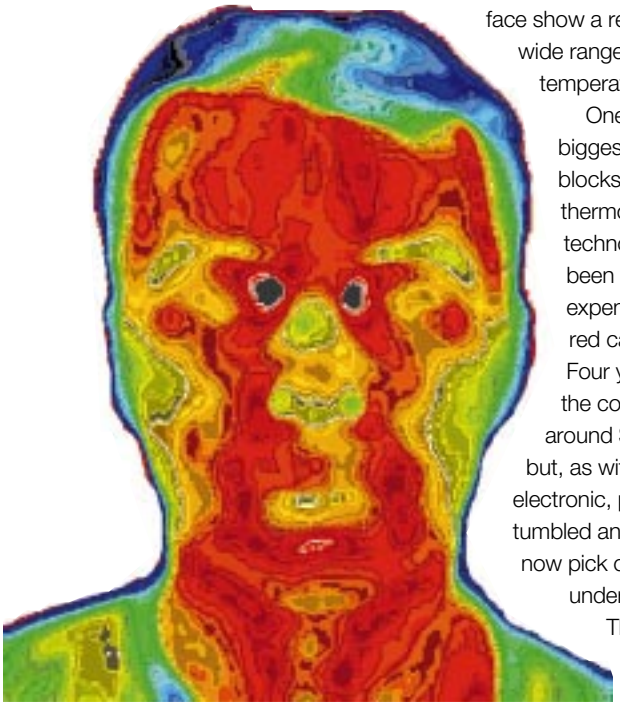
Face value

The face is your ultimate ID, a point scientists have been working to implement in a new facial recognition technique based on thermograms. Adam Evans reports.

Personal recognition has long been a holy grail of the computer community. Getting a cashpoint to recognise you before letting you get your hands on your hard-earned lucre is a worthy objective in an ever more security-conscious world. And although the eventual goal — quick, flawless identification — certainly raises a lot of questions from a libertarian standpoint, scientists have made remarkable progress in the past few years. Many approaches have been tried, some more successfully than others, including fingerprint identification, retina scanning and facial recognition.

The latest facial recognition technique is based on thermograms, pictures taken with an infra-red camera which show the heat given off by an object. The temperature of your skin is related to the local heat produced by the blood within the veins and arteries, and although your facial temperature can vary considerably, the heat differences between the various areas of your face remain the same. An infra-red photograph of your face provides a thermal map of your skin's temperature, or more accurately, shows the heat *emitted* by your face.

The Unisys laboratory in Mission Viejo, California, has been developing this technology for a couple of years and claims that facial thermograms are unique for every individual and, just as importantly, do not change (for adults) over time. A sensitive infra-red camera can detect temperature variations as small as 0.5° Celsius and the thermograms produced by a face show a remarkably wide range of temperatures (*left*).



The various colours represent different temperatures

One of the biggest stumbling blocks in thermogram technology has been the sheer expense of infra-red cameras. Four years ago, the cost was around $100,000 but, as with all things electronic, prices have tumbled and you can now pick one up for under $1,000. This figure will continue to fall and it will not be long before it is at a low enough level to be a cost-effective system for things such as cashpoints, passport control and other places where accurate identification is of paramount importance.

Unisys has installed a mock cashpoint in its lab to demonstrate its future "Thermoguard" product. Enrolling a person in the system is impressively simple: stand on a particular spot and look at the camera, then, in turn, at eight spots arranged around the camera. These nine thermograms are a mere 256 bytes each and are stored in the PC. The thermal sensitivity of the system can be demonstrated impressively: point the camera at a wall and run your fingertips over it lightly. The camera will easily pick up the trails of heat that your fingers leave behind, even from such brief contact. The entire registration process takes less than five minutes.

One of the essentials of this kind of computerised identification system is for the recognition to be quick and painless: if you are standing at a cashpoint waiting for confirmation of your identity, anything longer than a few seconds is an annoyance. For this reason, such a system could not simply compare your thermogram to a bank's hundreds of thousands of customers because massive computing power would be required. Instead, the cashpoint's PC would hold around 100 dummy thermograms along with your own, pulled from a central database once you put in your cash card or smartcard. All these images are compared with the one registered by the cashpoint camera. The PC then runs pattern-matching algorithms on the thermograms and accepts your identity only if your thermogram comes up as the best fit from 101 records *and* if your current thermogram passes a threshold level of similarity with your record. As an extra precaution, the system also remembers your height and will automatically point the camera at the recorded level.

The one problem with using thermograms for identification is the differences that spectacles and beards make to the infra-red image. These kinds of areas show up as very cool on a thermogram and significantly alter the thermal map. Glasses can easily be removed but anyone who grows a beard will need to re-register with the system. This is a pain, and points to one of the problems the developers of these systems have always faced. It is not good enough simply to recognise people in the erratic way humans do; the recognition must always be totally flawless. A few years ago this looked impossible, but now, with fingerprint, retina and facial recognition technologies making great leaps forward, the only question is how long it will take. ■

Hands On Contents

■ *Hands On* is the place where readers can contribute to *PCW* and, as always, we'll pay for anything we use. Macros, sections of code, and hints and tips will be rewarded with a £20 book or record token (please say which you would prefer) and we will pay hard cash for longer, more involved pieces. Please include relevant screenshots in .GIF format.
All submissions should be emailed to the author of the appropriate column or snailmailed to Hands On, Personal Computer World Editorial, VNU House, 32-34 Broadwick Street, London W1A 2HG. Questions and short hints and tips can be faxed on 0171 316 9313.
We are constantly working to improve the contents of Hands On. If you have any suggestions, send them to the Editor at the address above, or email them to pcw@vnu.co.uk.

Workshop

Operating Systems

Applications

Programming

Miscellaneous

***PCW/Hands On* on CD-ROM**
Remember, you saw it here first — that tip, trick, advice or review. And you can find it again: there's a whole year's worth of *Hands On* columns on our monthly CD-ROM. So if you've got a problem, or if that handy hint is on the tip of your tongue, our cover CD has the answer.

Put on an API face

In part IV, the final part of his Delphi workshop Tim Anderson explores multimedia, the net and handling the Windows API, and unravels the knots in the tangled world of Delphi strings.

No matter how good your algorithms, if you really want to impress, you need animation, sound and music. Thanks to the built-in features of Windows, you can do this easily in Delphi.

The TMediaPlayer component encapsulates the MCI (Media Control Interface). Using TMediaPlayer is a matter of following these steps:

1. Place a TMediaPlayer on a form.
2. At design-time, or in code, set the Filename property to the media file you want to play. This can be one of a limited range, including WAV, MIDI or AVI.
3. To activate the device, either call the Open method or set the AutoOpen property to true. Then it can be played either by clicking the Play button or by calling the Play method.

There are just a few points to note. First, if you want files like videos to play in a window on your form, rather than in a separate window, then you need to set the Display property — typically, to a panel component. Second, not all device types require a filename. For example, to play an audio CD, set the DeviceType property to dtCDAudio and leave the Filename blank. Delphi will automatically find the audio CD.

When troubleshooting, remember that TMediaPlayer depends on the multimedia features of Windows: if Windows is not set up correctly for multimedia, TMediaPlayer has no chance of working.

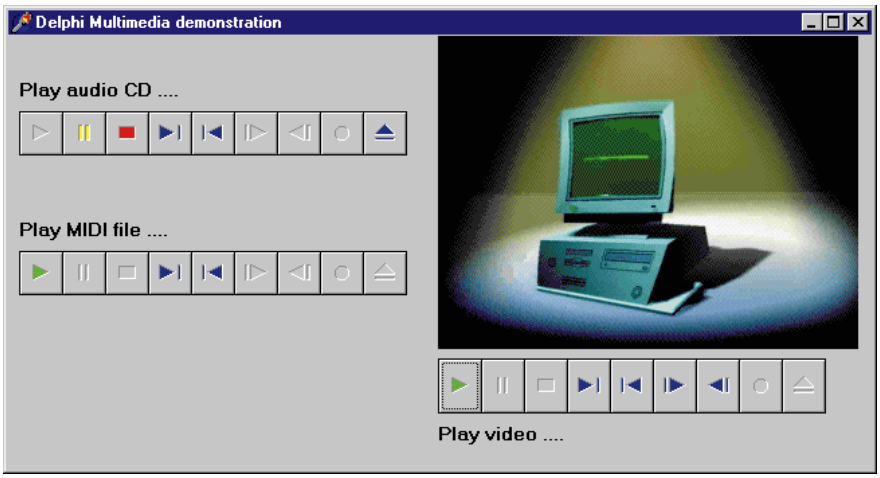


Fig 1 **Delphi's TMediaPlayer is great for multimedia applications, as long as you use a supported file type**

If you need to go beyond what TMediaPlayer can do, then it is time to delve into the Windows API (see below, "Delphi and the Windows API"). Note that ShellExecute can be useful for media types that are registered in Windows but not supported by TMediaPlayer.

With 32-bit versions of Delphi, you can perform high-speed games programming by using the OpenGL or DirectX API. Unfortunately, OpenGL is only available in Windows NT and DirectX is not part of the API specifically exposed by Delphi.

That does not cut out Delphi developers, though. Rather, it means you have to add your own declarations for DirectX, which is a COM interface, or use a third-party unit or component. For instance, the book *Delphi 2 Unleashed*, which I recommend as a medium-to-advanced level tutorial, includes examples of DirectX programming. It demonstrates that everything Windows can do, is within Delphi's reach.

Delphi and the Windows API

API stands for Application Programming Interface and the term Windows API refers to all the functions and messages which are used by the Windows operating system. It is hard to pin down precisely. There are differences in the API for each version of

Example 1: 32-bit Delphi and the Windows API

```
procedure TForm1.Button1Click(Sender: TObject);
begin
Form2.show;
if not SetWindowPos(form2.handle,HWND_TOPMOST,0,0,0,0,SWP_NOMOVE or SWP_NOSIZE) then
ShowMessage('Error using SetWindowsPos');
end;
```

Example 2: 16-bit Delphi and the Windows API

```
{in the interface part of your unit}
function SetWindowPos(Wnd: HWnd; WndInsertAfter: HWnd; X, Y, cx, cy: Integer;
  Flags: Word): integer;

{in the implementation part}
function SetWindowPos;  external 'USER';

procedure TForm1.Button1Click(Sender: TObject);
begin
Form2.show;
if SetWindowPos(form2.handle,HWND_TOPMOST,0,0,0,0,SWP_NOMOVE or SWP_NOSIZE) = 0 then
ShowMessage('Error using SetWindowsPos');
end;
```

Windows, and the API itself has parts which are core and parts that are specialist. Seasoned Windows developers have to know about the API, though, since ultimately many of the commands and functions in a language like Delphi's Pascal are resolved into API calls.

If you have the Professional version of Delphi, which comes with source code, you can trace what happens when you do something apparently simple like changing the caption of a form. You will soon find a host of API calls which implement the required action.

Delphi's Visual Component Library goes a long way to protect you from the API but there are several reasons why you may sometimes need to use it. The first is for debugging, the second for performance in some situations, and the third is to use those Windows features not otherwise available. It's mostly easy to call the API from Delphi. Borland provides units which expose most of the API calls you're likely to use. The main ones are WINDOWS.PAS (WINPROCS.PAS in 16-bit Delphi) and MESSAGES.PAS, with others like ACTIVEX.PAS, OPENGL.PAS and WININET.PAS covering the areas suggested by their names: in this case, ActiveX, the OpenGL graphics interface and the Internet API. Just include the required unit in your Uses clause and call the functions as if they were native to Delphi.

For example, here is how you would use SetWindowPos to specify that a window should be always on top. You could use FormStyle property to achieve the same thing but SetWindowPos is quicker and more flexible. Example 1 assumes you have added a second form to a project.

Note that Example 1 is for 32-bit Delphi. In Delphi 1.0, SetWindowPos is a procedure not a function, so you cannot check the return value. You could overcome this by re-declaring SetWindowPos, which also illustrates how you can use API functions which Borland has chosen not to declare for you.

Example 2 is for 16-bit Delphi. A point to note is that SetWindowPos is now declared twice: once in your unit, and once in WINPROCS.PAS. Delphi will use the one local to the unit first. In other cases, Delphi will choose which declaration to use according to the order of units in the Uses clause. This means you need to take care if you are in the habit of including duplicate function names.

Delphi and the internet

There are various ways you may want to web-enable your Delphi applications. Perhaps the simplest is to let your users open up a web page.

There are a couple of ways to do this. One is to use the ShellExecute API function and let Windows do all the work. You need to include SHELLAPI.PAS in your Uses clause. See Example 3 (*overleaf*).

If you have Delphi 3.0, you will find a simplified function called ExecuteFile in one of its example applications, the File Manager example in the Demos directory. All this does, though, is to call ShellExecute, so there is not much benefit. The advantage of ShellExecute is that the user's favourite browser will open and you do not need to worry about the name of the executable or where it is located.

Another possibility is to integrate a web browser into your application. There are three main choices. Bundled with Delphi 3.0 is the NetManage HTML component, an ActiveX control which works but with only limited support for HTML features. You can also use the Microsoft Internet Controls, assuming you have Internet Explorer installed.

In Delphi 3.0, choose Import ActiveX Control from the Component menu and add the Microsoft Internet Controls. This will put a WebBrowser control into the ActiveX tab

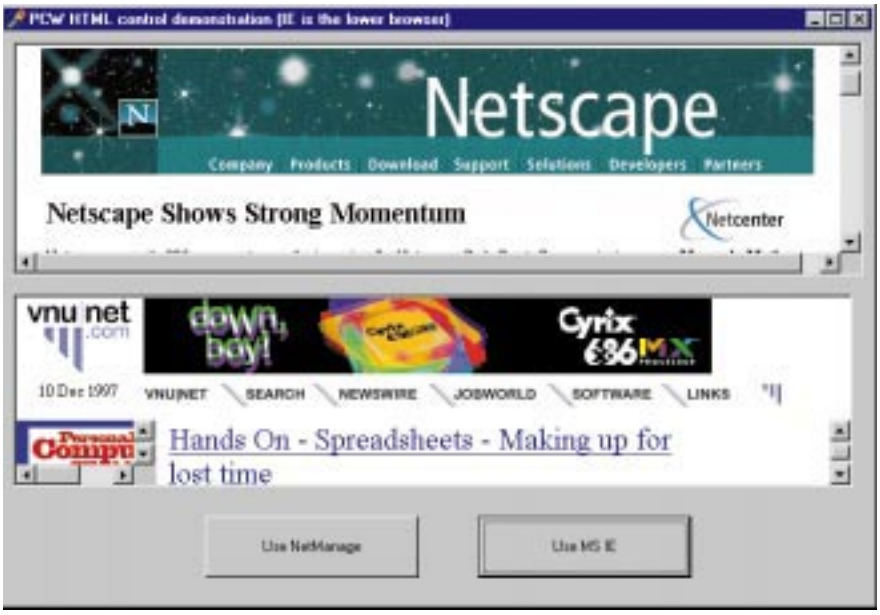


Fig 2 Using ActiveX controls, you can browse the web from a Delphi application. The NetManage control failed to display the *PCW* site but could cope with NetScape's site

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Example 3: Delphi and the internet

```
procedure TForm1.Button1Click(Sender: TObject);
var
hRetVal: THandle;
begin

hRetVal := ShellExecute(self.handle,nil,'http://www.pcw.co.uk',
     nil,nil,SW_SHOWNORMAL);
if hRetVal < 32 then showmessage('Error opening browser');
end;
```

of the component palette. The other option is a native Delphi HTML component and there is at least one popular shareware control, called THtmlViewer, available for 16-bit and 32-bit Delphi. Native Delphi controls are easier to deploy than ActiveX control, an important factor if you want to distribute your application.

What about File Transfer Protocol or other internet standards? The best solution is to use the Windows Internet API, although this is hard for beginners. There are Delphi encapsulations of this, and a source like the Delphi Super Page on the web should turn up what you need. There are also ActiveX controls available, including the NetManage set bundled with Delphi 3.0.

Mastering Delphi strings

Delphi's string variables can be confusing. The problem with strings is that unlike other variables such as integers or boolean values, they can be any length.

To store a string, the computer needs to know where it starts and where it finishes. In 16-bit Delphi, the string variable gets around this by storing the length of the string in the first position of an array of characters. Because a single byte can only store a number from 0 to 255, it means that a Delphi string can be a maximum of 255 characters. Another snag is that string variables occupy the full 256 bytes by default, even if the string is only a few characters long. Here are some tips for dealing with Delphi 1.0 strings:

- Remember, the string is an array of characters. The first character stores the length, so length(mystring) is the same as mystring[0]. This can be useful for string manipulation. For example, the third character in a string is mystring[3].
- You can save memory by specifying a shorter length when you declare a string. If you know that it will never be longer than ten characters, say, declare it like this:

```
mystring: string[10];
```

- If you want to deal with long strings, you can use a TStringList object. This is a collection of strings and has useful methods like LoadFromFile.

With Delphi 2.0 and later, things change. The old string type is still there but is now called a ShortString. It is mainly for backwards compatibility. The default string type is an AnsiString, although you can change a compiler setting to return the default to ShortString if you wish. Otherwise, if you declare a string variable, you get an AnsiString.

These AnsiStrings work in a similar way to Visual Basic strings, in that you can assign very short or very long strings to variables without worrying about memory allocation. A third type, the WideString, is for unicode strings, supporting multi-byte character sets.

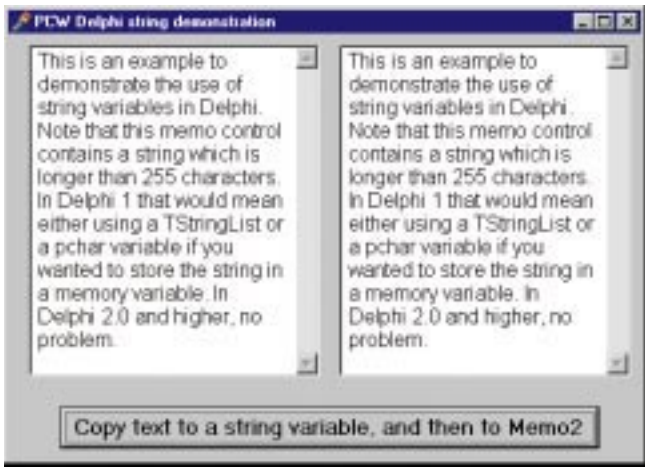


Fig 3 **String variables in Delphi 2.0 and higher are more flexible than in Delphi 1.0**

As if that were not enough, Windows complicates the situation. Windows was written in C and C++, therefore the Windows API uses C strings. In C, string variables are pointers, variables which contain a memory address. The length of the string is determined by the position of a terminating character, a null terminator. All versions of Delphi therefore support this string type, too. In Delphi it is called a "pchar".

Delphi 1.0 users need to know about pchars because Windows uses them so much. The problem is that you need to allocate and free memory for them specifically, and you must remember to treat them as pointers.

It is easy to crash your application with pchars. The advantage is that they are not limited to 255 characters. In Delphi 1.0 a pchar can be up to 65,535 characters, and in 32-bit Delphi it is limited only by memory. Note that the functions for handling pchars are quite different from those that deal with Delphi strings.

Under the surface, an AnsiString is very similar to a pchar but Delphi does all the memory stuff for you. You can typecast AnsiStrings to pchars and vice versa but there are limitations. Often, you can use AnsiStrings with the Windows API, which means that most Delphi string problems are solved in the 32-bit versions of the product. If you use Delphi 1.0, learn about pchars but handle with care.

Delphi resources

Serious Delphi developers will benefit from an internet connection. The official Delphi newsgroups are on Borland's news server, which is at forums.borland.com. There are also discussions on Usenet, in the comp.lang hierarchy.

■ More Delphi queries are answered this month and every month in the *Visual Programming* pages of *Hands On*.

PCW Contacts

You can contact **Tim Anderson** with your queries and tips at the usual *PCW* address (p10) or at visual@pcw.vnu.co.uk

Computer Manuals 0121 706 6000 for *Delphi 2 Unleashed* by Charles Calvert (SAMS) £54.95
Delphi Super Page (US Mirror) www.cdrom.com/pub/delphi _ www
THtmlViewer details at www.pbear.com

Homemade **cookies**

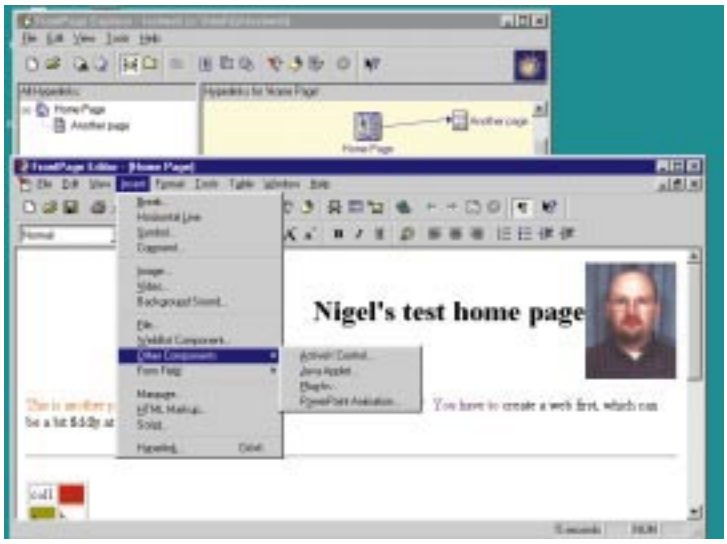
Crumbs! They ain't ginger nuts and there's no choccy bits in, either. Nigel Whitfield explains just what cookies are, what they do, and gives a recipe for customising your own web pages.

There are many different ways in which you can make web pages a little more interesting for the people who view them. For instance, on many sites you'll see options to allow you to choose whether you want lots of graphics or a text-only version. On some you just need to choose the option once and it will be remembered for the next time you visit. You might, perhaps, receive customised information about the products you have bought from a company, or other special information. All this is possible with cookies.

Using cookies to customise web pages

You may have noticed your browser asking whether you want to accept a cookie. It is not, contrary to some opinions, anything to be afraid of: it's simply information sent to your computer by the web server which will be automatically sent back when you access certain pages on the same server. It cannot interrogate your system, and the only information about you that can be transferred is something you've already sent to the server — for instance, in a form.

There are plenty of references on the internet to creating cookies. The specification is at www.netscape.com/newsref/std/cookie _ spec.html and a good guide, which includes sample programs, is at www.illuminatus.com/cookie.fcgi.



HTML created by programs like FrontPage and Word sometimes relies on special Microsoft extensions which may not be supported by your provider's web server

Essentially, all you need do to set a cookie is include a line that reads "Set-Cookie:" in the response from your server to the web browser. The rest of the line gives the name of the cookie and its contents, expiry date, path and domain.

The expiry date of the cookie tells a web browser how long to keep the cookie. If you don't specify a date, it will be discarded as soon as the user quits the browser.

The path and domain control just when the browser returns the cookie to the server. If the domain were, say, www.diversity.org.uk and the path were people/nigel/tests, then the cookie would be returned only when files starting with www.diversity.org.uk/people/nigel/tests were requested.

If you have lots of web servers, you might want the cookie sent to them all: specifying the domain as .diversity.org.uk (the first dot is important!) will do the trick.

Example 1: A Perl statement to send cookies

```
1     Print "Content-type: text/html
2     Set-Cookie: KookyNige=Test Cookie Data; PATH=/people/nigel/tests; DOMAIN=www.diversity.org.uk
      Set-Cookie: Another=More cookie data; PATH=/people/nigel/tests; DOMAIN=www.diversity.org.uk
3
4     <HTML><HEAD><TITLE>Cookie sent to your browser</TITLE>" ;
```

Key: Line 1. This is the first line, which tells the browser to expect HTML output. 2. Keep all the parts of your cookie on a single line, with semi-colons between each element. If you want to include special characters, use URL encoding for them. For example, %7E for a tilde (~). You can, of course, include variables to customise cookies for different users. 3. After all the headers there must be a blank line, which signals that there is no more header information to be sent. 4. Your HTML starts here, with whatever you want on the rest of the page.

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Example 2: Embedding a simple cookie

```
<META HTTP-EQUIV=Set-Cookie CONTENT="HCookie=More data;
 PATH=/people/nigel/tests; DOMAIN=www.diversity.org.uk">
```

Note: the code is actually written as one complete line

Similarly, setting the path to / would send the cookie when any page on the server were requested.

How the cookie crumbles

Here is an example of a complete cookie definition:

```
Set-Cookie: KookyNige=Test cookie
data; PATH=people/nigel/tests;
DOMAIN=www.diversity.org.uk; EXPIRES
=Wdy, 01-Apr-1998 12:00:00 GMT
```

The exact details of how to specify the expiry date can be found on the Netscape reference page. Remember, the only item you have to specify is the cookie, which in this case is called "KookyNige" and has the value "Test cookie data". You can also add "secure" to the end of the definition, which means that the cookie will only be sent back to the server via a secure connection.

Cookies by post

So, having seen how a cookie is written, how do you send it to a web browser? If you can run scripts on your server you'll be able to make the best use of them, although it's also possible to access cookies using JavaScript (which I will cover in the future).

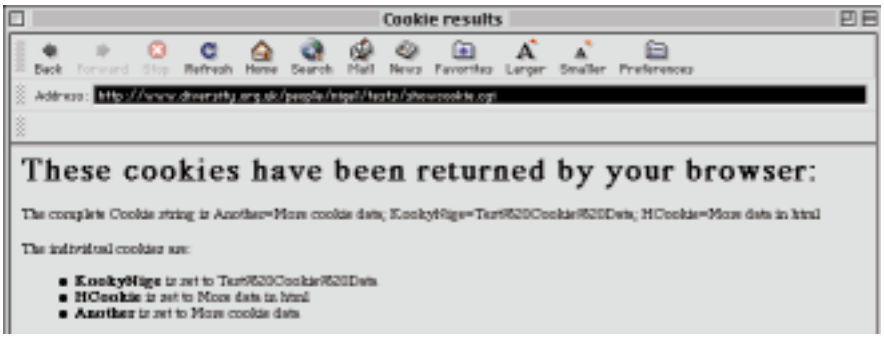
Sending the cookie requires building it first. In some cases, it's simply a check that someone has visited the site: this might be something as straightforward as "PreviousVisit=YES". But in other cases you might want to make something more complex: taking information that the user has entered via a web form and processing it to create a unique cookie with their information; but remember that you should keep to 4,000 characters as a maximum length. The Perl statement in Example 1 (see *previous page*) sends two cookies to a web browser and is called as a cgi script. It should be the first line of your script that produces any output (the Content-Type and Set-Cookie lines must appear before the HTML begins to be sent).

It is also possible to embed a simple cookie in the HTML source itself using the META tag, as in Example 2 which sets "HCookie" to "More data." This is only really useful for a static cookie which won't change for different users.

Checking cookies in a Perl script

When a page which matches both the path and domain for a cookie is requested, the web browser sends all the relevant cookies and they'll be saved on the server in the environment variable HTTP_COOKIE, which can be accessed from your scripts. The snippet of Perl in Example 3 takes all the cookies that are passed back from the browser and puts them in an array, so you can access $cookie{'KookyNige'} and $cookie{'HCookie'}, for instance. The second section prints them out as a bulleted list in HTML.

Once you have experimented, you will find that cookies can be a useful way to keep track of visitors to your site and provide them with what they want as soon as they visit. Remember that you can combine them with included scripts in web pages, for instance, to embed things like the name of a visitor in a welcome page, or to display different menu bars for them. Just remember to test your cookie-enabled pages thoroughly first. Some browsers, such as IE 3 for the Mac, have difficulty with multiple cookies.



You'll see this when you run the script to view the cookies stored by your browser as per Example 3

Example 3: An array of cookies

```
1       foreach $cs ( split( /; /, $ENV{'HTTP_COOKIE'} )) {
2               ($c, $s) = split( /=/, $cs, 2 ) ;
3               $cookie{$c} = $s ;
        }

        print "<P>The individual cookies are:<UL>" ;

4       foreach (keys %cookie) {
5                print "<LI><B>$_</B> is set to $cookie{$_}\n" ;
        }

        print "</UL>" ;
```

Key: Line 1. This loop splits HTTP_COOKIE into parts, setting $cs to each in turn; the separator is a semi-colon followed by a space. 2. Each part has the form Cookie=Setting, and this line splits the two at the equals sign. 3. We put the settings into the $cookie array, which is an associative array; indexed by the names of the cookies, rather than by numbers. 4. The command "keys %cookie" returns a list of all the cookie names in the array, and the foreach loop sets $_ to each one in turn. 5. We print out a name and value for each cookie in turn.

Strike up the bandwidth

A common complaint voiced among internet users is that "there's not enough bandwidth". Sometimes it's certainly true, especially when there's a sudden surge in the numbers of people who want to access a single site.

Nevertheless, there are times when accessing files slows to a trickle, or you simply can't reach another site. Sometimes bandwidth is to blame, and sometimes it's more to do with other things, like one ISP unilaterally blocking access to a system that it deems to be behaving in an unsuitable way, which, with the increasing commercialisation of the net, manages to put obstacles in the way of its fabled resilience.

With the approach of the next version of the internet protocols, called variously Internet 2, IPng, and IPv6, there will be special provisions to specify the "class" of your connection. The idea is that you'll be able to request a guaranteed connection of a certain bandwidth, enabling jitter-free video or very fast transfer of important files. Traffic of less importance could be bumped off, or re-routed via a slower link to ensure the capacity for "important" data.

All this, of course, will have an effect on how we gain access to the net. It may prove naïve to expect that for your £10 a month you'll receive the same quality of service as a business customer paying ten or 50 times more, even though, if you're connecting via ISDN, you may have nominally the same capacity as the office connected via a kilostream line.

Providing the "class of service" you want, when you need it, may be one way in which internet providers can help to increase their profitability in the future. But it's not, strictly speaking, something just for the future. If you have the money and the need, you can already turn to some providers for virtual private links.

> "...business users' demands may become more prominent, especially as, for many ISPs, they are a better source of income"

Virtual private networks are, according to some providers, likely to become far more widely used during the next year. That, and the class of service facilities, will certainly make the net and its technologies more robust and better able to perform some of the tasks that business users want. Home users might find that as extra capacity is installed on major backbones, business users' demands may become more prominent, especially as, for many ISPs, they are a better source of income.

More bandwidth is important and it will make a real difference to the way in which people use the internet. However, in the future there are going to be many more factors at play. For some users, this may mean paying more than they do at present to ensure that they receive the performance they want.

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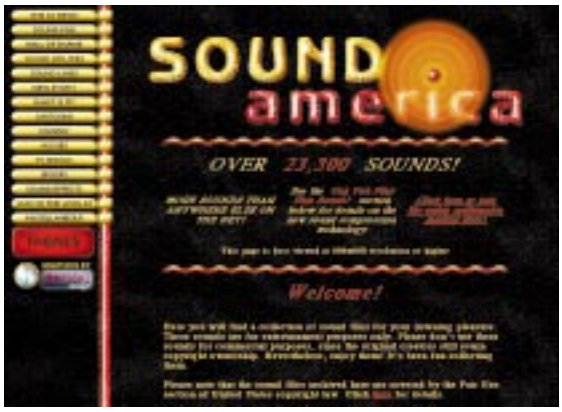
Questions & Answers

Q I am using a Mac and have been trying to download WAV files from the internet, but keep finding that many of them won't play. I receive error messages telling me that they're in an invalid format. Can I change something in my browser to download them correctly?



A Chances are you're not actually doing anything wrong; you just don't have the right application on your system to play the sounds. Many web sites now have sound files stored in WAV format using MPEG Layer 3 compression, which is a new addition to the format, and programs such as SoundApp, which is used by many Mac owners to play Windows audio, cannot understand it. Fortunately, there are programs around that will play this type of sound on your Mac, including MPEGLayer3Player. You can download this and other sound applications for both Mac and Windows from the Sound America site, which also contains a large number of curious noises you might enjoy. You'll find it at www.soundamerica.com.

Q I am having problems emailing the entries from a form to my mailbox. My ISP is BTInternet and I am using a form created by the Wizard in Word 97. The normal email function created by the Wizard works fine and the messages are received, but I cannot get the information from a form to transmit. Is this to do with the BT server being UNIX and the form using ActiveX to formulate the data?

A Yes, that's almost certainly the problem. There are a number of different ways in which information can be returned from a web browser to a user from a form, depending on how the server is set up. Many providers don't allow users of their free space to run scripts of their own and instead provide a special one which can be run to email the information from a form to a specific address. There is no standard way to do all this and the scripts for different providers may have different names, options and ways of being called. When you use a tool such as Word 97 to create a form, it will assume that you want to use a particular method of processing the data; in this case, by using a Microsoft extension. Unfortunately, this is a common problem with many web design tools. You'll have similar problems with Microsoft FrontPage which relies on special extensions on the server to support some of the functions created by the wizards. Unless your internet provider has those extensions on their server, you won't be able to make use of the wizards to process your forms. Instead, you'll need to ask the support desk whether or not there is a script provided which will process forms and email you the data from them.

Q I've been trying to connect to FTP servers and I continue to get connections refused. The administrator of the server says it's because I don't have a "reverse DNS entry". What is this, and what can I do about it?

A A reverse DNS entry maps the numeric internet address of your computer to a name; for instance, it might map 195.224.28.43 back to hando.diversity.org.uk. Many FTP servers will check that this reverse entry is valid, looking it up in both directions. If they don't receive a match, then they'll refuse a connection on the grounds that you may be trying to fake a connection from a trustworthy computer. There's nothing you can personally do about this, but you can ask your internet provider, ➢

Questions & Answers (cont'd)

or whoever looks after your nameserver entries, to help by updating tables to provide reverse lookups. If you're a Demon customer who's account has just been set up, you'll occasionally come across this problem as it takes a while, usually only a matter of hours, for details of new accounts to be updated. Other providers have a pool of addresses for their modems and you won't normally encounter this unless they haven't bothered to set up the necessary information. In this case you should contact them and insist: reverse lookups are used for a lot more than just FTP and if they're not configured correctly you could have real problems accessing some resources on the internet.

Q There is a file called Unattend.txt in NT4 which guides the unattended setup of other machines over the network. What I am trying to do is take the configuration from an HTML form and use that data to take the REMs out of all the appropriate drivers which correspond to the selected options in the HTML form. More specifically, the Unattend.txt has all the lines for the various net cards, video cards and so on. What I need is a program which will parse this generic file and take out all the necessary REMs (;) from the drivers selected in the HTML form. I already have the C code to take the results from the form.

A This is a fairly trivial task in fact, and it can be made easier by designing your HTML form carefully, ensuring that the names of the fields match the names of the drivers and other lines in the file which you want to process. The actual page itself can explain each option in more detail. A similar technique can be used for any file that follows the standard Windows INI file format.

Although it's possible to do all this in C, you'll probably be able to develop a solution far more rapidly in Perl, which is better at the sort of pattern-matching you need to do, to process the file.

Give each driver appearing in the file an entry on the form with an identical name. So, for example, for the "EE16" card, have an entry on the web page setting a variable called EE16 to true, then check for a line which matches that string. If there's an equals symbol in it you just need to uncomment the line, but if it's preceded by a left square bracket then it's the start of a section of lines that all need to be uncommented, until the next line which contains a bracket, or is blank.

Rather than produce a whole program to do that, I'll provide a couple of hints here on how this sort of thing can be done in Perl. It's easy to edit a line to remove the semi-colon that turns it into a comment:

```
$line =~ s/^;// ;
```

The =~ command is a pattern-matching command, and the "s" is a search and replace, changing ^; (the ^ means "at the start of the line") for nothing; in other words, removing the semi-colon.

To uncomment a whole section, called $sect_name, the following code would work and should be fairly simple to convert to other languages:

```
1     if ( $_ =~ /\[$sectname/ ) {
2       while( $_ !~ /\[|^$/ ) {
3               print s/^;// ;
        }
      }
```

Line 1. The square bracket has to be preceded by a backslash to stop it being interpreted in a special way.

Line 2. The !~ is the opposite of =~ and will be true for those lines that do not match the pattern; the | in the pattern stands for "or".

Line 3. Rather than save the results, we are simply printing them out directly. This may not be the best solution for your particular task.

PCW Contact

Nigel Whitfield is a freelance journalist, maintainer of several internet mailing lists and consultant to a number of non-profit organisations. Write to him via the *PCW* address (p10) or contact him at internet@pcw.co.uk

Shut down and shut up

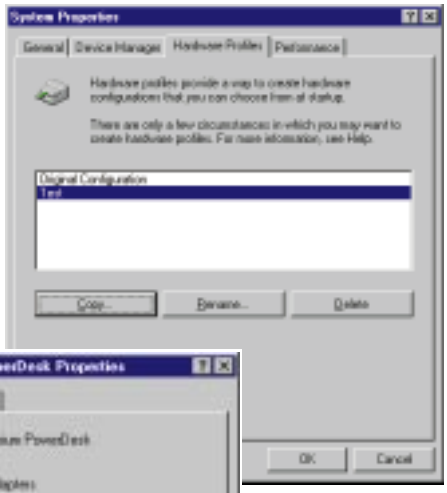
Having a showdown with your shutdown? Tim Nott finally troubleshoots device drivers. And, talking of shutdown, how to use Windows paint to brighten up a chequered scenario.

Here is the final episode in our three-part "blockbuster" on shutdown problems. But before we get into the wacky world of device drivers and plug-and-play, I've had some feedback on this. Paul Irvine wrote: "*In my case it turned out to be the versions of Novell's Client 32 software for Windows 95 PCs accessing a Novell Intranetware network. Novell has now acknowledged the problem and there is a new client available for download from their site.*"

Another obvious point (thanks, Brian Childers) is checking the physical network connection. If this has come unplugged, it can also cause the same symptom.

Getting back to device drivers, the best way to troubleshoot these is to create a new hardware profile:

- Back up the Registry, then in Control Panel, System, Hardware Profiles, press the "Copy" button and give the copied configuration a suitable name, say, "Test".
- Turn to the Device Manager tab and make sure "View devices by type" is selected. Expand all branches and double-click each device in turn. Most, but not all devices will have a box entitled "Device Usage"; if so, untick the "Test" configuration.
- Don't alter any of the System devices and if you're prompted to restart the computer, answer "No".
- Wait until you've unticked "Test" for all devices, then restart the computer. You'll see a DOS message that Windows cannot determine the configuration, and asking you to choose between the original and "Test".
- Choose "Test". You'll then (probably) get one or more error messages that Windows cannot find your display driver. Cancel these, and close the Display Properties dialog if it appears. Shut down Windows.
- If it closes normally, restart (again in "Test" configuration) and return to Device Manager.
- Re-enable each device for the "Test" configuration, in turn, restarting the PC.



Right First create a new configuration…

Below …then remove devices from it

Plug-and-play devices will be disabled next time you restart the PC. Windows will then find them and add them to the current profile. In other words, a second restart will enable them, so check carefully through the Device Manager each time. This should enable you to pinpoint the errant driver and you can then disable it from the "Original Configuration", then delete the "Test" profile. If Windows still doesn't close properly in the first "Test" profile, you have exhausted the possibilities known to me, your fellow *PCW* readers (so far) and the MS Knowledgebase. I can then only offer the advice that it may be worth reinstalling Windows, resetting the CMOS settings to the factory configuration, or shouting at your dealer.

Paint magic

Have you ever noticed that folders, in Large Icon view, form a grey and yellow chequered pattern when the Shut Down dialog is displayed? If not, it's probably because your icon size and spacing are not set to the defaults. But if you go to Control Panel, Display, Appearance, save your current scheme and then revert to Windows Standard, you'll see what I mean.

The phenomenon occurs because, when the Shut Down box appears, Windows turns off alternate pixels. Since folder icons are composed of alternate grey and yellow pixels, some will have all the grey pixels suppressed, others all the yellow. You can experiment in Appearance with different values for icon size and spacing, and even get individual folder icons to show a chequered pattern.

Anyway, stop messing about with all that, because it gets much better, as Tom Lynn discovered. For this splendid session of displacement activity you will need three instances of Windows Paint running and two same-sized bitmaps loaded in two of

Department of Obscure Tips

■ The quick brown fox has been jumping over the lazy dog since the invention of typewriting, if not earlier. It's the sample text used in the Windows font viewer and all save the terminally unobservant will have noticed it contains every letter of the alphabet.

It's not perfect, however; there are nine surplus letters, excluding spaces. I've yet to find a legitimate English sentence which uses each letter once and once only, but I recently came across "Jackdaws love my big sphinx of quartz" which, besides being wonderfully surrealistic, contains just five surplus letters. Since the dawn of Windows 95 I've idly wondered how to change the text used in the font viewer, but even searching the entire Windows folder for files containing the text fails to produce a relevant hit. What I didn't realise, but anyone with a modicum of programming experience would, is that the string is stored with alternate zero bytes. OK, I'm just an end-user, not a programmer. And loading Fontview.exe into a hex editor reveals the string.

So, if you'd like to change this, first make a backup copy of Fontview.exe somewhere safe. Then fire up that old hex editor, load Fontview.exe and go to offset 7FCA. Type in the new string, taking care to maintain the zero-byte spacers, and pad the end of the new string with spaces to keep the length the same. And there you have it.

Regrettably, professional ethics proscribe me from awarding myself a book token.

■ Here's a tip that's not in the least obscure or trivial. Are you as sick as I am of receiving email that starts with a plain text message then continues with a load of <DIV><FONT color=3D#000000 size=3D2>Hi!</FONT></DIV> and similar crap, which somewhere incorporates the text of the original message? Though there might occasionally be some tenuous justification for sending "rich text" email, most recipients, myself included, regard this as a pain in the neck. This is probably due to attempts by Microsoft Exchange or Outlook Express to double internet traffic, and I'm most grateful to Bob Crabtree and Paul Wigley for pointing out the appropriate cure.

The quick brown fox has jumped his last

If you're using Exchange, go to Tools, Services, select Internet Mail and click on Properties. Click on Message Format and unselect the "Use MIME when sending messages" checkbox.

Outlook Express users should go to Tools, Options, Send and select "Plain text".

I don't know if the next step is strictly necessary, but Paul then entered Settings and selected Uuencode instead of MIME.

these. Busy images with similar colours and contrast work best.

• In the third copy of Paint, go to Image, Attributes and set the size (Pels) to the same as the other two images, and the Colors to Black and White. OK the Attributes dialog.

• Fill the image, using the bucket tool, with 50 percent black (on my system, the ninth swatch on the bottom row of the palette). This should give you a pattern of alternate black and white dots. Zoom in to verify it; this will be your mask.

• Set the background colour to black for the mask and the first image, by right-clicking on the black swatch in each session.

• Back with the mask, Edit, Select All, then Edit, Copy. Switch to the first image, and Edit, Paste; you'll see the host image lighten as every other pixel turns white. Pick any other tool to "fix" the paste, then change the background colour to white.

• Edit, Select All, Edit Copy, then go to the second image. Make sure the background colour is also set to white, then Edit, Paste. You should see a composite of the two images, like two overlaid slides.

• Fix the paste by choosing another tool. Save the composite under a new name.

From the File menu, set the composite image as your tiled wallpaper. If you've got it right, it should look a mess. Minimise all windows and the wallpaper will leap into clarity. If your original images were an even number of pixels high and wide, you'll see one image repeated; if they were odd, you'll see them alternated.

There, isn't that better than working?

More paint magic

Speaking of things painty, I have some good news for users of Office 97. You may remember, back in the early days of

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Questions & Answers

Q I'm a keen gamer. Something which constantly bugs me is games that run only in DOS (i.e. totally out of Windows). Is there a way to have a shortcut on my desktop that will shut down Windows and then run a game automatically?

Simon Wells

A Yes. Create a shortcut to the game exe, com or bat. Right click on the shortcut, then Properties. Click the Program Tab, then the Advanced button. Tick the MS-DOS mode box.

Run those games in "real" DOS

Q One of the annoying features of the Windows 95 desktop is that it is too easy to move an icon by a sloppy double-click or Line Up Icons, which can play havoc with a carefully arranged desktop. I have tried searching the internet for a utility which locks/unlocks individual icons on the Win95 desktop, but without success. Do you know of such a utility? It would be a useful addition to PowerToys.

Rev. Mark Cumin

A You've almost answered your own question. Get your icons arranged the way you want. Go to Control Panel, Tweak UI, Explorer tab, and tick "Save window settings".

Restart the PC (*hint: save time by holding down Shift when you click the "Yes" button in the Shut down dialog*), then go back to Tweak UI and turn off "Save window settings".

Q Is there a way to assign a shortcut key combination to shut down?

Paul Davis

A Yes. Alt + F4 closes the active window, but if no window is active (i.e. the desktop has the focus) this has the same effect as selecting Shut Down from the Start menu.

Q I have heard that there is a way of changing all the icons for .bmp files to the picture that is actually contained in them: e.g. for clouds.bmp the icon would be a very scaled-down version of the picture.

Tom Fitzgerald

A Since this involves a Registry edit, back up the registry first. Then run Regedit and go to HKEY_CLASSES_ROOT, Paint Picture, DefaultIcon. Double-click the name entry (Default) in the right-hand pane and replace the existing string with %1 — and that's it.

If it doesn't work, it's probably because another image-editing program has appropriated the .BMP extension for its own file type. The easiest way to get around this is to remove, then re-install Paint, from Control Panel, Add/Remove, Windows Setup, Accessories.

Q In your December column, you explained how to change the icons for each disk drive. How can I use my own images as a drive icon?

David Barton

A You can use a bespoke icon editor like Microangelo but you can just as well use Windows Paint. Save your image as a .BMP file, then rename it with the .ICO extension. It doesn't even have to be icon-sized as Windows will resize it to suit, but you'll probably get a better-looking icon if you do create it at the right size.

You can check the current icon sizing by going to Control Panel, Display, then the Appearance tab. Select Icon from the Item list, and you'll see the size (32 pixels square is normal). If you've saved the icon as, say, C:\icons\mydrive.ico, then all you need to do is create a text file named autorun.inf, in the root of the drive, which contains the following two lines:

```
[autorun]
icon=c:\icons\mydrive.ico
```

Q I would like to install Windows for Workgroups on my machine and have Windows 95 on it as well. I can do this successfully, but I want a menu to come up (like when you press F8 during startup) so I can select the version of Windows I want to load.

Tom Fitzgerald

A Look for a file named MSDOS.SYS in the root of C:\ and make a backup copy in a safe place. Right click on it and choose Properties, then untick the read-only attribute. OK out, and then you'll be able to edit the file in Notepad. In the section headed [Options] you can add BootMenu=1 which will give you the boot options menu without having to press F8. Don't forget to reset the read-only attribute of MSDOS.SYS afterwards.

Q What's the trick to open a settings box with a particular tab selected? A shortcut to System, Device Manager would be particularly handy.

Tom Lynn

A I will come clean here — Tom actually answered this question himself, in a later email. Just create a shortcut to "C:\Windows\Control.exe sysdm.cpl,System,1" with an appropriate icon. The number at the end corresponds to the number of the tab, starting at zero, and the text preceding it, the icon title in Control Panel.

Note that it seems you can leave the latter out; just put two commas between the .CPL and the number. Note also that it doesn't always work: I can't get Tweak UI to recognise it, nor the pages added to Display by Plus and my video drivers. ■

Windows 95, that if you installed the Office import filters for certain bitmap formats, they would then also open in Paint. However, if you have Office 97, attempting to open, say, a GIF in Paint makes the latter perform an "Illegal operation" and crash. The good news is that an update to Paint is available from ftp://ftp.microsoft.com/Softlib/MSLFILES/PAINT95.EXE. This version, unlike its predecessor (as far as I remember), will both open and save in formats other than BMP and PCX.

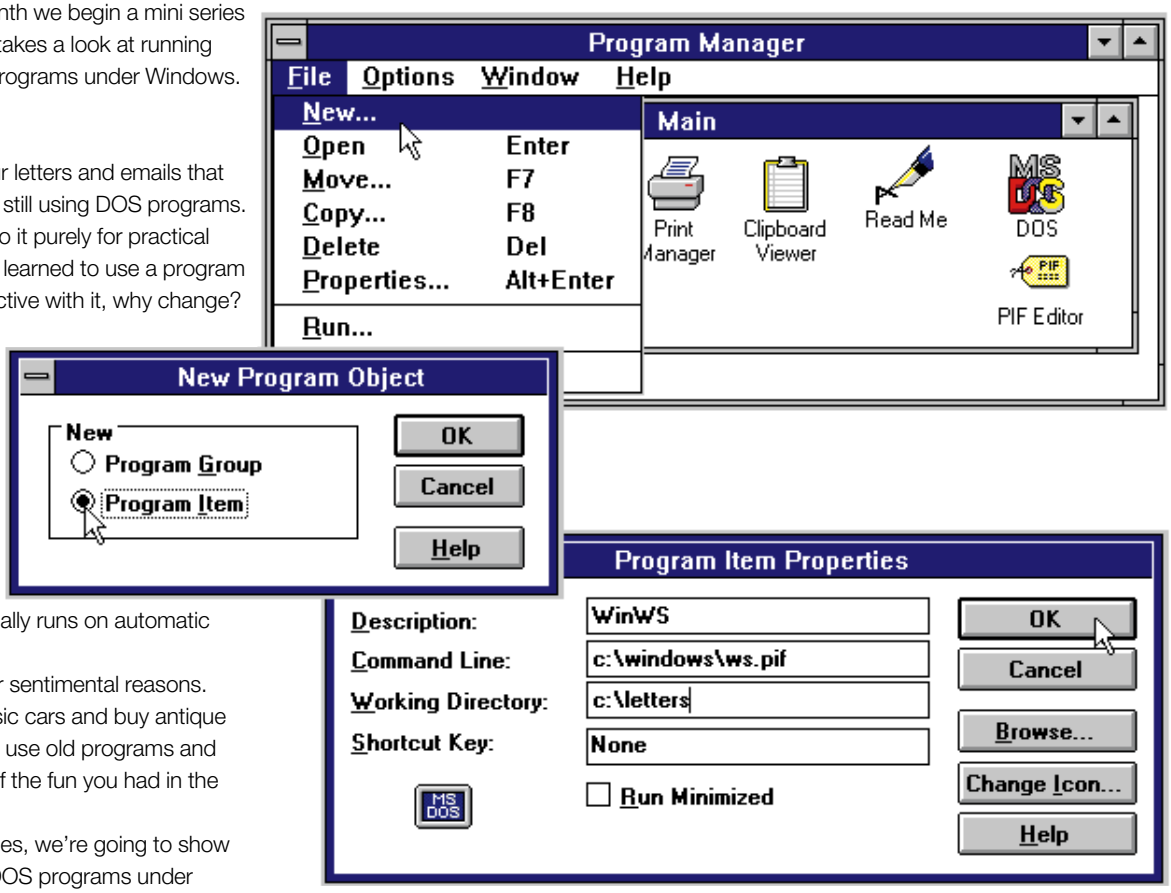
PCW Contact

Email **Tim Nott** at win95@pcw.co.uk or write to him c/o the usual *PCW* postal address (p10).

Not just a load of old **DOS**

OK, so DOS may be vintage; but running it under Windows holds advantages. Panicos Georghiades and Gabriel Jacobs begin a mini-series to help Win users get the best out of it.

This month we begin a mini series which takes a look at running DOS programs under Windows.



PIFs help you to get the best out of DOS programs

Vintage DOS

It seems from your letters and emails that many readers are still using DOS programs. Some no doubt do it purely for practical reasons. If you've learned to use a program and you're productive with it, why change? You could spend all your life learning new things and never doing any work. One of us still occasionally uses WordStar 4 — he knows it so well that it virtually runs on automatic pilot!

Others do it for sentimental reasons. People drive classic cars and buy antique furniture. Why not use old programs and recapture some of the fun you had in the old days?

In this mini series, we're going to show how best to run DOS programs under Windows and highlight its many advantages.

For a start, Windows offers the following facilities for DOS users:

- Switching from one DOS or Windows program to another.
- Multitasking: running a DOS program in the background.
- Copying data between DOS and Windows programs.
- Copying data between one DOS program and another.
- Using the mouse to cut and copy inside a DOS program which doesn't support such a function on its own.
- Leaving it to Windows to handle expanded memory for the DOS program concerned.
- Loading certain drivers needed for the program within a single DOS session, and therefore not taking up memory used by other DOS programs.

Unfortunately, running certain types of DOS programs under Windows can also mean problems. But if you're willing to spend a little time making sure everything is OK before you begin, you may well find that Windows is your perfect front-end for DOS applications.

Installing a DOS program

To run DOS programs in the most effective way, Windows needs to use a PIF (Program Information File). This contains information on how much memory the program needs and how it uses system hardware: graphics, communication ports, memory, and so on.

When you start an uninstalled DOS

program, Windows looks for a PIF file with the same filename. If it doesn't find one, it uses the _DEFAULT.PIF file, found in the Windows directory.

If Windows hasn't created a PIF file for your DOS program during the original Windows Setup session, and if the program's distribution disk doesn't supply it, you can create one yourself by editing the DEFAULT.PIF, using the PIF Editor (found in the Main group).

The best method for specifying a PIF file, however, is to leave it to Windows. So, if you didn't install your DOS programs during Setup, or you've added one or more after installing Windows, you can install them by running the Setup program (Main group). When you run Setup, Windows installs the appropriate PIF files, with icons, in the Applications window.

Windows 3.1 comes with a file called APPS.INF (in the System sub-directory) which includes data for creating PIF files for a large number of popular DOS programs. If APPS.INF doesn't have an entry for the program you want, once again you can edit the _DEFAULT.PIF file. You may want to do this if the DOS program doesn't work, or if you want to try improving its performance.

First of all, though, have a look at the DOS program's directory entries on the distribution disk(s) to see if there are any files with a .PIF extension. If there are, install them using the File, New option from the Program Manager (*see screenshots, left*).

Another method of installation is to run File Manager, then drag-and-drop the program's EXE, or preferably the PIF file if there is one, from the File Manager window into the Applications window. However, using this method, you'll get only the default MS-DOS icon and you have to use the Properties option to change it (see the panel, "Personal Icon Preference", below).

Running DOS programs

The basic methods of running any DOS program from Windows are as follows:

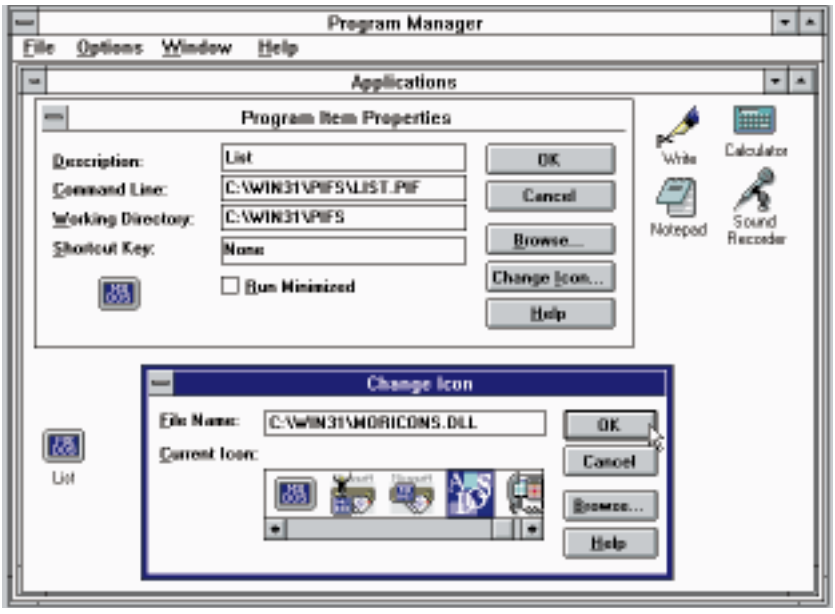
1. From the Program Manager's File menu, select Run and type in the name of the DOS program (with its path) or use the Browse option to identify the program.
2. From the File Manager, double-click on the DOS program.
3. Install the DOS program in the Applications or other Windows group and double-click on its icon.

You can start an application at the same time as starting Windows by dragging the program's icon into the Start Up group

Personal icon preference

When installing a program, if you don't like the icon which Windows provides, click on the provided icon once to highlight it, select Properties from the Program Manager's File menu, and click on the Change Icon button (*see screenshot, below*).

If none of the displayed icons in PROGMAN.EXE satisfy your tastes, there are more in a file called MORICONS.DLL. You can also use icons from any Windows application by supplying its full filename.



p244 ➢

Questions & Answers

Q A while ago I heard about a piece of software for Windows 3.0 which added multimedia. Is it still available? Does it run in Real mode? And where can I get it?

Alex Slack
106431.2710@compuserve.com

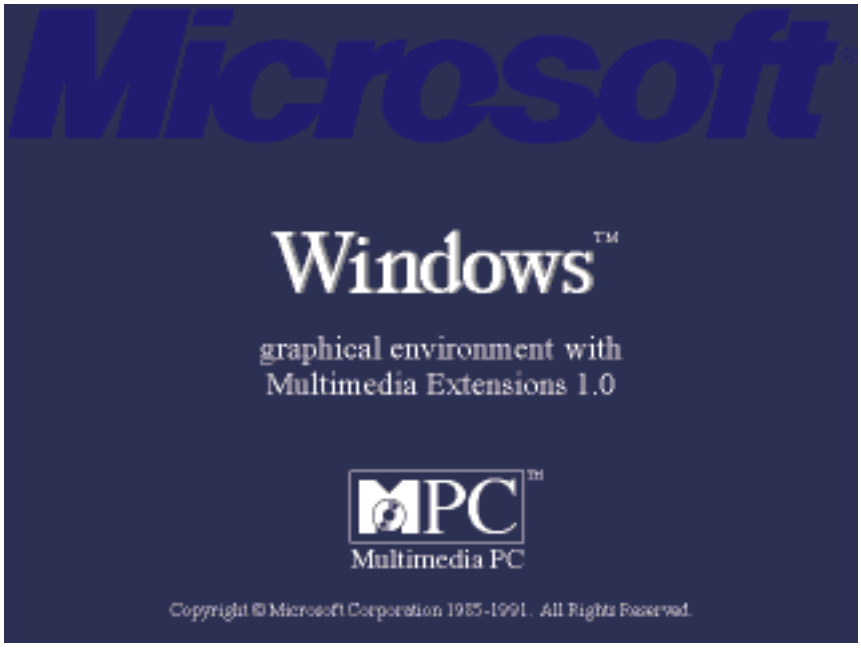
A Still available? Yes and no. The standalone product about which you're asking is Windows with Multimedia Extensions. But it's no longer a current product: it was an in-between release from Windows 3.0 to Windows 3.1.

Multimedia Extensions added multimedia capabilities to Windows 3.0. Most of these capabilities (digital audio, CD audio and MIDI) were incorporated into Windows 3.1 and all later releases. Additional multimedia capabilities such as video playback and audio compression became available later with Video for Windows (the runtime is free and is on our *PCW* CD-ROM).

So the answer is that if you're still running Windows 3.0, upgrade to Windows 3.1 (or 3.11). Otherwise you already have the multimedia extensions.

You don't say why you need to run Windows in Real mode, but Windows 3.1 doesn't run in Real mode, only in Enhanced or Standard Mode. Windows for Workgroups only runs in Enhanced mode.

If you are running Windows 3.0 and have good reason to stay with it, and you do manage to get hold of the multimedia extensions, bear in mind that they, too, run only in Enhanced and Standard mode.



Q In Windows 3.1, I intermittently receive a message telling me that there's an error in WATCOM.386. This usually results in applications struggling, memory-wise, forcing me to reboot. I've searched for any files named WATCOM and for references to this in INI files, but no joy. The error message is a total mystery to me. I would be grateful for your help.

Dan Rodriguez
dan.rodriguez@neuengineering.com

A Watcom is a Canadian company which produces, among other things, a computer language called Watcom C/C++ which can be used to write Windows applications, drivers and so on. One of the programs or drivers you're using has been written in this language.

Files with the extension .386 are likely to be listed in the [386enh] section of your SYSTEM.INI file. The relevant line would read something like

```
device=watcom.386
```

There may be a comment above this line describing which one of your applications has placed it there. Otherwise, if the line does read "device=" and not "display=", you can temporarily disable it by changing it to

```
; device=watcom.386
```

(in other words, by adding a semi-colon).

You may then find that some programs won't run, but doing it should at least guide you to the application responsible for the problem and perhaps you can re-install it. It's also possible that the line may be a left over from some old program you've deleted, in which case leave the line disabled. ■

window (Windows 3.1 only). Alternatively, you can place the program's EXE or BAT file, together with any switches it may require, after the command WIN at the DOS prompt (or in your AUTOEXEC.BAT file). Thus, WIN WS will automatically start WordStar after Windows has loaded.

Windowed or full screen?

There are advantages and disadvantages associated with running DOS programs in a window. For instance, they run more slowly than under DOS alone and can be clumsy to handle because they use graphics screens rather than their original text screens. But running them in windows means you can view more than one program at a time and have access to copy-and-paste operations between them.

To have a DOS program running in a window each time you start it, you need to create a PIF file with the Windowed option enabled. You also need to set the Display options appropriately in the Advanced settings of the PIF file.

You can switch between window and full-screen by pressing ALT + Enter, or in some cases by using the DOS program's Control menu to change the settings.

With DOS applications which behave unpredictably in a window, we've found that it's best to use full-screen mode as the permanent setting in the PIF file, then ALT+ Enter to switch to windowed use when you need to copy data.

Next month, we will explain how to create and optimise PIF files, and how to set up the mouse for use with DOS programs.

PCW Contacts

If you have any queries or Win3.1-related topics to discuss, contact **Panicos Georghiades** and **Gabriel Jacobs** at win3@pcw.co.uk

Consolidate the **positive**

Where can you get decent disk defragmentation when you need it? Windows NT 5 will include a cut-down version of Executive Software's Diskeeper. Andrew Ward reports.

In the good old days of the DEC PDP-8, the disk defragmentation program was supplied with the operating system and just worked. Now, over 20 years later, we face a situation where an operating system sorely in need of disk defragmentation software doesn't include one. And of the third-party utilities available, none do a particularly good job. In fact, Windows NT 5 will include a cut-down version of Executive Software's Diskeeper that won't allow scheduled operation but which can be used manually.

A new version of Diskeeper is available that will now consolidate NTFS directories, something that was previously considered impossible. I spotted Diskeeper 3.0 at Comdex last year and obtained a copy from the UK distributor (*see* "PCW Contacts", *p256*) to give it a whirl.

Directory consolidation can only be carried out at boot-time and this may seem like a serious disadvantage, especially for a server. However, you'll need to carry out directory consolidation very rarely: once initially, but thereafter only if a major application has been installed or removed (circumstances in which a reboot is often necessary anyway).

I tried the directory consolidation feature on a messy 2Gb hard drive with around 1,000 directories and it took almost 15 minutes to consolidate the directories into one block. The only directories that Diskeeper cannot move, because Windows

Fig 1 **Diskeeper 3.0 allows directory consolidation**

NT expects them to be in specific physical locations, are the recycle bins.

To carry out directory consolidation, you have to run Diskeeper to set directory consolidation for each partition you want defragmented and then reboot manually (it doesn't pop up one of those "reboot now" dialog boxes). Ideally, you should defragment your hard drive before carrying out directory consolidation so that Diskeeper is assured of a reasonable contiguous block of free space.

Note that directory consolidation *per se* doesn't achieve much, but what it does do is remove all those directory files that are scattered around the disk, inhibiting effective free space and file consolidation.

The UK end-user pricing for Diskeeper for Windows NT Server is £265 and for Windows NT Workstation is £50.

I still think that the philosophy behind the PerfectDisk method of defragmentation, whereby the files are sorted into most- and least-recently used, makes the most sense as an overall defragmentation policy. Having used Diskeeper 3.0 to consolidate the directories, I run PerfectDisk for normal disk defragmentation.

Other Diskeeper 3.0 changes which network administrators will appreciate are:

- the server version can now be installed on workstations;
- there are greatly enhanced scheduling capabilities and logging options have been expanded; and
- files defragmented, number of fragments eliminated, and disk, file, pagefile, directory and MFT information can all be logged if required.

Just one word of warning if you're running a Windows NT 5 Beta: Diskeeper won't install on NT 5.

Speeding things up

Now a few tips from Keith Sullivan. The first of these relates to speeding up Windows NT disk accessing, and helping to preserve the defragmented condition of your main drive, by moving temporary files to a different physical hard disk. He explains how you can also move the printer spooling directory from %systemroot%\Spool\Printers to point to the partition you use for temporary files. Find the registry value DefaultSpoolDirectory in

```
HKEY_LOCAL_MACHINE\SYSTEM\
CurrentControlSet\Control\Print\
Printers
```

and change it to point to C:\SPOOL or wherever your temporary partition is.

Keith points out that it's also possible to move the Windows NT Application, Security and System logs by finding the keys (in Listing 1) and changing the File values.

Listing 1 Find the keys and change the values

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\EventLog\Application
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\EventLog\Security
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\EventLog\System
```

p255 ➢

On the related subject of moving the Internet Explorer cache directory (see my December '97column), Mike Davies has pointed out that yes, you do get a "move" button in the release version of Internet Explorer 4 which in theory ought to allow you to move the directory. It's in View/Internet Options/General/Temporary Internet Files/Settings. However, Mike says it still doesn't work and that you have to attack the registry because there is a key which uses the user variable to reconstruct the directory name and rewrite the static keys, putting everything back how it was each time IE4 loads.

Fig 3 A new control panel applet is installed by the DNS server

Faster web browsing

Keith Sullivan has another speed-up suggestion, this time to improve the speed of web browsing when using Windows NT Workstation. What he does is to run a DNS server on his system configured as a "cacheing-only" server. Hence, any DNS addresses are cached locally, and future lookups then take place on your own local server rather than across the phone lines to your ISP.

I've tried it myself and web browsing certainly seems faster. Primarily, you no longer have the "finding site www.domain.com" delay on second and subsequent visits to a web address. I used the BIND freeware port to Windows NT, available from www.software.com/prod/bindnt/bindnt.html.

The install program is extremely effective: a graphical Setup wizard takes you step by step through the process and configures all the necessary files and directories. A sensible choice of installation directory would be:

```
%systemroot%\named
```

When given a list of server types, select Cacheing-Only Server. There are then a few fiddles you'll have to do, to make the DNS server query your ISP's DNS server and to change your own system to use the new DNS server.

In the Control Panel, select the Networks applet, then TCP/IP, Properties and DNS. Make a note of the DNS servers (these should be the ones belonging to your ISP), remove and replace them with your own IP address (or rather, 127.0.0.1). Then you can manually edit the boot file (found at %systemroot%\NAMED.BOOT) as shown in Fig 2, using the appropriate addresses for your ISP's DNS servers, of course, instead of the IP addresses shown.

Also, find and edit

```
%systemroot%\RESOLV.CONF
```

to remove the following line:

```
domain yourdomain.co.uk
```

Then run the Control Panel applet to stop and restart the service so that it will use the new configuration files. Of course, the penalty you pay is that the DNS server will use some memory. On my system, the process "named" takes up 1,080Kb, according to the Task Manager.

BIND includes a new control panel applet, DNS Server (Fig 3). You'll also see a new service within Control Panel/Services, called DomainNameService. The options to dump statistics and the database not only save a file but take you straight into Notepad in order to view the file.

Remember that the DNS cache is stored in memory so each time you restart the system you're back to square one, and the first access to www.microsoft.com or wherever will result in a "finding site…" delay. And the reason for using the freeware BIND rather than the Microsoft DNS server is, of course, because the Microsoft

p256 ➢

Fig 2 Editing the boot file

Changes necessary to the DNS server NAMED.BOOT file

```
; make this a slave to the ISP's DNS servers

options         forward-only

; list some forwarders

forwarders
194.72.6.57 194.74.254.2
```

software is only supplied with, and suitable for use with, Windows NT Server.

Matrox misery

As I have pointed out before, new Matrox video drivers can often cause as many problems as they solve. Linda Davies has reported trying version 3.25 and subsequently finding that the system ran very slowly, so she had to uninstall it.

Keith Sullivan also had to uninstall version 3.25, because he found that Windows NT Explorer would spontaneously shut down whenever he attempted to access the Start menu or a Control Panel menu on his Mijenix PowerDesk Toolbar.

Be warned: treat any new hardware driver with caution, and certainly test it thoroughly before installing it on a production machine.

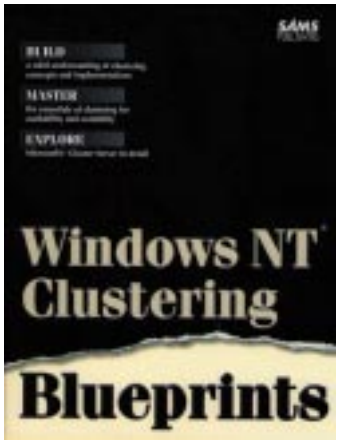
Accent on accents — again

Keith Lomax has pointed out that you do not need additional software in order to compose accented characters under Windows NT, as long as you have a US keyboard.

What you can do instead is to define the keyboard layout as US-International, under Control Panel/Regional/Settings/Input Locale/Properties. Then, any special character can be composed by simply typing the appropriate keys in order: thus, "^ " followed by "e" for "ê". If you ever really do want to type "^e" you would have to hit the space bar between the two characters. Thanks for that, Keith.

By the way, Keith observes that he does not mind having to use a US keyboard because he avoids the £ sign for pounds in any case. He points out that it can be confused with the symbol for the Italian Lira, which could be a very expensive mistake!

Book review — *Windows NT Clustering Blueprints*



Unfortunately, this book went to press before the final version of Windows NT Cluster Server. There are thus some references to features of the beta software which contain some degree of uncertainty over whether these actually made it to release.

A very useful background section on the principles and technologies of clustering is clearly explained and well illustrated. Both shared-disk and shared-nothing clustering techniques are explored, with various possible topologies evaluated. And you get an overview of clustering technologies other than Microsoft's, so it is possible to make an informed judgement as to which is the most appropriate for your requirements.

Perhaps the most important is Chapter 13, which looks at various applications and how the use of clustering technology may, or may not, impart competitive advantage to a business. Clearly, there is no point in clustering "for the sake of it", yet far too many books on technical subjects ignore the salient point of whether or not there is actually a business case for using it in the first place.

Other useful features include a look at the different network technologies (although you'll have to dip about a bit: SCI and ServerNet, for example, are covered in the introductory chapters rather than alongside alternative hardware) and how to design a cluster-friendly network and a network-friendly cluster. Overall, for anyone interested in clustering, this is a good buy.

Author Mark A Sportack **Price** £26.95 **ISBN** 0672311356
Publisher SAMS **Contact** Computer Manuals (see "PCW Contacts")

Cleaning up the registry

There is still a lot of software which does not uninstall itself properly or does not come with an uninstall program. As a result, the HKEY_CLASSES_ROOT tree of your registry can be left filled with a lot of rubbish. There is a Microsoft registry cleaner, regclean, but that stopped working under Windows NT 4 with the advent of Service Pack 3.

An alternative is a utility (Fig 4) written by Keith Young called Regzap*. This looks through the HKEY_CLASSES_ROOT tree and identifies all those entries which appear to be invalid, and then allows you to delete them. Most obviously it will spot references, for instance, to files that are simply no longer there. However, there could be other reasons, so do use this tool with care. For example, a reference to a non-existent file could simply be because the drive is not currently accessible — maybe it is software that you run from CD? — so do not automatically assume that it is safe to delete entries listed. Another point is that you will need to use it recursively. For example, the first time you run it there may be typelib entries which refer to files that no longer exist. After you have deleted these, there will then be interface entries which refer to those now-defunct typelib entries, so you will need to run Regzap a second time to get rid of those.

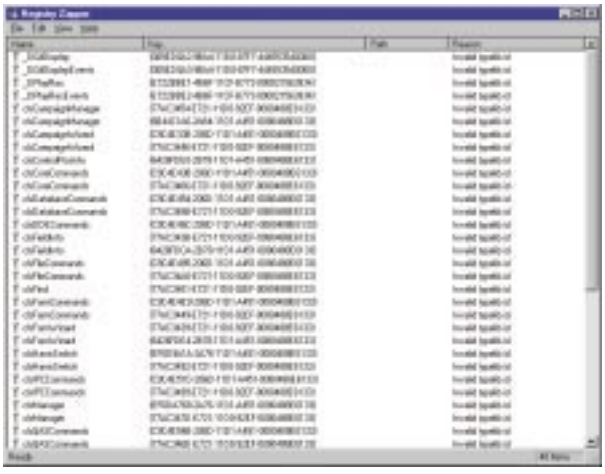


Fig 4 **A handy utility like Regzap will identify and delete spurious registry entries**

*Note: *Regzap, like any registry tool, should be used with caution and only when you have taken a backup copy of your registry. I always delete everything in its list and it has never given me a problem; nevertheless, you use it at your own risk. The author wishes it to be made clear that he accepts no liability whatsoever for its use or abuse. This software is provided as shareware and the author owns the copyright and reserves all rights.*

PCW Contacts

Andrew Ward can be contacted at NT@pcw.co.uk or write to him at the usual *PCW* address (p10).

Computer Manuals 0121 706 6000; www.compman.co.uk
Diskeeper 3.0 from your local reseller or Executive Software 01342 327477. Free 30-day trial copies of both the server and workstation versions are available for download at www.execsoft.co.uk

Fast track

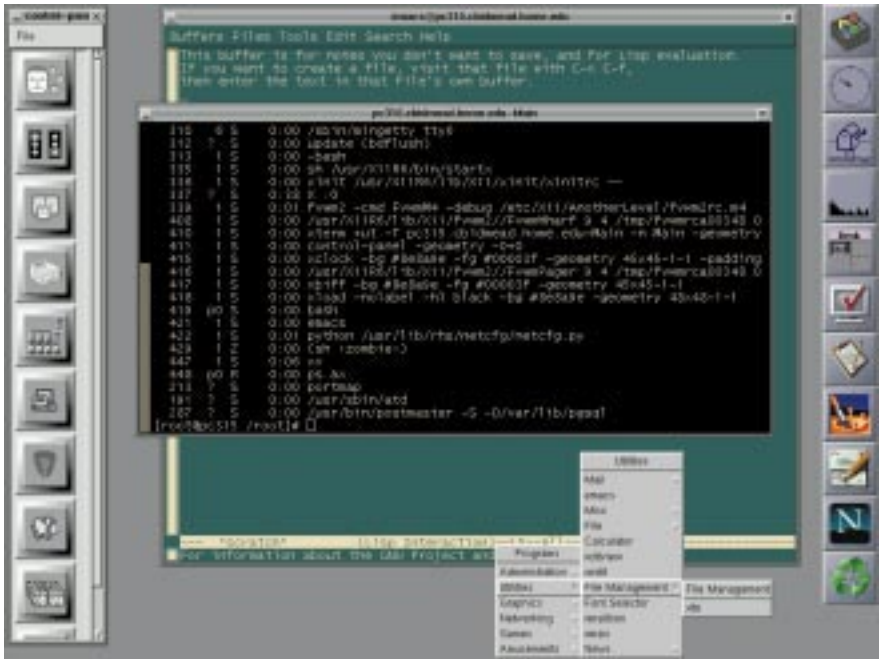
Chris Bidmead plucks a FreeBSD installation out of thin air — actually, from the internet, and it's so easy. But it would not have been possible without his new, fast Zyxel ISDN router.

I think it was Elgar who, when asked about the source of his inspiration, said: "Ideas are everywhere — you take as many as you need." I thought about Elgar the other day when I was conjuring up a complete Unix installation from thin air. With a fast internet link you don't need a CD-ROM drive to acquire a new operating system. Both FreeBSD and Debian distributions are designed to be easily installed directly from their respective web sites. It took me about an hour to get up and running with the stuff from www.freebsd.org.

You start by downloading a single small file, a disk image from which you create a boot diskette. This diskette contains an ultra-small version of FreeBSD including the TCP/IP software you need to connect you to the site again after a reboot.

I used this diskette to bootup a newcomer to my network, a 200MHz Pentium Pro server, the IBM PC315. This handsome brute (the most powerful I have here) came with a pair of 2Gb SCSI hard disk drives which I thought might pose a problem for the FreeBSD installation. But no; the boot software asked me a few necessary questions to establish the network credentials of my machine and then connected me to the FreeBSD site.

The remote site behaved like a CD-ROM drive from this point on, feeding the rest of the operating system and associated utilities and applications onto my allocated disk partition. It was as easy as that —



Linux is getting too easy. This is one manifestation of the Official RedHat version 5.0, which installs out of the box to give you the choice of a Mosaic look, a Win95-ish look, or this AfterStep desktop, inspired by NeXT

nothing to write about! (Remember the days when I had to spend an entire column telling you about an installation?). Congratulations to the team who put FreeBSD together; getting it up and running could hardly have been simpler.

By the way, I wrote those FreeBSD notes and much else of this column on one of those little PalmPilot PDA thingummies. So next month I'll not only be telling you more about FreeBSD, but also about how you can dispense with the Windows software supplied with this popular shirt-pocket PDA and connect the Palm Pilot directly into Unix.

Everything connects

I don't think I would have embarked on the FreeBSD installation without the fast internet connection provided by my Zyxel ISDN router. Last month, I promised to tell you about the few simple tweaks you need to connect each and every machine through it to the internet, once you have set up a router on your network.

For name resolution I use local hosts tables on my local area network rather than a local DNS (Domain Name System) server, because I find it easy to understand and it doesn't leave me dependent on any one particular machine. Name resolution is what you do when you convert a human-understandable address like www.infoseek.com into its dotted quad equivalent (in this case 204.162.96.34).

/etc/hosts is just a table of readable names against dotted quad names, but of course my hosts tables don't comprise every address on the internet, just the half dozen machines I'm running locally. So when I go on to the internet I need another way of resolving addresses. For this I use a DNS server "out there", targetting one suggested by my Internet Service Provider. Actually, it's more enlightening to look at this the other way round, and say, "When one of my machines is asked to access an address it can't find in its local "/etc/hosts" table, it resorts to DNS. The DNS server just happens to be "out there".

Under Linux, the instruction to use /etc/hosts as the first resort is set up in a second file called /etc/host.conf by a line

Windows 95 under Linux?

Derek McKee at dmckee@cix.compulink.co.uk says that he thought it was a wind-up when he stumbled upon it, but on checking it out, yes, www.world.std.com/~bochs really does seem to be a kosher effort. It describes itself as "a portable x86 PC emulation software package that emulates enough of the x86 CPU, related AT hardware and BIOS to run DOS, Windows 95, Minix 2.0 and other OSs, all on your workstation."
I haven't had time to install it here, but I'd certainly welcome reports from readers who get it running.

p260 ➢

which says something like

```
"order hosts,bind"
```

" bind" being a synonym for DNS. If you're not familiar with /etc/hosts and /etc/host.conf, take a look at them. They're text files, they won't bite, and with a bit of luck your distributor will have included some explanatory comments in there.

A third file called /etc/resolv.conf supplies the dotted quad address of the nameserver by including a line like

```
"nameserver 142.186.1.60"
```

You can optionally add up to two other nameserver addresses as failovers.These nameservers are on the far side of my router so, to access them, the system needs to kick the router into action. But how does the system know how to find the router? The information is stored in the routing table. This isn't an ASCII file but you'll see it if you type the command "route", or alternatively "netstat -r". It gets into the table during bootup time, when your init scripts set up the network parameters. Exactly how this happens varies from Unix to Unix or, in the case of Linux, from distribution to distribution. With RedHat, for example, information about the gateway that you're asked to supply at installation time is saved in /etc/sysconfig/network.

So there are four things you need to do: set up local addresses in /etc/hosts; make sure /etc/host.conf contains the instructions to visit hosts before it attempts DNS; put the dotted quad addresses of up to three external nameservers into /etc/resolv.conf; make sure the default route knows the way to the ISDN router.

This same process also applies in principle to setting up Win95 and Windows NT, although with these operating systems you're mostly messing with dialog boxes rather than editing text files. Unices tend to vary the names of the key configuration files (just to keep you guessing): for instance, under AIX, what Linux calls /etc/host.conf is called /etc/netsvc.conf and requires the line hosts=local,bind. Apart from the fact that it took me an entire afternoon to unearth that last bit of information about AIX, this strikes me as much simpler than having to do a whole bunch of different PPP setups on each of my machines. Yes, I've definitely become a router fan.

The ls command goes bananas

I thought my ls command had gone bananas this morning. I simply wanted a listing of all the .jpg files in my home directory. I typed ls *.jpg and got this:

```
ls: illegal option -- o Try `ls -
help' for more information.
```

…"Illegal option -- o"? I hadn't typed an "o".

ls - help was less than helpful. It confirmed there is no - o option to ls. But I knew that. Old Unix hands will guess immediately what was happening but if you come from a DOS background, like me, you'll start suspecting sinister corruption in the ls command. Why else would it be messing up the wildcard expansion?

But wait a minute... That's a classic mind-trap. The ls command doesn't expand wildcards. Neither does mv or any other command. What happens (it's called "globbing") is that the shell handles the expansion and passes the expanded names to ls. When you type:

```
[ls550 bidmead]$ls *.jpg
```

"ls" never gets to see the *. instead it gets passed all the full filenames the shell can find which match the pattern. What happens if one of those files is called -o.jpg? Filenames that begin with a dash are very bad news so let's fix that with:

```
[ls550 bidmead]$mv -o.jpg _o.jpg
```

Now mv thinks I'm trying to pass it a -o switch!

There are a number of arcane ways of dealing with this. The simplest trick is to tack the name of the current directory onto the filename. For example, once I realised what was happening,

```
[ls550 bidmead]$ls ./*.jpg
```

happily delivered a full list of filenames. And you can even do

```
[ls550 bidmead]$ls ./-*.jpg
```

to view the offenders. And the same trick with mv can be used to rename them individually. Alas, you can't get them all out of the way at one stroke with

```
[ls550 bidmead]$mv ./-*.jpg _*.jpg
```

because mv doesn't handle multiple filenames as targets. Instead, I used the rename script contributed to this column by Dr Rich Artym <rartym@galacta.demon.co.uk> back in November '96.

This indispensable utility handles multiple files, changing <string1> to <string2> in all the files that match <pattern>. There is not enough space to reprint it here, but if you want a copy, drop me an email.

Questions & Answers

Q: *I enjoy reading your column, Chris, but I'll have to stick to the theory, I'm afraid. You see, I need Windows 95 and I don't have a spare machine on which to install another operating system…*

A: When you say you need Windows 95…

Q: *…For my word processing, spreadsheets, web browsing, games and so forth.*

A: You think other operating systems don't have word processors, spreadsheets, browsers, and games…?

Q: *…I need to stay compatible.*

A: That's what I thought about three years ago. When I switched to Unix for my main workstation, I was astonished at how I'd been conned.

Q: *Windows is a con?*

A: Well, that's putting it too strongly. Windows is cheap, ubiquitous, useful… But the surprising thing is that it turns out not to be essential at all. Years ago I was once in a play by Berthold Brecht called "The Caucasian Chalk Circle". The name was taken from a trick which peasants played on chickens. You draw a chalk circle on the ground around the chicken and hypnotise the chicken into thinking it can't step outside the circle. Now why does that remind me of Windows? No, I don't think there's anything I need to do that I can't do under Unix. In fact, using Wabi, I can even run Windows if I want. Not that I particularly do.

Q: *Are you seriously suggesting I format my hard disk and install something like Linux?*

A: It would solve those GPF problems. :-) But no, you don't have to do all that. You can happily dual boot between Windows 95 and Linux — and even set it up so that Linux can read the files on your Windows 95 partition. You'll find plenty of information to help you with this at www.linux.org/help: you might start with the Win95+Win+Linux mini-HOWTO that you'll find there.

PCW Contact

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Java favours Warp

The Warp client has the best Java support of any desktop OS, and as applets filter through to the mainstream, the benefits will become increasingly important, writes Terence Green.

Readers continue to remind me that I write too much about Warp Server. What can I say? Like it or not, this is one of the main drivers of new developments from which the Warp desktop also benefits.

Since IBM's Warp development programme for 1997 was aimed at enhancing Server's ability to support both past and present networking configurations, there was more visible activity on the server side. But the Warp client also benefits because the same Warp kernel underpins both client and server.

An example is Warp's native support for Java applets which closely tracks the developing Java specification. A lot of the work on developing Java is prompted by the needs of very large companies such as banks and financial institutions, because it enables them to respond more quickly to changing needs without having to alter their existing operating system platforms.

Recently, while in conversation with an IT manager at the Woolwich Building Society, I learned that it is upgrading thousands of OS/2 systems to Warp precisely because the Java support enables the Woolwich to keep its options open.

The Warp client now has the best Java support of any desktop OS, a result of pressure from large customers like the Woolwich for IBM to drive Warp Server developments. It may not seem important to desktop users at present, but Java applets are beginning to filter into the mainstream, so I expect a lot more to appear this year and the benefits will become more obvious.

For a start, the old complaint of "no native applications" will lose relevance as

Before you buy a PC, visit the OS/2 Device Drive Pak Online to see which hardware vendors support Warp

Java applications such as Netscape's Java-based Navigator, and AOL's Instant Messenger for Java, become mainstream. Java applications are well suited to web situations because they can be updated easily and frequently, so expect to see lots more in 1998.

SmartSuite for Warp 4

Despite the push to Java, IBM in the form of its Lotus subsidiary is about to release a native OS/2 office suite. There's an enormously long history to this project which I won't go into again except to say it has been promised since 1994.

Lotus posted Beta 1 and Beta 2 of Lotus SmartSuite for Warp 4 at the end of 1997, with a final release aimed at early this year. As the name suggests, it will require Warp 4. I've been playing with the betas and they're quite impressive.

Reader John Lewis will be pleased. He is still happily using Ami Pro OS/2 but is interested in swapping to WordPro when it eventually becomes available and the bugs have been sorted. Lotus SmartSuite for Warp 4 is a native OS/2 office suite that is built from the same code base as Windows 95/NT SmartSuite 97, and it's therefore broadly similar in feature and function.

Hardware support

Reader, Adrian Ratcliffe, will also be pleased

The Windows 95 porting project is a public domain effort aimed at helping Windows 95 software publishers provide Warp equivalents

to hear about SmartSuite for Warp. He currently uses SmartSuite for Windows 95 but is looking to trade up, partly because he finds Windows 95 user unfriendly. Adrian tried to buy a computer with OS/2 already loaded but found it next to impossible. Well, it may not be obvious, but OS/2-supporting hardware *is* out there.

Most of the major manufacturers support OS/2, even though for marketing reasons they may not make a lot of noise about it. Since IBM plans to drop the OS/2 name this year to lose the negative image and capitalise on OS/2's network computing advantage, the reluctance of companies such as Hewlett-Packard, Compaq, Toshiba and Dell to make a fuss about their OS/2 support is no surprise.

Nevertheless, many big companies use Warp: the Royal Bank of Scotland is currently rolling out 7,000 OS/2 workstations and it needs hardware that supports Warp, so no major PC vendor can afford to ignore it entirely.

Not a lot of people know that

The best place to find out who supports Warp is at IBM's online OS/2 Device Driver repository at service.software.ibm.com/os2ddpak/. You can also find the latest drivers for all kinds of hardware devices that you never knew Warp supported.

Several people have asked whether Warp runs Windows 95 applications. It doesn't. There's a public domain effort underway to develop a Win32-to-Warp converter <www.io.com/~timur/win32os2.html> but many Warp users believe that Win32 apps are best run on Win32 operating systems and don't want to see Warp hampered by an unnecessary Win32 emulator.

Warp does, however, have the ability to run Win32s applications. These are hybrid 32-bit applications designed for Windows 3.1 users. There are some limitations. WIN-OS/2 in OS/2 Warp supports Win32s versions 1.15, 1.20, 1.25 and 1.25a. After IBM delivered Win32s support for OS/2, Microsoft came out with version 1.30. Applications that require Win32s version 1.30 won't run on OS/2.

Of the Win32s applications that IBM has tested, Adobe Photoshop, EndNote2 Plus and PSPICE require Win32s 1.30 and will not run. Other Win32s applications may ship with Win32s 1.30 but should work with version 1.25 which can be obtained from the Hobbes archive at hobbes.nmsu.edu/pub/windows/w32s125.zip. Extract the contents of W32S125.ZIP, read the README and install the file W32SPACK.EXE.

Then, in the WIN-OS/2 session that runs your Win32s application, change the DOS settings for DOS_FILES to 255. If you see a message saying that the Win32s application has run out of memory, decrease the DPMI_MEMORY_LIMIT in DOS settings. To run Visual FoxPro, set DPMI_MEMORY_LIMIT to 16in DOS settings.

You can get more advice by visiting IBM's online Warp pages and searching for "Win32s", or just use the Search facility at www.ibm.com to lead you there. Warp pages have been updated a lot recently and there's a wealth of technical information to help solve Warp problems.

PCW Contact

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Euro-file

Tim Nott has good news: with the latest download from Microsoft, you can now use the euro currency symbol in the Tahoma font. You may have to play 'find the euro', though.

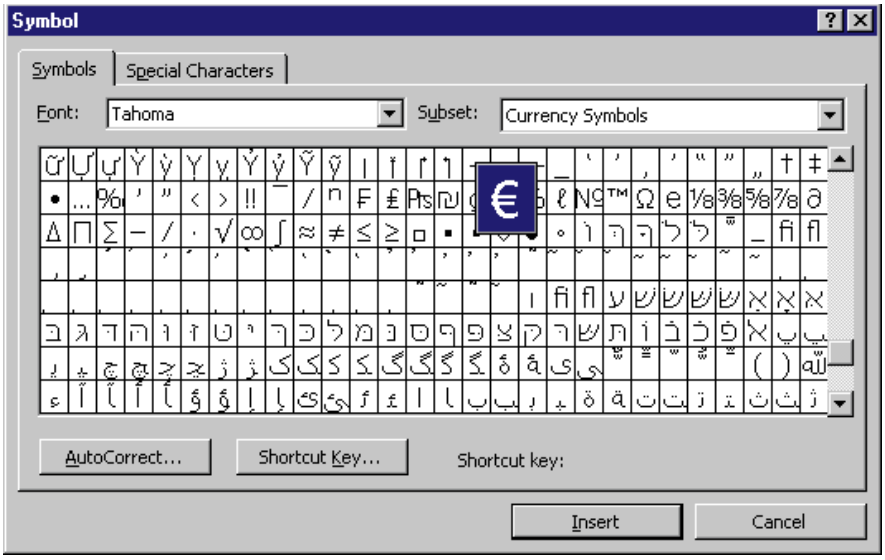
Thank you to all who replied to the uncontrollable scrolling problem in Word 6, 7 and 97, when selecting text which goes beyond that currently visible (*PCW*, Jan).

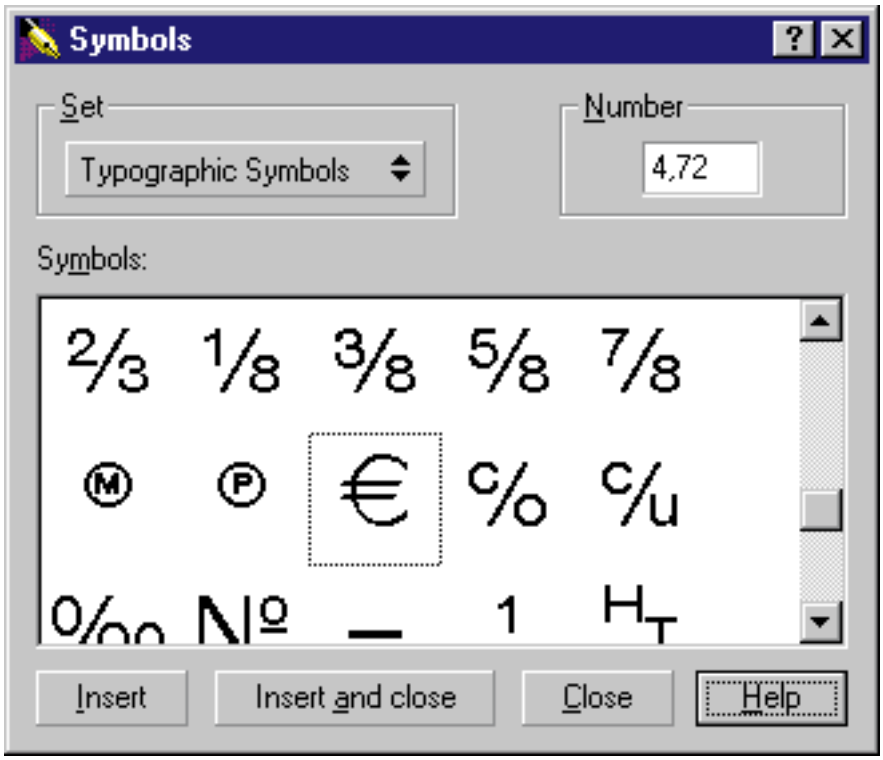
Andrew Turner, Chris Bird and David Kelsey all stated that the solution lies in careful control of the mouse. To quote the former: "If you take the mouse just as far as the bottom scroll bar (and not to the foot of the screen) the scrolling is far, far slower." Well, it doesn't work for me in Word, guys, but it does in Excel.

The favourite solution (thank you, Peter Gittoes, Jeremy Ensor, Adrian Bailey, Les Kneeling, Thibaud Taudin-Chabot and any others I may have overlooked) is to click once at the start of the selection, scroll by using the scroll bar or keyboard, then Shift and click again. Les went as far as to describe this as "the right tool for the job". Sorry Les, I disagree — it's a kludge for a bug. Dragging and scrolling works fine in WordPad, WordPro and (just) in WordPerfect. It should also do so in Word, yet it doesn't.

Extracting the euro

Good news for us Europeans: Microsoft has released versions of the Tahoma font which include the euro currency symbol. You can download it from the Microsoft ftp site. Point your browser at ftp.microsoft.com/softlib/mslfiles/tahoma.exe. If this draws a blank, try searching the index text file at ftp.microsoft.com/softlib/index.txt.





Top, right Word gets euro-aware with a free font from Microsoft…
Right …and for those watching in WordPerfect

Questions & Answers

Q I am writing an instruction manual using Word 7. All the steps need to be numbered, so I use the List Number style for the instructions. This is OK if I don't have any breaks in the list, but often I want to comment on an instruction, having issued it, in a separate unnumbered paragraph. The List Continue style is just right for that, but then I lose the numbering of the list when I return to the List Number style.

I've tried several things. Pressing Shift+Enter at the end of the instruction, instead of Enter, doesn't start a new number and neither does it give any space between paragraphs. If I use the List Number style for the next instruction but change the Start At setting, I have to go through two dialogs. I could define styles List No 2, List No 3… starting at the appropriate number, but there must a better way.

Brendan Breen

A This is one of those rare occasions when styles are not the best answer. The neatest way around the problem I can find is to use the numbering button on the formatting toolbar instead (Fig 1).

Type the whole thing with numbering turned on, then go back to each paragraph you don't want numbered and turn it off again. The subsequent paragraphs will re-number themselves to suit. I find that in Word 97 (but not in 7) this also loses the indent, but that may be some peculiarity of my setup. In any case, since the indent button is also on the formatting toolbar, it's no great hassle to reapply this.

Q For some reason, Word insists on pushing the bottom border off the printable area of the page. The bottom border appears as expected when I'm in page view, but does not show up on the print preview. I'm told of the problem by a friendly dialog box when I go to print. It doesn't seem to matter which printer I try to use: the problem is the same with both an HP DeskJet 510 and a Canon BJC-600. I don't have this problem at work, though. The only relevant differences, as far as I can tell, are that at work I use NT 4.0, not Win95, and the printer is a LaserJet.

Kevin Parsons

A I must confess that I'd missed the exciting new possibilities of page borders in Word 97. Back in Word 7 you had to draw them with the rectangle tool, which is probably why I've never bothered. But having taken a trip to Format, Borders and Shading, Page Border, it's really all rather exciting, especially with all those jolly little hearts, flowers and other ornaments available from the Art list.

However, I get exactly the same problem with a DeskJet 870cxi. The friendly dialog is quite right, since the DeskJet can't use the bottom 12.7mm of the page. Presumably, Kevin's HP and Canon printers have a similar limitation, whereas the LaserJet doesn't.

If you hit the Options button in the Page Borders dialog you'll see that you can increase the distance from each edge of the page, individually. But this only goes up to 31 points (Fig 2). Why this should be so , and why in points anyway, beats me, and since 31 points equals 11mm, this is still too little. The answer is to select Text from the Measure From box. Then your borders will be measured outwards from the margin settings in Page Setup and you'll additionally get the choice of enclosing or excluding headers and footers. Astute readers will note that this means there's a "no go" area for borders if your margins are greater than 22mm, as the 31-point limit still applies. But that's the wacky world of Word for you.

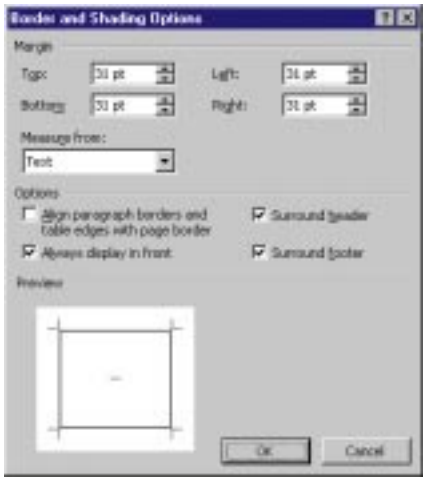


Fig 2 Borders, and how to keep them on the page *(see left)*

Q I have built up 2,000 WordPerfect secondary merge files over the years in DOS 5.1, then Windows 6.1 and now 7. All files are unique and stored in one directory, and have an identical number of alphanumeric fields. I wish to find a macro to automate the sequential opening of each file, export the data into a new file (or a spreadsheet), close the file, open the next and repeat. If all files were in 5.1 format, I might possibly manage with a keystroke macro, since this will permit opening the directory and will open *.* files. But version 5.1 will not read version 6 or 7 files. The token macro used in versions 6 and 7 will not allow wild-card opening and requires a specific filename. If I were to try this manually it would take weeks, if not months.

David Graham

A I must confess that I don't have an answer to this. Has anyone found a simple solution to automate the process?

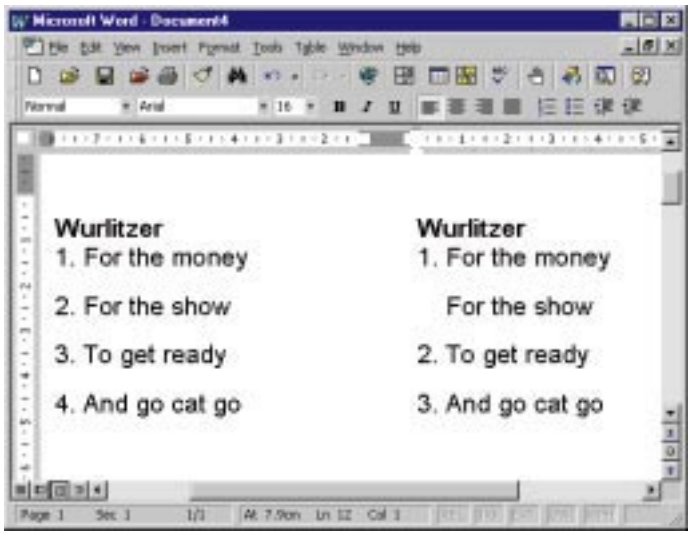


Fig 1 It's all done with buttons *(see above)*

p266 ➢

Having downloaded the file, running it will ask you where you want the files extracted to. Specify a temporary location and you'll get normal and bold font files and a readme. Make sure all MS Office applications are closed (Office uses the Tahoma font in dialogs and menus). Open the Fonts folder and delete the existing Tahoma and Tahoma Bold fonts before installing the replacements.

Now the fun starts, with the "Find the euro" game. No, of course the readme file doesn't tell you where it is. And the Windows Character Map won't find it, because this is a Unicode font and the Character Map only shows the first 256 characters.

You can find it in the Word Insert Symbol dialog, if you look in Currency Symbols for Tahoma. You'll be able to assign it to a key combination. Note that although Tahoma is listed with the Symbol fonts, it works as a standard font and does not exhibit the problem aired in December's column, where changing back to a standard font produces boxes instead of letters.

WordPerfect 8 users will find the euro symbol by entering 4,72 in the Insert Symbol number box. This will only work if the WP Typographic Symbols font is installed, though. Word 97 users have the additional facility of using a macro to access the Tahoma euro (and other Unicode characters) with, for instance, the code shown in Listing 1.

Listing 1: Accessing the Tahoma euro

```
Selection.InsertSymbol Font:="Tahoma", CharacterNumber:=8364, Unicode:=True
```

As far as I can make out, neither WordPerfect nor WordPro supports Unicode characters in macros or symbol insertion. At least, if they do, it's a closely guarded secret, as I can find nothing in the documentation or help files.

Symbolic logic

Having covered various ways of inserting symbols over the past year, you would think there was nothing left to be said. But there is; it works in any word processor and it's called "the screamingly obvious". Eric Marchant, in New Zealand, came up with the following bright idea.

"What I have done is to put all the symbols I use frequently on one document page and called it SYMBOLS.DOC. All that needs to be done then, is to load SYMBOLS.DOC plus the document on which I am working, and simply copy and paste the symbols as required."

Beautifully simple; and if I can add my two pennyworth, how about having two versions of each symbol? A large one to see properly, and a normal-sized one to copy into the text.

Restoration works

Jon White has a rather useful tip for WordPro (and SmartSuite in general). Open the Windows Registry Editor (run Regedit from the Start button), and go to the key

```
HKEY_CURRENT_USER\Software\
Lotus\WordPro\97.0
```

Highlight this folder in the left pane and File/Save the branch. Keep the .REG file produced somewhere safe and you will be able to right-click, then Merge. This will restore all your settings should you have to reinstall WordPro.

Macro virus reprise

Several readers complained that when I wrote "select Macro from the Tools menu" in Word 6 or 7, it wasn't there. Easy, I replied: go to Tools, Customize, turn to the Menus tab, select Tools from the Categories and ToolsMacro from the Commands list, and click the Add button.

Several readers mailed me back to the effect that this would all be very well, except they did not have Customize on the Tools menu. The penny finally dropped when I received this message from Robert Clark: "Recently my macros have started to disappear. Both the Macro and Customize options go from the Tools menu. Macros started from other programs fail to operate… The only way to restore them is to completely remove MS Word and re-install the software. The macros will then work for a day or two but disappear again."

This is our old friend the Word macro virus — or "prank", as Microsoft likes to call it. Any decent commercial or shareware virus checker should be able to get rid of it. Word 7.0a comes with a protection macro and you can find a Word 6.0 version at ftp.microsoft.com/softlib/index.txt.

A perfect headache

In December's column, I mentioned David Fox's problems in using WordPerfect 6 for DOS under Windows 95 where "it does not sit happily". Many thanks to Kyle Lamb, who responded with a lengthy and erudite explanation of the problem. It's too long to reproduce here, but the essence is that WordPerfect 6 hits the hardware directly in all sorts of ways. This conflicts with the pre-emptive multitasking in Windows 95, with the result that the former can crash, taking the latter with it. The answer, Kyle points out, is to use a PIF file set to run WordPerfect in exclusive mode.

WordPro challenge

Here's another challenge, this time for WordPro users. Jon White wants to know if it is possible to change the default indents created by the Infobox buttons to anything other than 1.27cm (or half an inch). After much fiddling about, both he and I have given up. You can create a style with a different indent, but if you then remove and reapply the indent with the buttons, it defaults back to 1.27cm.

Have any clever Lotus users cracked this one? I'd be intrigued to know.

Oddly enough…

■ What's wrong with the following sentence? "*This type of research promises to give us much improved machines, even 'intelligent' machines.*" So wrote Dave Browning.

Word's on-the-fly grammar checker stuck a green squiggle under "much improved" and suggested "much-improved". So Dave concurred and let it change. Back came the green squiggle, suggesting that "much improved" would be better than "much-improved". And so on…

■ Now here's another funny thing. Sunil Rao renamed a Word 97 file from Paper.doc to Paper and received the usual warning: "If you change the extension, the file may become unusable". Except it didn't. Double-clicking on it continues to open it in Word and its properties still show the extra pages.

I've tried this and get the same result, so it looks as if Word files (Excel, too) have some special status. Conspiracy theorists to the fore, please.

PCW Contact

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It's go! for Quattro Pro

Stephen Wells appreciates the new Quattro Pro 8, from Corel; it's great for power users and beginners alike. And, Project 98 is the new project planning software from Microsoft.

Quattro Pro always had a loyal following in the past. Although fully-featured, its drawback was that it was slow. But following a change of ownership, Corel Quattro Pro 8 offers a convincing challenge to Excel 97 and Lotus 1-2-3 97.

When you first open it, Quattro Pro 8 looks remarkably like Excel. Many of the icons in the main toolbar are the same, or similar, to Excel's: the format painter, for instance, is a brush in Excel and a paint roller in Quattro Pro. But then, many of the visual devices of today's Excel, such as the notebook tabs, originated in Quattro Pro.

My personal attitude to new software of any kind is heavily influenced by how intuitive it is. In other words, if I can guess correctly how to get it to do something, I'm happy. Beyond that, I like help files which are well written and properly indexed. With Excel, I often find I have to open Lotus 1-2-3 just to read its more illuminating help file. Quattro Pro passed both these tests easily.

Apart from non-techies, like me, two other groups will appreciate Quattro Pro: raw beginners and power users. The PerfectExpert is an optional, large toolbar at the left of the screen which simplifies each task. Hover the mouse over any button and a longer description of the options is offered. "Work with Data" thus expands to Sort and find Data, plus build complex formulas. Click on that button and you are offered further buttons (Fig 1) which lead to explanatory tips or hand-holding dialog boxes. It's just like working through a fast tutorial for anything you want to do.

It's easy to create your own functions using the Formula Composer (Fig 1). This is a dialog box which provides multiple views of a formula, including an outline pane to examine the structure of the formula and edit parts of it, and trace cell references and cell names; an @function description pane with a brief description of the selected @function; and a pane for entering arguments.

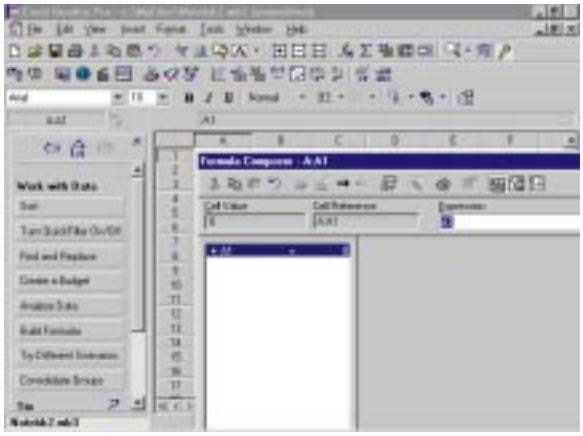

Fig 1 (above) **Two features of Quattro Pro 8: the PerfectExpert buttons (on the left), and the visual tool for creating and editing formulas**

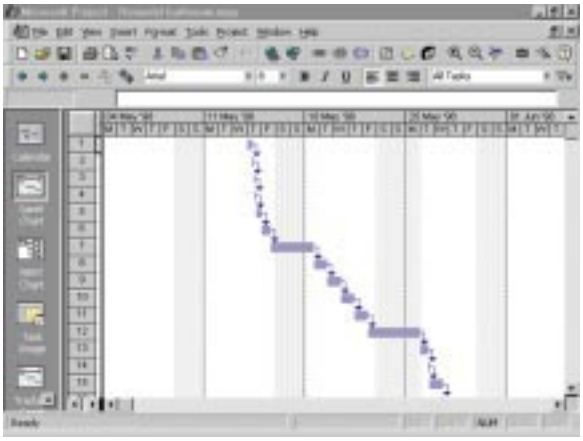

Fig 2 (right) **Transferring information between Microsoft's job management software, Project 98, and Excel is easy**

Beginners, too, are offered a wide choice of templates. The Budget Expert helps you to set up personal and income statements, and there two dozen card file options, from books to wedding lists.

Experienced users will find a choice of two macro languages. One, the Corel Quattro Pro syntax macro, is stored as labels in notebook cells and edited in Corel Quattro Pro. (Macros in earlier versions were only available in this format.) Alternatively, you can write Corel PerfectScript macros that are compatible with the technology available in other Corel applications, like WordPerfect and Corel Presentations. These are easier to learn than VBA, but Quattro Pro won't run VBA applications. You can, however, import Excel versions 3, 5, 7 (Excel 95) and 8 (Excel 97) files.

If you're writing applications, you can also use the Developer Mode: start Quattro Pro with the command line switch /D to gain some properties. You do not have to be in Developer Mode to change or read these property settings, and macro commands can always access them. You can disable right-clicking, the property settings from the Property Bar and the properties key (F12). You can also change the text that displays in the Quattro Pro title bar.

XLS How-to: Quickies

■ ***If I redefine a style, is that for the worksheet or the whole workbook?***
It's available in the whole workbook. You can restore the styles in a workbook (Book 1) by creating a new workbook (Book 2). Choose Windows, Book 1. Then choose Format, Style, Merge, Book 2, OK.

■ ***How can I maintain my headings while the rows scroll underneath?***
With a list that has headings in row 1, click on cell A2 then choose Window, Freeze Panes. With a typical tabular worksheet that has headings in row 1 and labels in column A, click first on cell B2. To undo this, choose Window, Unfreeze Panes.

■ ***In cell C12 I've entered the formula SUM(C1:C11) but the displayed total is for the values in C7 to C11. What's happening?...***
I expect you formatted cells C1 to C6 as text before you entered those numbers. At this point, you cannot change it to number format either; even if you choose Edit, Clear, Formats. You have to specify a number format before entering values, or enter them in the cells which are completely blank. If they start blank, Excel will use the General format and the numbers will total.

■ ***…I have Excel 97. Does that make any difference?***
Well, in that case you can use the flexible Text to Columns Wizard. Select the range C1:C12. Choose Data, Text to Columns, Delimited, Next. Then clear all the check boxes under Delimiters. Click Next, General, Finish. Your Sum function will now show the correct answer.

■ ***I have four worksheets in my workbook. How can I add four more?***
Hold down Shift and click the first and last tab, then choose Insert, Worksheet.

■ ***What's the fastest way of making a copy of a worksheet?***
Hold down CTRL, then with the mouse, drag its tab to left or right.

■ ***What's the fastest way of totalling all values in a list?***
Use the column label. If the column is headed "Winter", enter

```
=SUM(Winter)
```

■ ***How can I check exactly what a Name refers to?***
Choose Insert, Name, Define. In the Names in Workbook list, click the Name. The "Refers To" box displays the reference, formula or constant which the name represents.

■ ***What's the fastest way to jump to the bottom of a list?***
Double-click the bottom border of a cell in the list.

All drawn objects in a chart window gain two properties. "Dimension" lets you move and resize chart objects created with the toolbar in the chart window; and "Name" is used by macro commands, link commands and @functions to read or change property settings.

There are so many leading edge features in Quattro Pro 8 without it being memory hungry and unwieldy, and it is so easy to use, that it deserves to be a bestseller. Unfortunately, so many people acquire their spreadsheets in Office packages, bundled with new machines, that its success is likely to depend on the number of PCs which are available with the Corel suite.

Project 98

Another new package I've tried is Microsoft's project planning software, Project 98 (Fig 2).

■ It is easy to import information from a Microsoft Excel workbook:

1. Choose File, Open, Microsoft Excel Workbooks.
2. In the Look in box, click the drive or folder which contains the file.
3. In the folder list, open the folder which contains the file you need. Double-click the file you want to open.
4. In the Import/Export map dialog box choose from a dozen maps (table formats) for importing. This might be "Cost data by task" or "Top Level Tasks List" or you can define a new map.
5. Click, Open and the data is imported.

■ Exporting information from Project 98 to Excel is just as simple (Fig 3).

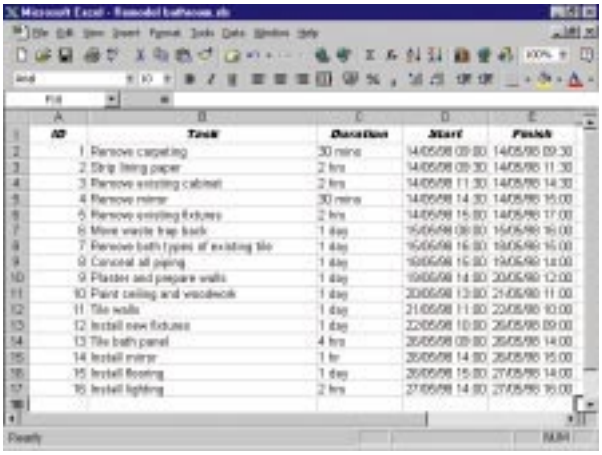

Fig 3 The data in the Gantt chart shown in Fig 2 is formatted automatically when exported to an Excel workbook list or PivotTable

You can define an export map to select which fields you want to export and where in the destination format you want the data. You can also apply an export filter to your project data, as part of your export map.

1. As you define your export map, a preview grid at the foot of a dialog box will display the format of the data as it will appear in the exported format.
2. Then, on the File menu, click Save As. In the Save As type box, choose either Microsoft Excel Workbooks or Microsoft Excel PivotTable.
3. In the File name box, type a name for the exported file. Click Save.
4. In the "Export map to use for exporting" list, click the name of the map you want to use, or you can define a new map or edit an existing one. Click Save.

What tickled me when I tried it is that the Export Wizard formats Excel's columns to show dates, or dates and times in one cell, as needed. You can use any Project 98 import or export map for moving between Project 98 and Excel or Access, or ODBC databases, or translating into the HTML web page language.

Clocking in

Greg Wilson writes: "*Having designed my own flexi spreadsheet, I was interested in the one you published from John Seaden*

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Book review — *Visual Basic 5 Fundamentals Unleashed*

This book is a comprehensive introduction to the latest version of Visual Basic, giving a detailed explanation of all its new features, updates and enhancements. It is a companion to *Visual Basic 5 Development Unleashed* which covers more complex topics of application design. The ten authors of *Visual Basic 5 Fundamentals Unleashed* have each written chapters on their own specialities.

The book is divided into sections: new features, using the new wizards and templates, the code behind the forms, and using controls in programming. A CD-ROM includes the source code for the authors' examples, plus the Control Creation Edition of Visual Basic 5 and other third-party tools for incorporating graphics, creating web pages, and eliminating bugs. However, many of the examples in the book are only supported in the Professional or Enterprise editions of VBA.

The new Integrated Development Environment is comprehensively described, as is the migration wizard for converting forms into ActiveX documents. Previous versions of VBA had a property window: VBA5 offers the more comprehensive property page and there is a wizard for creating it. Another new tool in VBA5 covered here is the repository for saving and retrieving data from your projects. OLE drag-and-drop is also now available to the advanced VBA programmer and five chapters of the book are devoted to this sophisticated operation.

If you have questions about resource files, templates, interfaces, file management, formatting for printing, hooking into the PC's hardware timer, or animation, you'll find the answers here. This book should prove valuable to the VBA5 application developer as a study course or reference work.

Price £27.95 (638 pages + CD-ROM)
Publisher Sams
Distributor Computer Manuals

[*PCW*, Dec '97]. *My spreadsheet does not rely on Excel's TIME functions. This has enabled me to write formulas to calculate rolling credit/debit based on a 37-hour week. The hours and minutes are entered in separate cells. There is a column to record reasons for absence. The rolling credit/debit figure, along with the Period Total, appears at the bottom left of the worksheet.*"

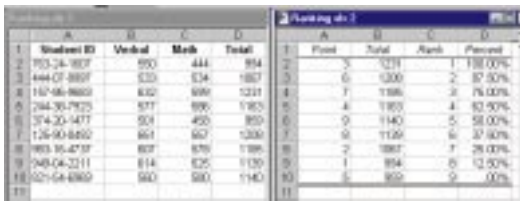

Fig 4 Excel's Rank and Percentile tool will analyse the data on the left and automatically open and create the sheet on the right

I've included Greg's timesheet on this month's cover disc. The file, Flextime.xls, can be opened in Excel 5 and above, and other spreadsheets which import that format. I've included Greg's instructions for use on a second worksheet in the same workbook.

Greg works in the Civil Service for the MoD. They work a 37-hour week, and also have a four-week accounting period on the flexi-system. They are allowed to carry forward a certain amount from one accounting period to the next, and at the end of each period, the timesheet is printed off for checking by their line manager.

In column X, 444 is the total number of minutes in a standard day and is a fifth of 37 hours. This figure of 7hrs 24mins is used as the basis for daily adjustments. The total in column W is reduced by this amount to give the daily variance. In column Z, the cumulative variance is calculated taking into account any flexi-days' leave, and in columns AA and AB this is converted into hours and minutes. I asked Greg whether the sheet could be adjusted for a different-length week and he replied: "*Adjustment is easy. Wherever 444 is encountered in the formulas in columns X and Z, this should be changed to the number of minutes in the new standard day. For example, in a 38-hour week, the number of minutes in a standard day is 456, and for 40 hours it is 480.*"

Greg's contribution earns him a book token.

Rapid ranking

One of the most common needs for simple data analysis is to rank a list. In Excel, go to Tools, Add-Ins and check Analysis ToolPak so that it is available. Assume you have a short list of student exam scores. Row 1 has the labels Student ID, Verbal, Math and Total in columns A through D.

1. Enter the student identification numbers (as text) down column A (the range A2 to A10), some typical scores down columns B and C, and total them in column D.
2. Choose Tools, Data Analysis, Rank and Percentile.
3. In the Input Range box, click the little red arrow to minimise the box and with the mouse choose the range D1 to D10.
4. Click the arrow again to return to the dialog box and choose Columns, Labels in First Row, and New Worksheet Ply, OK.

That's all there is to it. Excel will automatically open a new worksheet and create a new table (Fig 4). The headings in row 1 are Point, Total, Rank and Percent, in columns A through D. Row 2 will show the results of the highest ranking student, with their ranking (1) in C2, their total score in B2, their original position on the list in A2, and 100% in D2. Row 10 will give the equivalent results for the lowest ranking student with 00% in column D.

Headers and footers

Tony Hamilton has an interesting problem: "*I want to find some way of replicating my standard header and footer layout, which includes my (very long) company name, across each of the 30-or-so tabbed sheets in each of a number of worksheets. So far, I have had to type the header (four items in three columns) and footer (delete the default, then add two items) many times over. Is it possible to shortcut this?*"

I suggested that Tony group his worksheets. You do this by holding down Shift and clicking the first and last tab. Or, right-click on a tab and choose Select All Sheets on the Shortcut Menu. Then choose View, Header and Footer and set them up. To ungroup the sheets when you're ready, right-click on a tab and choose Ungroup Sheets on the Shortcut Menu.

Tony replied: "*Excellent solution. Thanks. Seems like one has to go 'mining' in Excel to find all its gold deposits!*"

PCW Contacts

Stephen Wells welcomes problems, solutions or suggestions relating to spreadsheets. Write to him at the usual *PCW* address (p10) or email spreadsheets@pcw.co.uk

Computer Manuals 0121 706 6000
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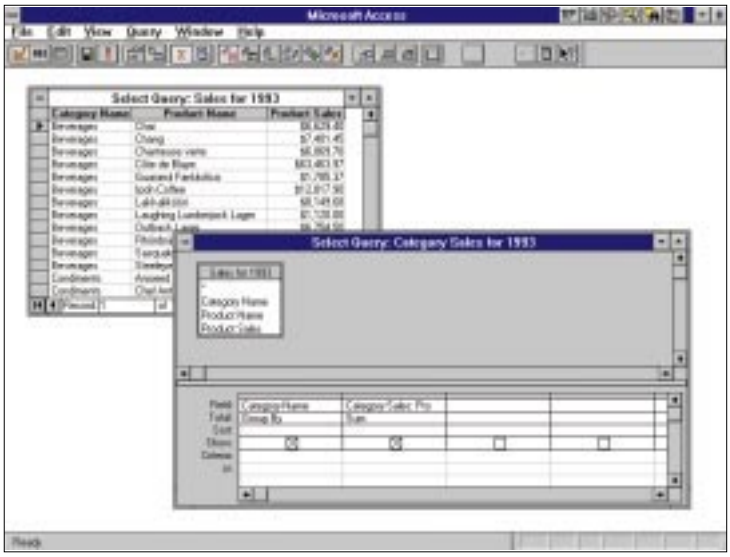
Set to **connect**

Exactly how does a workstation communicate with its server? Mark Whitehorn explains what you need to consider about ODBC connections prior to setting them up.

This month we'll examine the theory behind ODBC connections and next month we'll have a look at actually making some.

An ODBC connection is a mechanism which allows a workstation to communicate with a database server. The Open Database Connectivity (ODBC) standard was developed by Microsoft and is based on the Call Level Interface specification of the SQL Access Group. (The word "access" in this context has no relation to Microsoft's RDBMS of the same name.)



Out of the closet: I like a GUI — the wimp's tool for querying the database!

Why do you need such a connection? The obvious answer is that any user of your database will need it. But in practice I find that the first ODBC connection I set up is usually for my own use in my capacity as a DBA (Database Administrator). In addition, I usually set it up, oddly enough, between the server and itself; why? At the risk of teaching my grandmother to suck eggs, back-end databases like SQL Server, DB2, Oracle and so on do not come equipped with GUI data manipulation tools. True, they come with a whole range of tools which enable you to create tables, set up rights for users and so on. But they do not, typically, come with GUI tools that allow you to add data to tables, or even change and/or delete that data. Instead, they simply provide some form of text window into which the hapless DBA is expected to type raw SQL.

The reasoning behind this lack of a GUI tool seems to be twofold. Firstly, let's face it: why on earth would a DBA want to manipulate data? DBAs, by definition, *administer* databases, they don't play with the data; users were created for that particular function. Secondly, in the unlikely event that a DBA did want to manipulate data, they would be perfectly capable of doing so with raw SQL. Indeed, any self-respecting DBA would be positively insulted if offered any other tool.

Both of these arguments are hopelessly flawed, though. The problem with the first is that DBAs demonstrably *do* have a pressing need to manipulate data. For a start, you will probably want to generate sample data to populate the tables and test the database. Then there are entities like triggers (see *Hands On Databases*, November '97). Unless your work happens to be perfect first time *every* time when, as a DBA, you set up a trigger, you will want to test it. In order to trigger the trigger, you have to alter the data.

The flaw in the second argument has to do with closets, and coming out thereof. Take me, for example. Of course I can type raw SQL — *I'm a real DBA!* But the truth is that (*creak of closet door opening*), not only do I prefer a GUI, I can usually work faster with that than with a text-based interface… (*stunned silence*). I realise that this revelation will have shocked some, in particular the designers of RDBMSs, but the truth is, I happen to think that I'm not alone.

So, as soon as I install a new server-based RDBMS I feel that my hands are tied behind my back unless I can get a GUI-based query tool in operation. The easy way to achieve this is to make an ODBC connection to the database server from a front-end that does have a GUI query tool. I could do this from a workstation but since, in practice, I usually sit at the server itself, it turns out to be easiest to use the server as a workstation as well and make the connection internally.

Choosing a front-end tool

We need to distinguish two different flavours of front-end tool. One flavour (Access, Approach, Delphi) comes with built-in data manipulation abilities. In other words, you can use Access to look at a table and edit the data it contains.

The second flavour (Visual Basic, C++, Delphi) is, more accurately, tools with which front-ends can be built. If you want 500 ➢

Questions & Answers

Q I am writing an application that uses Access to gather data and which is then printed on various printers throughout the organisation, early in the morning. Unfortunately, I am unable to find a way to change the printer at runtime using Access. I am currently using VB and Crystal Reports to accomplish this but I would like to discover how to do it via Access.

Simon I Smith

A I'm afraid I don't know the answer to this one. Do any readers out there help with Simon's problem?

Q I have been running a multi-user Access database with the data files stored on a NetWare fileserver. One of my users had problems with an Action Query: no error message appeared on the user's screen but the query slowed almost to a standstill, and the message "Station Record Lock Threshold Exceeded" appeared on the file server's console.

The server's error log recorded what is shown in Fig 1. I checked the NetWare manuals but, broadly speaking, all they said was that the cause of the message "Record Lock Threshold Exceeded" was that the record lock threshold had been exceeded and that the cure was to increase the record lock threshold!

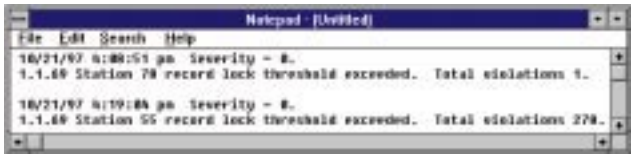


Fig 1 A user's action query resulted in this "threshold exceeded" message and the query slowed almost to a halt

Marius Malaczynski

A This sort of problem can be difficult to deal with because it results from the interaction of products from different (and antagonistic) companies. In fact, Marius found the answer in some Microsoft documentation! When Access runs an update or delete query in multi-user mode, it locks every record involved in the query. (In fact, Access, despite what some of the manuals say, locks 2Kb blocks of data rather then individual records, but the principle is the same.) Access uses the locking facilities provided by whatever back-end is used to store the data, so if it is stored on a NetWare server it will use NetWare's locking mechanism. By default, NetWare allows any one workstation to have 500 simultaneous locks, so any Access query that "touches" more than 500 records is likely to fail, given the default settings.

The answer is to increase the number of locks available via NetWare, which can be done by adding something like Fig 2. The actual figures you use will depend on the size of your data files, but those shown (Fig 2) are the maximums allowable by NetWare. The first value sets the maximum number of locks for an individual workstation, the second sets the limit for the server.

Fig 2: More locks

```
set maximum record locks per connection = 10000
set maximum record locks = 200000
```

Incidentally, NetWare 3.11 can *abend* (a delightfully coy Novell expression, which translates as "crash" — it actually stands for "abnormal ending") if the lock limit is exceeded.

This problem has been fixed in later versions, so the easiest answer is to upgrade. If you want to stick with 3.11, you can download the latest NetWare 3.11 patch and add:

```
load patchman.nlm
load ttsfix.nlm
to your Autoexec.ncf file.
```

Q I am running an Access 2.0 application under NT but I find that although my application runs on some NT machines, it fails on others. The problems are to do with registering OLE DLLs. On our NT workstations here, we can install our application, with the 16-bit DLLs being

p280 ➢

Questions & Answers (cont'd)

installed in \system. They register themselves okay and the application works fine. On a number of customers' machines, however, the registration fails with "DLL not found" errors. It seems as if NT is installed as an upgrade to an existing system which already has 16-bit applications, such as Access 2, installed. It installs a set of 16/32-bit OLE compatibility DLLs in System32 — but if it is a fresh installation onto a new machine, it doesn't. So, when we later try to install our 16-bit Access 2 application on to one of these machines, the OLE doesn't work.

Rob Lewis

A I have identified some of the required files. They are: Compobj.dll, Ole2.dll, Ole2disp.dll, Ole2nls.dll, Storage.dll, Typelib.dll. All are much smaller than the "real" 16-bit DLLs and, when examining their properties, show as "Microsoft Windows NT 16/32-bit OLE compatibility DLL". The only successful workaround I've found so far is to include the above DLLs in my kit, copying them to \System32. This is enough to get my application running without crashing (although none of the OLE controls work) and I then re-install NT as an upgrade, which magically sorts everything out. But this suggests that I've missed some DLLs, or perhaps there are some registry entries made during the upgrade that I have not found.

I have two detailed emails from Rob, which are excellent but unfortunately too long to reproduce here. However, if this problem sounds horribly familiar and you would like more detail, try reading his emails which are in ROB.TXT on this month's *PCW* cover CD-ROM.

of your users to be able to reach data in a database server, you might well write them an application in Visual Basic or C++. However, these tools don't usually have built-in data browsing tools of the kind you require for playing around with the data during testing.

Experienced users of a tool of the second flavour may well have acquired and/or written toolboxes which provide that kind of functionality. However, for those who don't already have a favourite, I recommend you choose a tool of the first type. These tend to be PC-based DBMS products with more or fewer relational features, depending on the product.

On a personal level, I happen to like both Access and Delphi, but clearly you should use the tool with which you are most comfortable. As long as it supports ODBC, you should be able to use it as described.

Astute readers will have noticed that Delphi is described both as a front-end and a development tool. It is probably best known as the latter, but Borland has added such a great set of data manipulation tools that I feel it qualifies as both.

This is all a matter of opinion and degree: since Access can be used to develop standalone applications, it too could be counted as a development tool. I don't want to offend those who favour any tool for any job, but I do feel that Delphi does the best job of standing in both camps. So if you don't yet have a favourite, Delphi is well worth considering.

Fig 3: Changing values

```
Me!txtSelName.Value = "[abc]*"
DoCmd.OpenQuery "qryNameNumber"
sfrmNameNumber.Requery
DoCmd.Close acQuery, "qryNameNumber", acSaveNo
The query has as its criteria:
Like [forms]![frmNameNumber]![txtSelName]
```

ODBC data source

An ODBC data source seems like a slightly nebulous entity on first introduction. It is essentially a description of a potential connection which can be made between a workstation and a database on a database server. What? Well, when you make use of a database from a workstation you must have an ODBC connection between the two machines, so you first create and store a description of the connection: which ODBC driver it will use; what it connects to; who is the default user, etc.

Thereafter, whenever you want to make that connection, you call up the description of it rather than redefine it again. This "description" of the connection is called the ODBC data source: each is "tied" to a particular database and allows you to interact with the objects within that database. So if you have three databases, you will need three ODBC data sources.

Each ODBC data source allows some type of front-end on the workstation (say, Access or Approach) to access a single database on the server. For many people, especially users, a single ODBC data source may well be enough since they will only want to access one database, and that single data source will allow them to reach all of the tables in the database. You, however, may well want to have more than one data source because you will want to control multiple databases.

Reader's tips

■ "A curious problem came to light on an NT machine, so here's what to do if it happens to you. If you try to copy your <filename>.mdb file from c:\ to elsewhere, it may show up on the destination drive as <filename>.ldb. The fix for this is to check if your original file is compressed. If so, just decompress it and make the copy."

Derek Brankin

■ "I thought I could use the wildcard expression '[abc]*' *[which I covered in my Dec '97 column — MW]* to tame my too-huge phone book by breaking it down into alphabetical groups. I was thinking of a way to pass a value from the click event of a command button to a query, and remembered an article you did some time ago *[PCW, Feb '97]* using properties of the 'Screen'. But that would have meant ugly button captions. What I found worked as an alternative was to use a hidden text box to pass the value, and a command button to fill the text box with the string to be passed to the query. The code for the command button populates a subform." (See Fig 3.)

Ivor Davies

PCW Contact

Mark Whitehorn welcomes readers' correspondence and ideas for the Databases column. Write to him at the usual *PCW* address (p10) or email him at database@pcw.co.uk

Mark Whitehorn's book, ***Inside Relational Databases with Examples in Access,*** is available at a special price to *PCW* readers: see our *Reader Offers* on page 310.

• Also, a copy of the book will be awarded to each reader who makes a significant contribution to the *Hands On Databases* column.

The USB buzz

We're all keen to jump on the universal serial bus but where are the wheels? Coming this year… hopefully. Roger Gann explains what's happening, what it is and what it can offer.

I've looked at a number of emerging technologies over the past year but this month the spotlight falls on the much-vaunted Universal Serial Bus (USB).

I first saw a USB port as long ago as the summer before last. I wish I could say the same about USB peripherals: precisely none have passed through my hands, so what's going on in the USB world? What exactly is USB and what does it offer?

The problem with PC I/O

The original PC was blessed with reasonable input/output (I/O) facilities and it had both serial and parallel ports. Over the years these have sufficed, allowing you to connect a modest variety of peripherals; things like modems and printers. But times change and with them, hardware requirements, such that today's serial and parallel ports no longer cut the I/O mustard.

They fall short of users' needs in a number of areas:

- Throughput: serial ports max out at 115.2Kbps, parallel ports (depending on type) at 500Kbits. Modern devices, such as video or digital cameras, require more bandwidth than these can provide. OK, parallel ports aren't too bad in this respect, but hey, don't forget this is a printer port we're talking about!
- Ease of use: the advent of plug-and-play has made life a lot easier, but connecting devices to these legacy ports can still be fiddly, especially if you're trying to daisy-chain parallel-port devices via their pass-through ports. In any event, this is a messy way of connecting peripherals. And the ports are always located at the rear of the PC; not the most convenient place if you want to plug in devices.
- Hardware resources: each port requires its own interrupt request line (IRQ). A PC has a total of 16 IRQ lines, most of which are already spoken for (some PCs have as few as five free IRQs before peripherals are installed). COM ports can "share" IRQs but some operating systems (Windows NT 4.0, for example) don't tolerate this kludge.
- Limited number of ports: most PCs have a pair of COM ports and one LPT (parallel) port. Life gets complicated if you want to hook on more than a handful of peripherals.

What's so good about USB?

USB is a peripheral bus standard developed by manufacturers including Compaq, Digital Equipment, IBM, Intel, Microsoft, NEC and Northern Telecom. It combines the best features of SCSI architecture with an advanced PnP standard.

The USB standard eliminates the need to install cards into dedicated computer slots and then reconfigure the system, as must users today. Instead, computer peripherals such as keyboards, mice, scanners, digital cameras, and printers will be automatically configured when they are attached to the system, without the need to run a setup program or reboot. New devices such as web TV, cellular phones and digital cameras are not traditional PC peripherals but USB will make those peripherals possible.

With throughput as high as 12Mbps, USB is aimed at simplifying and standardising the interconnection of maxi or mini PCs with peripherals such as modems, printers, mice, keyboards, digital speakers, joysticks, game pads, telephones, telephone networks, scanners and digital cameras. Not all devices require 12Mbps of bandwidth — mice, for instance — and so a slower 1.5Mbps channel is also provided in the USB standard.

USB allows up to 127 individual devices to run simultaneously on the PC. In addition, some peripherals, notably monitors and keyboards, can act as hubs to provide additional plug-in sites. This is very convenient: for instance, the mouse will plug in to the keyboard and other peripherals can plug in to, say, the base of a monitor. Additional USB ports can be located in external expansion hubs and will allow a tiered-tree connector configuration which will enable peripherals to be daisy-

chained together. The maximum cable length for USB is five metres.

The USB uses a new-style square connector, a four-pin socket with two data lines, one power line and another for ground. There are, in fact, two series of connectors specified for USB: Series A is for applications permitting the cable to be moulded into its peripheral, Series B is used for applications requiring removable cable. The two-connector series is keyed differently to avoid mis-mating.

All peripherals connected via a USB interface are managed by a USB host controller mounted on the PC's motherboard or on a PCI add-in card. The USB host controller resides in the PC and links to peripherals via a node connection with a hub connecting the end points.

The host controller and subsidiary hub controllers manage USB peripherals, helping to reduce the load on the PC's CPU time and improving overall system performance. In turn, USB system software installed in the operating system manages the host controller.

Data on the USB flows through a bi-directional pipe regulated by the host controller and by subsidiary hub controllers. An improved version of bus mastering allows portions of the total bus bandwidth to be permanently reserved for specific peripherals, a technique called isochronous data transfer.

USB controllers fall into two categories: those for devices aimed at low-speed applications (with a data transfer rate of 1.5Mbps) such as mice and keyboards; and those for full-speed applications (12Mbps) which include modems, sound cards, monitors and other devices.

USB support has been built in to Intel's PCIset since the 430VX and many current motherboards feature connector headers for USB socket panels. Virtually all major-brand desktop PCs and most notebooks now come equipped with a pair of tiny USB sockets. Dataquest estimates that the penetration rate of USB in the installed base of PCs will be 50-60 percent in 1997, rising to nearly 100 percent in 1998.

In addition to offering the convenience of PnP with support for hot-swapping, USB is source-terminated, so you do not have to worry about device termination issues as you add or remove peripherals. When you connect a new device, the USB hub controller queries the device for a vendor ID and the operating system chooses an appropriate device driver. USB further simplifies peripheral handling by using a single IRQ, port address and DMA channel.

As well as simplifying connectivity and allowing up to 127 devices to be linked and recognised by a single PC, USB's ability to reduce tech support headaches is also a major benefit. Take scanners, for instance: major retailers have reported that scanners experience an average 30 percent return rate, based primarily on a perceived difficulty in setup. USB would virtually eliminate these problems.

What USB does not offer is the very high-bandwidth data transfer required by such data-hungry devices as digital cameras/camcorders, high-speed printers, network cards and mass-storage devices. But in addition to the devices mentioned earlier, USB should be able to handle light-workload printers and low-bandwidth cameras used in videoconferencing.

Windows 95 and USB

There's good news and bad news here, as Microsoft has been slow off the mark in providing native operating system support for USB.

The good news is that OSR2.1, the latest OEM release of Windows 95, contains all the basic software drivers needed to run a USB peripheral. Microsoft considers USB as a key part of its "Zero Administration Windows" and "Simply Interactive PC" initiatives, which aim to make PCs as easy to use as consumer-electronics equipment.

The bad news is that OSR 2.1 is not a retail product and is only supplied with new PCs. OSR2.1 has shipped with all new PCs since February last year. Of course, some PCs equipped with USB ports shipped with earlier versions of Windows 95, which don't support USB and thus cannot be easily upgraded. Windows 98 will naturally support USB from the off. It also promises to have one or two interesting USB tricks up its sleeve.

Microsoft is preparing new software audio drivers for the new version of Windows that will deliver CD-quality sound (they claim) over the Universal Serial Bus with no need for a separate audio signal processor. The drivers will provide multi-channel audio streams, emulate legacy software and dynamically manage multiple USB devices; all you'll need to do is plug in some USB-powered speakers.

Whether or not this technology will steal too many processor cycles remains to be seen. The launch of Windows 98 should provide a much needed shot in the arm for USB.

You'll see more USB products on retail shelves this year, with maybe as few as half-a-dozen products to begin with, increasing in the coming months, according to Intel sources. For the latest information on USB go to www.usb.org.

FireWire: the facts

Don't confuse USB with another emerging serial data standard, IEEE 1394 (aka FireWire). It was developed by Apple Computer and Texas Instruments as a high-performance data bus. It offers a data transfer rate far in excess of USB (between 100 and 400Mbps) and for this reason many see it as complementary to USB: the two buses can coexist in a single system, in a manner similar to today's parallel and serial ports. IEEE 1394 isn't as far along in development as USB, but support for the standard, in addition to that already pledged by Microsoft, Apple, Texas Instruments and Intel, is widespread.

FireWire provides high-bandwidth, high-speed data transfers in excess of what USB offers. It can support data-transfer speeds from 100Mbps to 400Mbps — roughly four times as fast as a 100BaseT ethernet connection and far faster than USB's 1.5Mbps or 12Mbps speeds. Its high-speed capability makes FireWire viable for connecting digital cameras, camcorders, printers, TVs, network cards and mass storage devices to your computer. The current implementation of the standard supports up to 63 devices on a single bus. It uses a six-conductor cable (up to 4.5 metres long) which contains two twisted-pair transmission lines, two power conductors and a shield. The design resembles a standard 10BaseT ethernet cable.

In 1997, Compaq, Intel and Microsoft proposed an industry standard called Device Bay. By combining the fast interface of IEEE 1394 with the USB interface, Device Bay offers a bay slot to slide in peripherals such as hard disks or DVD-ROM players. We should see some Device Bay products by the end of the year.

PCW Contact

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Strings without stress

More holes than a string vest in your ensemble patches? String along with Steven Helstrip and Rob Young, who unravel the mysteries of successful programming without the knots.

This month we turn to that great ensemble, strings. Let's start by chasing off that old argument which cropped up in our look at brass programming last month: namely, that if you use the ensemble patches, you are likely to throw away some credibility.

In most tone generators, the ensemble strings patches range from good to superb, while the solo instrument patches (cello, violin, etc) can be nasty, scratchy affairs. Sometimes, scratchy is exactly what you want; but when it isn't, pick what sounds best. To be fair to the "anti-ensemble" brigade, they've picked a good argument; they're just attacking it from the wrong direction. Too many MIDI programmers set up their ensemble strings patch, clamp their hand on the keyboard for three minutes and then reach for a cigarette. Quite simply, it isn't the patch

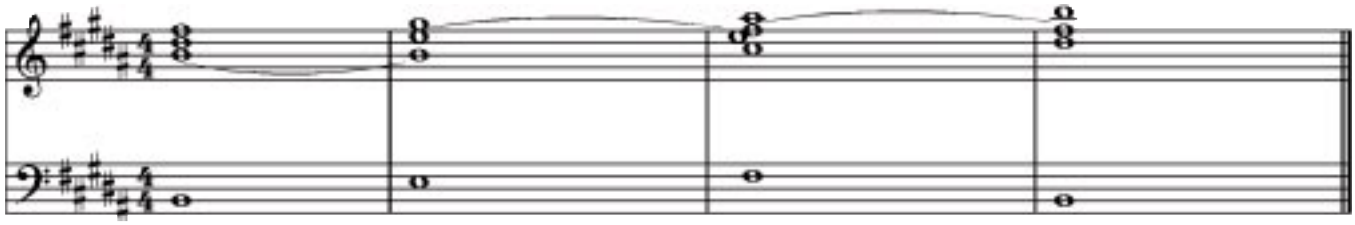


Fig 1 **Pad part? Could be. Strings arrangement? Hell, no**

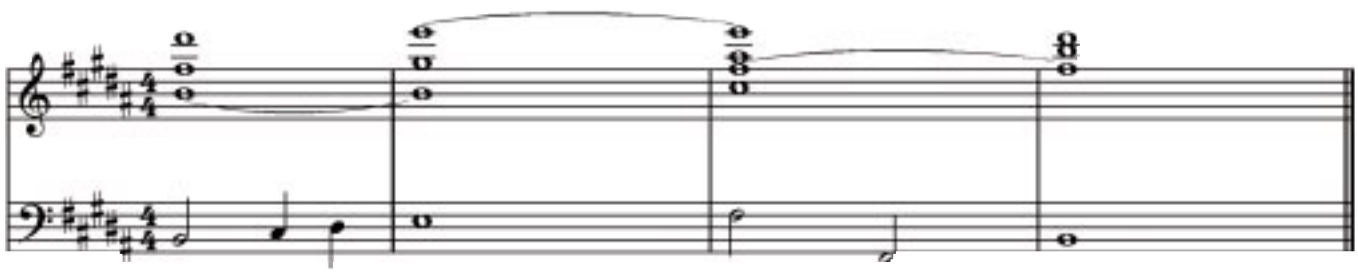


Fig 2 **Taking the part one stage further by changing the voicing of the chord and adding some movement in the bass**

Fields Of Motion

Personal Computer World Recommended

Fields of Motion is the fourth release under Zero G's Altered States label. The previous volume, Ghost in the Machine, turned out to be a bit of a let-down following the massively successful and highly usable collection of sounds and textures found on Cuckooland (reviewed in *PCW*, October 96). So is it downhill from here? We think not.

Judging by the first few tracks alone, Fields Of Motion stands out as one of those "must-have" titles, presenting totally original and inspirational soundscapes to better any tune with an experimental edge. Much of the material is derived from so-called "organic" sources, which range from fairground rides through to heavy industry, with some techno vibes thrown in to make this CD compatible with the dancefloor. With some exciting sounds in place, followed by effective use of sampling and studio wizardry, this disc is guaranteed to satisfy.

A wide range of tempos and styles are covered, from 60 to 200bpm. The format of the disc is such that arrangements at the start of each track are followed by its constituent parts. These include loops as well as individual hits and noises. An accompanying floppy disc contains the MIDI files of the complete arrangements, making it a doddle to customise loops.

There's certainly plenty to get excited about on this disc: from industrial hits and eerie *whooshes*, through to full-on clanking loops. The production is superb, and there's plenty of depth and mileage to be had out of this slightly off-the-wall production. An Akai CD-ROM is available and includes the audio disc free of charge. Now you can't say fairer than that.

Price £59.95; Akai CD-ROM £119
Contact Time + Space 01837 841100 www.timespace.com
Rating ★★★★★

Strings programming tips

■ Need a vibrato effect? Don't use modulation, it never succeeds. Instead, step-enter small spikes of pitch bend alternating between 0:64 and around 0:70. It takes a little time to do, but you should be able to copy this part wherever it needs to be re-used.

■ If you need to create a realistic string orchestra, put your maximum effort into the lead instruments — usually your first violins. If these sound believable, they'll hide all kinds of shortcomings in your other instruments and might even give you the incentive to do some work on those remaining parts, too!

■ If you're a General MIDI user, don't ignore the Slow Strings patch (#50). The marcato patch below it has a strong attack well suited to rock or quasi-orchestral programming, but in most synths it doesn't have the sweetness or subtlety needed for ballad styles. The best ensemble results come from recording each part separately, rather than copying a single part and editing note pitches.

■ You can add further realism by implementing constant expression-controlled swells and fades (covered in some depth in *Hands On Sound*, Oct '97). First, get a rough idea of the dynamic movement you want to create, then record the expression data separately for each channel. Remember to use expression (CC11) rather than volume (CC7). This will provide greater flexibility, should you need to tweak the balance between each instrument when it comes to mixing the track.

that matters, it's what you do with it.

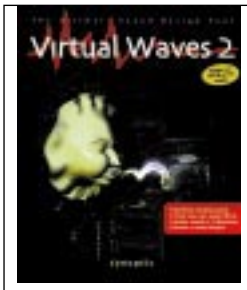
This kind of playing is fine if you're recording a pad track, but it won't give you a credible strings part no matter how lifelike your strings patch might be. To my mind, and I'm prepared to argue this one, strings differ from most of the other instruments that programmers have to emulate, as it's not usually necessary to think like a strings player. Perhaps that's partly because ensemble strings patches are so good.

The big trick to the art of strings programming lies in the arrangement, or actually being able to pick the right notes. Take Fig 1 as an example: here we have a typical "hand clamped on keyboard" part, consisting of three chords in close position. But a tiny amount of editing, or the addition of another hand, could breathe a lot more life into the part. Try shifting the D# from the first chord of B major, and the E from the second E major triad, up an octave so that each chord covers an interval of a tenth or an 11th instead of a fifth or a sixth. As well as adding warmth and interest to the part, this creates space for other instruments, like guitars and pianos, which tend to occupy the same range.

Spreading a simple three-note chord like this makes a good starting point to creating

p286 ➢

Virtual Waves 2



Here's a package that shows just what can be achieved given a basic PC equipped with 16-bit sound. We've already seen GM and XG soft synths, from the likes of Yamaha, that will one day replace hardware synthesisers altogether, but here's a synth with a difference.

Virtual Waves 2 (VW2) is essentially a sound design toolkit, used to build synthesisers from the ground up, based on one or a collection of synthesis techniques. You make a sound by first choosing a generator, such as additive synthesis, then apply any number of processes before calculating the final sound.

Many of the generators will already be familiar to you. For starters, there's FM, wave sequence, physical modelling and a sample player. Some of the not-so-obvious generators include formant wave functions (a form of subtractive synthesis to emulate the human voice), a myriad of mathematical functions, cellular automata and the spectral sketchpad. The latter two are graphic-based generators which turn your doodles into, er, noise.

Once you have generated your source waveform, however simple or complex, you can then patch into further modules, or processes. It's just like using an old analogue patch-chord synth, only this is digital and brand-spanking new. In the processes department there are more modules to write about than we have space for, but as you'd expect there is a range of filters, envelope shapers and effects including reverb, flange, and so on. Some of the more unusual and powerful processes include cut-up,which slices up the sound and rebuilds it based on set parameters; metamorphosis, to make timbral changes from one sound to another; and transfer function, which enables you to set up alternative output values for the input signal.

The Virtual Waves interface, although not bound by the usual Windows conventions, is very intuitive. Down the left of the screen is a list of the 53 modules, and over to the right is the workspace. To build a synth, you simply drag modules into the workspace and, using patch chords, link them up. Double-clicking on a module brings up its specific dialog box where parameters can be tweaked to your heart's content.

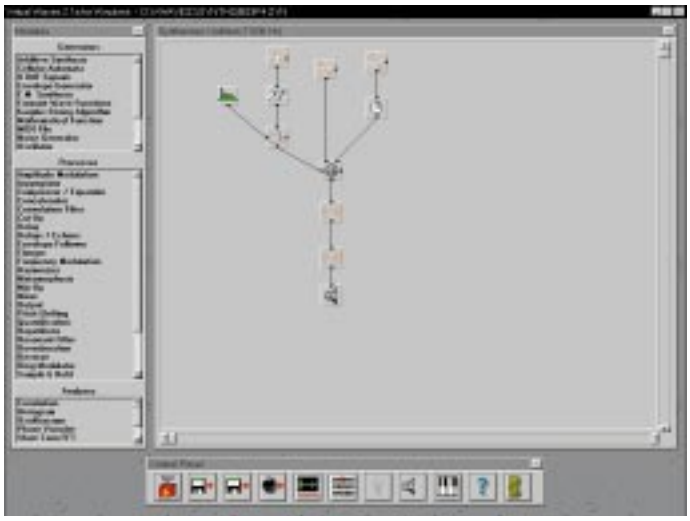
The thing I really like about this package is that you can connect any number of oscillators or other generators and route them through filters to come up with some massive analogue-esque sounds. However, it can be very time consuming nurturing a sound to give it a lot of depth and warmth, although it can be done. Once you have made a change to any of the parameters in your synth, the sound must be recalculated by clicking on the lightbulb icon — and here's where it pays to have a fast PC. Complex synths can take up to one minute to be calculated, even on a 166 Pentium. Even then, the end result is a single sample which can either be dumped directly to an AWE-32, or via MIDI to a sampler.

The integrated virtual MIDI keyboard should allow you to playback samples at different pitches, but in practice this rarely works. There are other areas within the package where stability is not its strong point, and it doesn't take too much effort to crash the program. Hopefully, many of the bugs will have been ironed out by the time you read this.

To learn the basics of VW2, you'll only need to spend an hour in front of the screen to fathom out what everything does. Learning how different modules interact, however, is more likely to take a lifetime to master.

Whether you're a sound designer or you just love synthesisers, there are hours of enjoyment to be had with this incredible package. There's nothing else out there that's quite this powerful.

Price £169.99
Contact Serious Audio 01923 442121 www.synoptic.net



Three oscillators, one going through the appegiator, one delayed, and the third going direct to the mixer. The output of the appegiator is routed to a resonant filter which has an envelope on it. The output from the mixer is then sent to two echo modules before finally being output. The result? Something rather weird that belongs in Doctor Who

more involved arrangements, but you can get the best results by employing some low-tech equipment at the start — the humble pen and paper. Taking a note from each chord, plan three or four separate strings lines and add a few passing notes in each line to add some movement. Fig 2 (*p284*) includes simple movement in the bass part but there's no reason to stop there. Remember to record each part on a separate channel and pan two of the channels slightly left and right of centre. This combination of space and movement covers the two most important ingredients of a successful strings part.

Orchestral manoeuvres

If you want to go further than we've gone so far, you're looking towards orchestral, and this is where credibility gets tricky. You need a range of strings patches which, when mixed, really do sound like a string orchestra. You won't know what the end result will be until you've planned and recorded that first arrangement. The odds are that you'll swap a few of those viola and cello channels for ensembles.

One tip which meets the orchestral need halfway is to follow the steps we took above, then record a second version of your top line using a violin patch, and the middle or lower line using a viola or cello. (Don't just copy the tracks: the slight timing and velocity differences will add to the effect.) De-tune both of the new tracks slightly sharp using a single pitch bend event or RPN Fine Tuning (101:0, 100:1, 6:??, 38:??) and add a little chorus to warm up these often-chilly patches.

PCW Contacts

Steven Helstrip and **Rob Young** can be contacted at the usual *PCW* address or via email at sound@pcw.co.uk

Formulating **fonts**

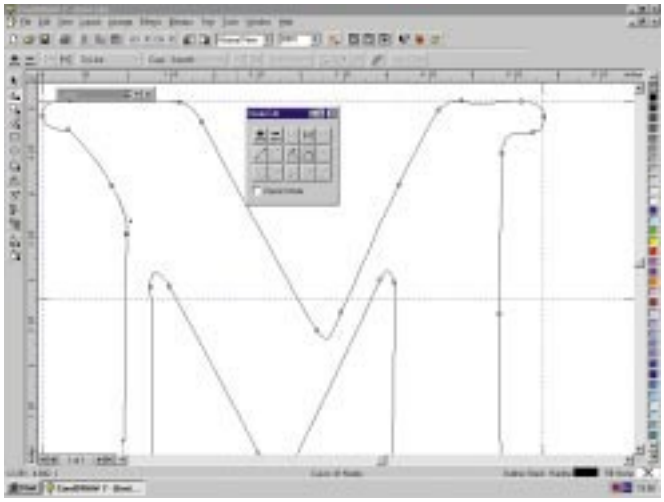
No longer need you rely on the old faithfuls, as Ken McMahon gets into character and creates fonts from scratch. Plus, font designing on a budget can be achieved with Softy.

In the December issue we had a look at how to modify font characters in CorelDraw 7 using an existing TrueType font. This month, we're going to take it one step further and create a font from scratch. The process is very similar, making use of Draw's TrueType export filter to export the characters singly. You can also create Adobe Type 1 fonts in this way.

You could, of course, literally create your own font by drawing the characters, but especially if you're new to font design it makes the job easier to use an existing font as a reference. If you're creating a symbol font you'll have your own ideas about what it should look like. For my example, I've scanned a sample of a font from a thirties typography catalogue.

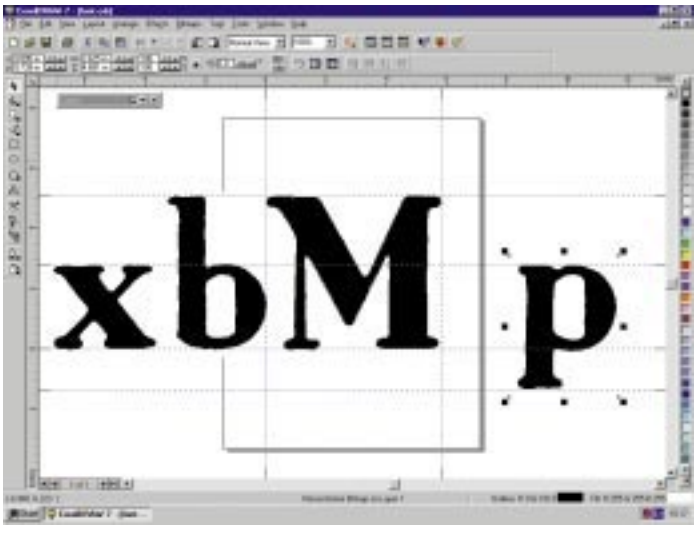
The bigger you can get the characters, the better. Ideally you want them five or six inches high. This not only makes them easier to trace, but irons out any wobbly bits and inconsistencies when the font is printed at normal sizes.

If your originals aren't big enough, enlarge them on a photocopier before scanning them to get the best results, then scan at around 300dpi using the line-art setting.



The scanned bitmaps need to be turned into vector graphics

You can scan the characters individually, or all at once if they are printed alphabetically as in a type book, then copy and paste them to new documents in your bitmap editor. Save them as uncompressed TIFs and you'll have no trouble importing them into Draw. If you find they're taking up a lot of space on your hard drive, you can delete them as soon as you have finished with them.

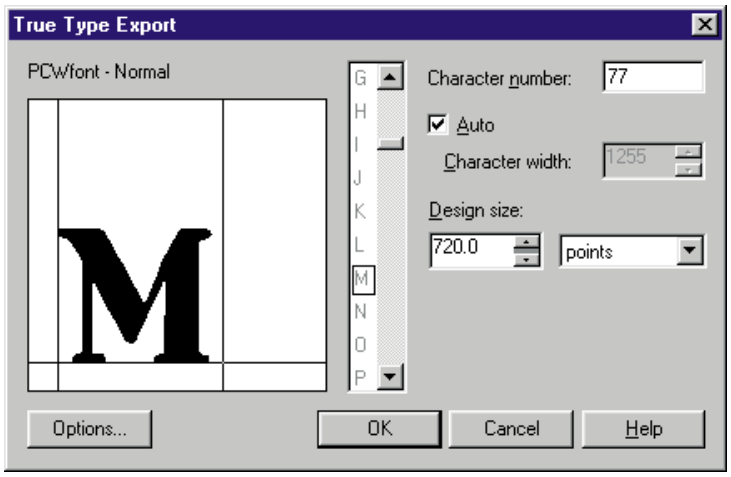


Having scanned the characters, use CorelDraw 7 to set up a grid for the font

Next, set up a grid in Draw 7. You can use the upper-case M as a guide. Position it roughly in the middle of the page and pull down four guides to create a bounding box along the top, bottom left, and right edges. Then drag the ruler origin to the basepoint at the intersection of the leftmost and bottom lines. Then import the lower-case x character and position it on the baseline, and pull down another guide to the top of the lower-case x; this is the x-height.

Finally, import a lower-case p and position it on the baseline with the descender hanging down, and pull another guide to the bottom of the p's descender. You now have a grid set up into which all your characters should fit.

You're now ready to create your first character, which will be a full point. It's a good idea to create this punctuation character first, because when you create a new font, Draw fills the entire font with a default character which is the first character you create. Don't forget that if you want a complete typeface, you'll need to create all the punctuation and numeric characters.



Change the vector graphics into a TrueType font

Ready for vectoring

The next stage is to convert all the scanned bitmap characters into vectors. You can do this using CorelTrace, Adobe Streamline or any other auto-tracing utility, but as you're going to have to do a certain amount of editing anyway, it's probably easier to carry out this task manually. Doing it this way will also give you a better feel for the nuances of the design: the shape of the serifs, the width of the stems, and so on.

With the full point out of the way you can create characters in any order you like. First import the bitmap, position it on the basepoint, then trace it using the bézier tool. If you put the bitmap on one layer and do the trace on another, you can use the layer manager to turn the bitmap on and off while you make adjustments to the trace. Use the the node edit roll-up to add and remove points and change point attributes as necessary.

You can fill your characters with black to get a better idea of how they'll look, but this, along with any stroke setting, will be ignored when you export. There are a couple more rules of which you need to be aware. Create characters as single or combined objects: a character such as an x or m can be a single object, but with b, o, or p you will need to select the outline and the counter (the round bit in the middle) and create a combined object. Also, you can't have any intersecting lines: all objects must be either within, or surrounding other objects.

Having traced and tweaked your character, it's now time to export it. You can either delete the bitmap original or select the vector you've just traced and check the "selected only" box in the export dialog. In the export dialog select "Save as" TrueType font (TTF). If you want to create an Adobe Type 1 font and the format isn't shown, you'll have to run the installer again to add the Type 1 export filter.

If you have done something wrong you'll find out at this stage, otherwise another dialog box will appear showing each of the character codes, with the default full point character we created earlier, in each position. The character number for the lowercase "a" for example is 97, so that's where your "a" goes. For now, leave the character width on its auto setting: this determines the gap between it and adjacent characters.

Once you've created the entire character set you can experiment with some random type to see how the kerning works out. If there is too much or too little space between certain characters, you can adjust it later. The design size is the size at which the character was created. Returning to your scan, if your original characters were five inches high, set this to 360 (there are 72pts in an inch, so 5 x 72 = 360).

Softy on the *PCW* disc

Following December's look at modifying fonts in CorelDraw 7, a number of people emailed me to say that they didn't have Draw 7 but were still pretty keen to indulge in some font designing on a budget which didn't include buying a copy of Draw 7.

Well, on this month's *PCW* cover-mounted disc you'll find the answer in the form of Softy 1.05, a shareware TrueType font editor written by Dave Emmett. Try it out. If you like it, don't forget to mail Dave his shareware fee (full details are in the accompanying readme file). I reckon it's worth every penny.

The Softy 1.06 version adds the ability to edit Adobe Type 1 fonts. You can get it from Dave's homepage at http://home.iclweb.com/icl1/d.w.emmett/. If you don't have access to the web and you'd like a copy, contact me in the usual way and if there's enough interest we'll look at putting updates on the cover CD.

p292

ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890
abcdefghijklmnopqrstuvwxyz

Two down, more to go

That's your second character completed. Now import the next character to be traced, repeat the process and export. When the export dialog appears, select your new font from the available list (it helps to put it in its own folder) and export the character to its appropriate character code. Do the same for the remaining 100 or so characters and you've got yourself a font.

Yes, it's hard work if you want to create an entire font, so if that seems like too much effort you can always start out by creating a symbol font with, say, half a dozen symbols and add to it as and when you want.

If you do feel an overwhelming urge to create a type font, you can save some time by using certain characters as the basis for others. You can create an h, for example, from an n, and the characters p, b, and d all share similar attributes. You can use this to your advantage: not just to save time, but to ensure your characters look consistent.

■ In my column in the December issue, I mentioned font-editing packages from Macromedia and DTP Software and gave URLs but no contact phone numbers. So for those who emailed: Macromedia, from Computers Unlimited 0181 358 5857; DTP Software (Germany) +49 241 902355.

Questions & Answers

Q I'd like to know whether or not I need to upgrade my graphics card. I cannot find a definitive answer. I see adverts with screenshots of Lara Croft without square edges and think "Is this real?" Will an upgrade improve the quality of my scanning or printing?

My PC is a P166MMX with 32Mb. The motherboard is a Spear SR-M504 and has a Cirrus Logic 5446 PCI card. The monitor is a Samsung SM 584V. My scanner is an HP ScanJet 5p (SCSI) and the printer is an Epson 600. All three ISA slots are full but there are two PCI slots free. Please advise me whether or not I need an upgrade. Lastly, can you explain the difference between a graphics card and an accelerator card?

R.G. Mackenzie-Bell

A From a graphics perspective, the only reason you might want to upgrade your graphics card would be if the current card lacked enough video RAM to display images on-screen with sufficient colour depth and resolution. This is most likely to be the case while working on photographic images in an image editor like Adobe Photoshop or Corel PhotoPaint.

Cards supplied with PCs usually have 2Mb of video RAM on-board. This is sufficient to display "true colour" images at resolutions up to 800 x 600, but if you have a 17in or larger monitor and want to use 1024 x 768 or even 1280 x 1024 you will need 4Mb of video RAM on the card. If you do not have sufficient video RAM to display 24-bit or 32-bit colour, the card will produce dithered colours where its colour palette is too limited to display all the colours in your image.

Windows 95 users can check the limitations of their graphics card by right-clicking on the Windows desktop and selecting Properties from the pull-down menu, then Settings from the tabbed panel. Set the colour palette to true colour and experiment with the resolution slider, increasing the resolution until the colour palette setting drops to 16-bit or even 8-bit colour. If you can't get true colour on an 800 x 600 screen it probably means your graphics card has only 1Mb of video RAM.

Some cards have slots for an upgrade and you can plug in additional RAM: it doesn't cost very much and you can upgrade a 2Mb card to 4Mb for around £25. If your card has no spare slots then it's probably not upgradeable, and if you want true rather than dithered colour you'll have to buy a new card. The card itself will have no effect on the quality of your scans or output — you'll just have to suffer the inconvenience of a less-than-perfect display.

Most cards these days improve the quality and speed of games by hard-wiring some of the functions normally carried out by Windows, into an accelerator chip. Hence the terms "graphics cards" and "accelerator cards" are used pretty much interchangeably.

Q I run a small business and do my own advertising (usually with Corel Draw and/or Photoshop), sending a diskette with a TIF image to the particular magazines. But I have perpetual hassles with this. The attitude of their DTP people is usually "the world is Mac and PCs do not exist". (With such a blind-loyal customer base, it's no wonder that Apple is in trouble, but that's another story!) I find that if I send an image (TIF or JPG) on a single 1.44Mb disk, I usually get away with it. But how can I send an image which is bigger than 1.44Mb? One way is to reduce the resolution and/or the JPG quality until it fits, but that is often not possible. I know of Stuffit, but few Mac users have heard of it and none I asked would be willing to "install a whole new program" on their Mac. I also use 128/230Mb optical disks, which are often used in the Mac world, but the Mac format is different and I cannot produce it. Also, the expensive disks are rarely, if ever, returned to me. I recently sent in a 2.5Mb file on a CDR and that seems to be the way, if a bit extreme!

Peter Stevens

A Stuffit certainly is available on the Mac and is one of, if not *the* most popular compression utilities, so I'd be surprised if a Mac bureau didn't have it. If your bureau is not prepared to install the software, create a self-expanding file (.sea) so that they won't have to. I'm pretty sure that Stuffit will allow you to compress a big file across several floppies. An alternative would be PKZip.

Do you have a modem? At 34Kbps, sending a 2.5Mb file isn't out of the question and most bureaux have modem links, or you could email it.

PCW Contact

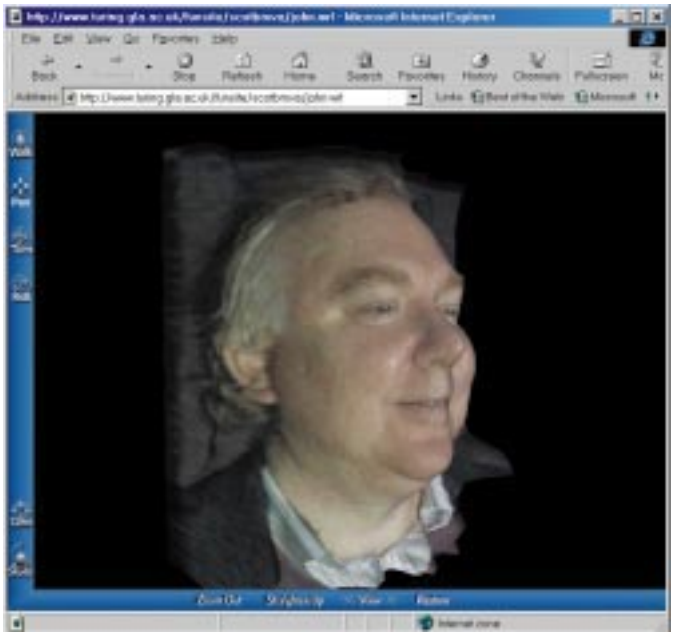
Ken McMahon can be contacted at the usual *PCW* address (p10) or via email at graphics@pcw.co.uk

Through the **looking glass**

Ever fancied 'getting inside' a photograph to have a look around? The technology to make this possible is almost here. Benjamin Woolley enters the amazing world of photogrammetry.

Imagine this. You find some old photos, a series of pictures of a loved one long dead, or a house in which you once lived. What if you could step inside these photos, look at that person again as though they were there, walk around that old house?

A series of 3D technologies on the threshold of release onto the market could one day make this possible, at least to a limited degree. They are already set to completely change the way 3D graphics are used and the type of imagery produced, so let's take a detailed look at them here.



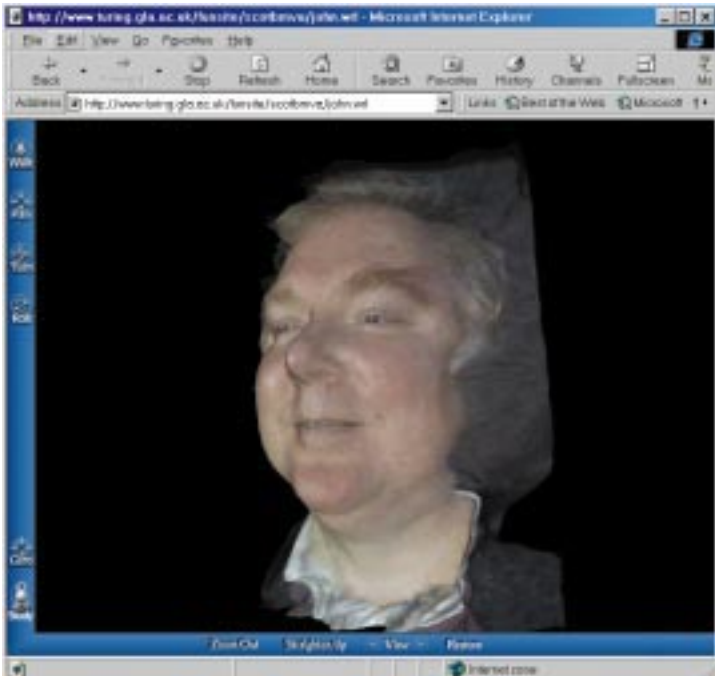


Fig 1 (left) A face captured with the C3D model 2020 system, seen using a VRML browser
Fig 2 (below, left) Same face, different angle

Seeing double

The key concept is "photogrammetry", an ugly term for some clever ideas. If you were to look at one of those stereo or 3D photographs, which you view through a special pair of glasses, but without using the glasses, you would see that the picture is really made up of a pair of images of the same scene, with one overlaid on the other and slightly shifted to the left or right.

When you put on the glasses you see one of these two images in the left eye, the other image in the right. The slight offset between the two is then unconsciously interpreted by your brain to work out how far you are from the objects depicted, thereby recreating the impression of depth.

A computer can exploit this offset to perform the same operation. If presented with two photographs of an object taken from cameras set slightly apart, it can use the differences between the two pictures to retrieve 3D information from the image. The trick is to get the software first to identify the correlations between the image pair. For example, if the images are of a person's face, the software needs to be able to locate, say, the right corner of the mouth in each picture. This is generally done by taking each pixel, looking at its neighbour and using the pattern to discover the corresponding point in the scene in the other picture.

Having established the correlations, the next job is to look for the differences: how great is the offset between the

pixels representing the same point in the scene? The greater it is, the closer that point is to the position of the cameras. You can see for yourself by holding a finger up in front of you. As you bring it towards the tip of your nose, your eyes, which automatically adjust their orientation to correct for the offset, finally give up (unless you go cross-eyed) and you can see two identical fingers appear before you; one the equivalent of an inch or so away from the other.

20/20 vision

This, then, is the basis of stereographic photogrammetry. It uses disparities between the images to recover the 3D information from 2D data.

At the Turing Institute, a technology company based in Scotland's "Silicon Glen" with connections to Glasgow University, they have built a system called C3D model 2020 which uses these techniques to create 3D models from photographs, and the results are extraordinary (available on the internet, at www.turing.gla.ac.uk/products/c3d.htm).

The C3D model 2020 comprises a special camera unit linked to a standard PC. The unit, or "pod", has two cameras set at a fixed distance apart from one another (the distance is usually called the "baseline") and a projector light to illuminate the subject.

To use the model 2020 system, you first calibrate it with a standard calibration object and then fire away at the object you want to capture, as you would with any camera (albeit a very large one). The software then uses photogrammetry techniques to turn the images it receives from the pod into a 3D model (in either DXF or VRML formats).

And that's not the end of the matter. The software can also drape the image data over the model as a texture, thus recreating an extremely realistic rendition of the original. Figs 1 & 2 show two views of a VRML model of a human face, created using the C3D system (when I inspected it interactively, it was positively eerie).

There are limitations, however. Even though in theory this technology can be used over any scale, larger sized scenes demand wider baselines to capture accurate 3D information (the C3D pod, with its "eyes" set a few inches apart, is limited to a working volume of 260 x 200 x 150mm; roughly the size of six copies of *PCW* piled one on top of the other). Also, it depends on input from specialist camera equipment, as any "noise" in the stereoscopic image data affects the software's ability to identify the correlations it needs to find to calculate the offset.

Fig 3 This is not a photograph: it is entirely artificial. Generated from photos, it was taken from various other points of view, of the University of California campus at Berkeley

The Berkeley approach

An alternative approach addresses some of these problems. It is being developed at the University of California in Berkeley by Paul Debevec (among others) and was used to create the image in Fig 3. This would appear to be a straightforward photograph of a tower on Berkeley campus — except that it is not a photograph. It is a completely artificial image, rendered using a computer.

Like the C3D models, the one used to create the image of the tower was generated from photographs — but 16 rather than two and taken from positions scattered around the tower rather than two fixed viewpoints. With this sort of data, it is impossible, at least at first, to use stereoscopic techniques to recover the three-dimensional information.

Instead, Debevec and his colleagues began by building a model of the tower and matching it to each photograph. This may sound like cheating, but in fact it required very little work, as only a rough approximation of the tower was needed.

Now the clever bit: as soon as the basic model is in place, everything, so to speak, snaps into place as it provides a common frame of reference for working out the relative points of view of all the photos. From this, stereoscopic techniques can be used to automatically retrieve more detailed 3D information.

The resulting detailed model can then be textured using another clever idea: view-dependent texture mapping. With traditional texture-mapping, a single static image is used to colour-in each face of the model. With view-dependent texture mapping, the different views in each photograph of the same surface are dynamically mixed together in proportions appropriate to the point of view from which the model is being seen. The result is the level of realism you see in Fig 3. If you think it's a fluke, I would strongly recommend a visit to the Debevec's web site at www.cs.berkeley.edu/~debevec/Campanile/ to look at some of the other images and some movies.

There are limitations with the Berkeley approach, just as there are with C3D. It is really designed for capturing architectural scenes as this makes it much easier to create the crucial frame of reference model. A complex landscape or object made up of organic shapes, such as a face, would be a much tougher prospect.

Try it yourself

Neither the C3D model 2020 nor the Debevec software (Façade) are yet ready for the consumer market, but this does not mean they are irrelevant to current work. For example, you could try creating a crude form of view-dependent texture mapping for yourself. Suppose you wanted to use a section of craggy rock to texture a surface. If you take one picture from a position perpendicular to the wall's face, you will miss much of the surface geometry. But if you were to take two pictures, each at 45 degrees to the rock wall, you would probably get more detail. You could then use a 2D paint package to merge them into a single map.

If you were more ambitious, and owned 3D software that allows both multi-layered and animated texture maps, you could import the two pictures — assuming they had first been aligned and cropped to be the same size, using 2D software. You could then layer them one on top of the other and when animating any movement past the wall, change the transparency parameter for the upper texture depending on how much you wanted them mixed.

I have only been able to sketch these technologies here, and would recommend a look at the Turing Institute and Debevec web sites. Debevec is generous with material, and offers a link at www.cs.berkeley.edu/~debevec/Research/debevec-siggraph96.pdf to a useful illustrated SIGGRAPH paper on the subject in PDF format.

PCW Contacts

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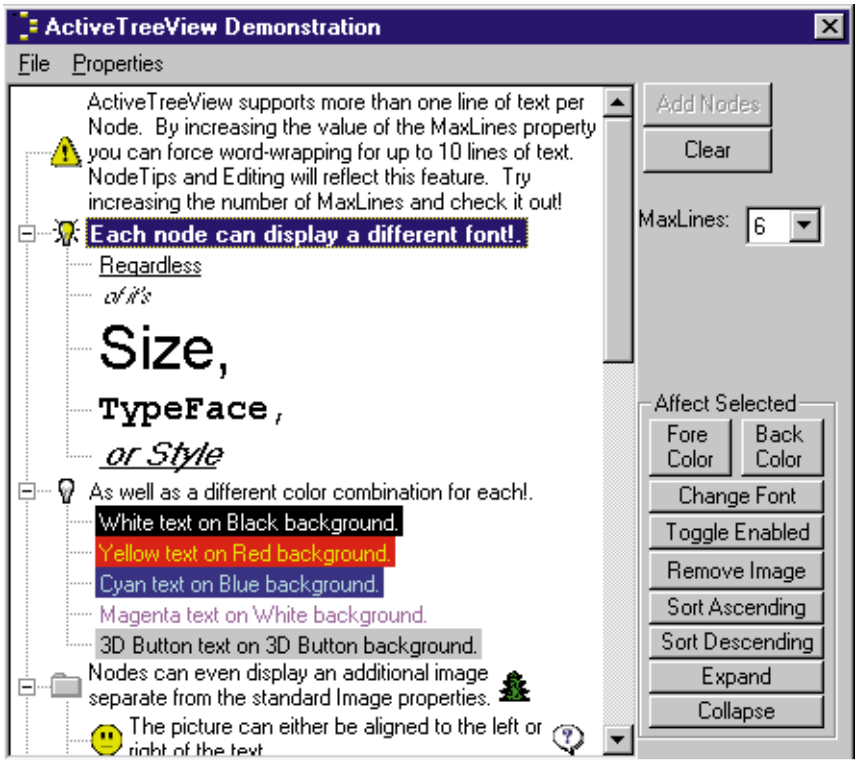
Tree view

Tim Anderson investigates Active TreeView, a 32-bit ActiveX control, gets help from AnswerWorks, reviews a Java tutorial and answers your Visual Basic and Delphi questions.

Tree views are increasingly popular as a way of viewing data, partly because Microsoft uses them so extensively in the Windows 95 interface. Rightly so, because it is a powerful and intuitive user interface tool. Visual Basic 5.0 comes with a tree view control, a wrapper around the common control provided with both Windows 95 and NT 4.0. This standard item works well but Sheridan has gone one better with Active TreeView, a 32-bit ActiveX control.

Active TreeView has a superset of the standard control's features, the idea being that it is a drop-in replacement; however, a little editing is required if you substitute Sheridan's control in an existing project. It is worthwhile, though. Adapting VB 5.0's sample data tree project revealed that Sheridan's control is more than twice as fast at adding items. It also has substantial extra functionality. For example, you can control the font on an item-by-item basis, and add images to the text and create multi-line entries.

The real value of Active TreeView is as a database front-end. Although not a bound control it can be populated with data in code, using a virtual mode: in other words, it is not necessary to hold your entire database in memory while using the control. Two events, OnDemandPrepare and OnDemandFetch, let you add only the data which the user actually wants to view. Using this technique, you could explore large databases while maintaining good performance. If a tree view is appropriate for your particular database, Active TreeView could be worth the investment.



Sheridan's Active TreeView does multiple fonts, images, colours and even word wrap

Calendar Objx

I have considerable respect for FarPoint, which makes ActiveX add-ons. Typically, FarPoint components come in every

Book Review

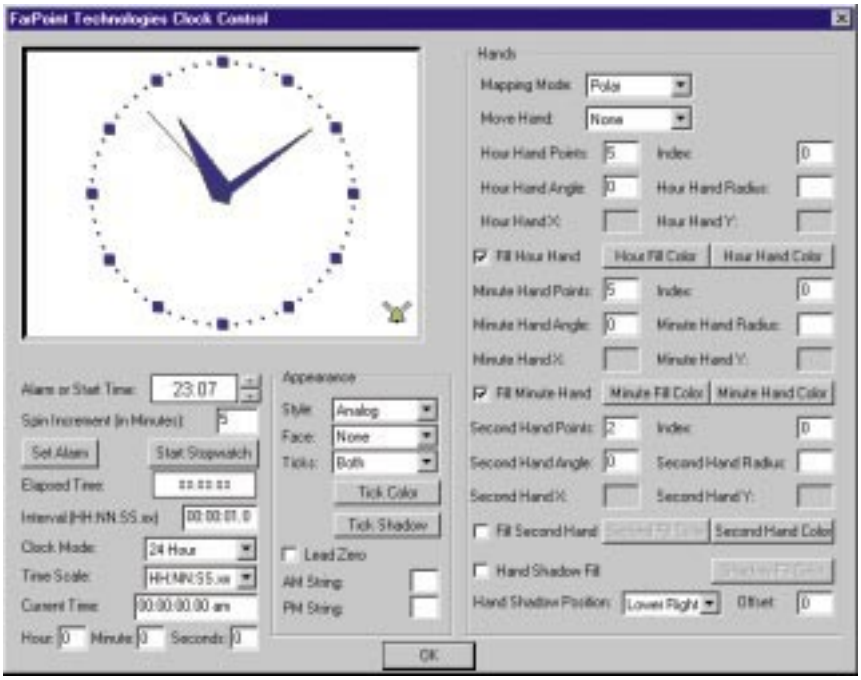
■ ***Object-Oriented Programming in Java***
by Stephen Gilbert and Bill McCarty

I was drawn to this title by its coverage of two key issues. Most developers know the essentials of programming with objects, but the skill of designing a sound object-orientated application is less common. As for Java, whether it is a language or a platform, it clearly has an important role in the future of software development.

The authors cover both topics without assuming any prior knowledge. Sounds promising, except that the book is so careful not to leave you behind by going too fast that it falls into the opposite trap, becoming ponderous. The danger is, you may leave anyway, out of boredom. Quizzes and exercises reinforce the sense of repetition. As a consequence, even with nearly 1,000 pages to play with, there is no space for important topics like JDBC database connectivity or JavaBean components.

If you are patient and work through from beginning to end, you will learn a lot about Java. But if you want a fast-paced, up-to-the-minute tutorial, this is not for you.

• *Do you have a favourite object-orientated programming tutorial? Email me at visual@pcw.vnu.co.uk with your reasons, and I'll list your suggestions in this column.*



Developing an analog clock in VB could be tricky, but not with FarPoint's Calendar Objx

possible format, including .OCX, .VBX, and both 16- and 32-bit DLLs. The controls themselves are generally of high quality and are packaged with a detailed printed manual, unlike Sheridan which has dropped printed documentation completely.

Calendar Objx is no exception, and provides three controls. The Calendar control has day, week, month or year views, and a wide range of display options. The Clock has digital and analog displays plus built-in alarm and stopwatch functions. The Poster control can offer a scrolling window onto a large image, hence its name. It also has facilities for overlaid and tinted images.

If you are creating a personal information manager or scheduling application, Calendar Objx will be invaluable. It is a niche product, though, and unnecessary for many applications. A surprising omission is that no Visual Basic 5.0 sample applications are supplied, although there are examples for C++. I would also like to see Delphi developers catered for — FarPoint does not seem to have heard of the product.

AnswerWorks

Online help is more than just the finishing touches to an application. Good online help reduces frustration and support costs, while poor help creates a bad impression and prevents users getting the best from their work. The help viewer has always been one of the best things about Windows, providing a fast and flexible way to view online documentation. That is all up in the air now, with vendors including Microsoft implementing different versions of online help using HTML. There are some advantages to these new formats, but in general they do not yet work as well as the old Windows help.

Another development in online help, seen in products like Office 97 or Corel WordPerfect Suite, is natural language querying. The idea is that your users enter a question in the same style in which they might ask a colleague: presumably questions such as, "Why do addresses start on one label and finish on the next?" Fantastic parsing algorithms then swing into action, and online help opens to display exactly the piece of information you need. It's a good plan when it works — which is not very often in my experience.

Thanks to WexTech Systems, one of the leading suppliers of help authoring tools, you now have the opportunity to do this in your own applications. AnswerWorks borrows from Corel's PerfectExpert (actually Novell technology, judging by the copyright line) so that you can adapt an existing help file to include natural language search.

Using AnswerWorks is laughably easy. A wizard interface lets you open any existing help project, although HTML help is not yet supported. AnswerWorks then automatically creates its own kind of index and recompiles the help project, adding its own button to the toolbar. That's all there is to it. In my tests, the results were at least as good as a well-indexed help document and much less work to create. However, it is not really natural language help; more like synonym-based indexing. You can edit the synonym files, which is important for specialist terms that AnswerWorks will not know about.

My gripe with this product concerns the licensing. The idea is that the authoring environment is freely available, but a licence must be bought for each distributed application that uses AnswerWorks. This makes AnswerWorks very expensive for small developers and will limit its use; a shame, because it works well.

Questions & Answers

Q I cannot find a Delphi version of the BASIC command MID$(). I wish to be able to extract a single ASCII character from an ASCII string variable and also to find this extracted character's ASCII number.

James Booth

A Part of the fun when moving to Delphi from VB is finding equivalent functions. Delphi's version of MID$ is called, surprisingly, Copy. For example:

```
mySubStr := copy('one two three',5,3);
```

The second parameter is the position in the string to start extracting, and the third is the number of characters to extract, so the result in this case is "two". To find the ASCII number of a character, use the Ord() function.

Copy is very similar to Mid$, but in some cases Delphi is lacking. For example, Delphi 1.0 has no equivalent to VB's trim functions for removing leading and trailing spaces from a string, although this was rectified in version 2.0. The answer is to create your own equivalent. A possible RTrim is shown in Fig 1 *(p299)*.

If you put functions like this into your own utility unit, then you can re-use them in any Delphi project, as needed.

Q Could you show me a simple method for printing the contents of a TMemo object?

Elliott

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Questions & Answers (cont'd)

A TMemo objects have no print method. There is an easy way to print the contents though, by using the AssignPrn function. This treats the printer like a text file, with any text you write to the file variable being printed. I've shown example code in Fig 2. (See also, Fig 3.)

Note that if you set the size property of a font, for the printer's canvas object for instance, Delphi should automatically ensure that it is scaled correctly to accommodate the high resolution of the printer compared with the screen. In Delphi 1.0, particularly, this does not always work correctly. If necessary, you can retrieve the printer resolution using GetDeviceCaps and make manual adjustments to the printing size.

Fig 1: A possible RTrim

```
function rtrim(strparam: string):string;
{strips trailing blanks from a string}
var
iCountVar: integer;

begin
iCountVar := length(strparam);
if iCountVar > 0 then
while strparam[iCountvar] = ' ' do
      begin
      delete(strparam,iCountvar,1);
      dec(iCountvar);
      end;
Result := strparam;
end;
```

Fig 2: Using AssignPrn

```
procedure
TForm1.Button1Click(Sender:TObject);
var
prnFile: TextFile;iCountVar: integer;begin

{set font}
printer.canvas.font.assign(Memo1.fnt);
printer.canvas.font.size := 12;

{print text}
AssignPrn(prnFile);
Rewrite(prnFile);
 for iCountVar := 0 tomemo1.lines.count -1 do
 Writeln(prnFile,memo1.lines[iCountVar]);

System.CloseFile(prnFile);
end;
```

Q I have started programming using Delphi 3. My main interest is serial communications. I have used the following code in Turbo Pascal to read a comms port:

```
repeat
{ code to read serial port}
until KeyPressed;
```

I want to use similar code in a Delphi program but the function KeyPressed doesn't exist there and I can't find an equivalent. I would like to use a button to stop the loop.

Maurice Heneghan

A In order for a button to be able to interrupt a loop, there are two conditions that must be satisfied.

Firstly, the loop must be able to see the result of the button-click — typically in a variable visible to both routines. Secondly, the loop must yield some processing time to the button so that Windows gets an opportunity to detect the click.

The first condition is easy. For example, you could declare a private, boolean variable for the form:

```
type
  TForm1 = class(TForm)
{…}
private
    { Private declarations }
    bStop: boolean;
```

The code for the button click:

```
self.bStop := True;
```

and finally, the code for the loop:

```
self.bStop := False;
while true do begin
{your processing code here}
application.processMessages;
if self.bStop then break;
end;
```

The key line here is application.process Messages, which allows Windows to process the click. This is the way to do it in Delphi 1.0 (Fig 4). In Delphi 2.0 or 3.0 you could also use a thread, so that the loop executes as a background process. Thread objects have a Terminate method.

Q I am an Access 7.0 programmer considering moving to VB 5.0. I'm trying to investigate VB's strengths and weaknesses in accessing databases. In Access, a sub form can represent a group of records. Access also allows you to change field types to a combo or list box which can show the user data while saving different data (bound data) to the record (a numeric Primary Key, for instance). Can the VB's DBGrid use list and combo box in this way? Is there an alternative approach?

Fergal O'Connor

A In a relational database you will generally have fields in a table which are meaningless on their own, but which map to records in another table. This is a problem for data entry, since a user can hardly be expected to remember that A001 stands for a left-handed tin opener, or whatever.

Fergal uses a feature of Access that displays such a field as a combo box within a grid cell. The combo box looks up the meaningful names from the linked table while storing just the

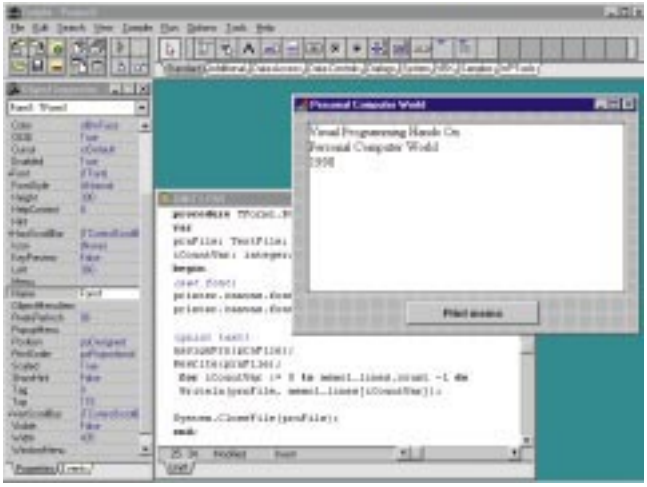

Fig 3 How to print a memo in Delphi. This is Delphi 1.0.

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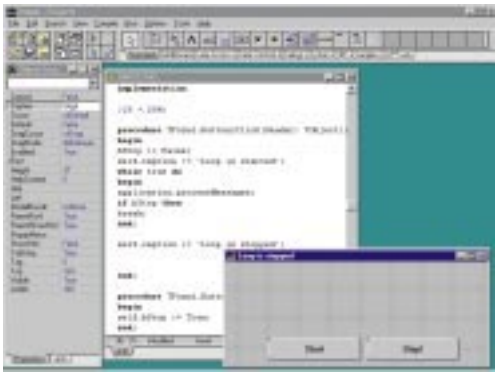


Fig 4 **A simple way to interrupt a loop in Delphi**

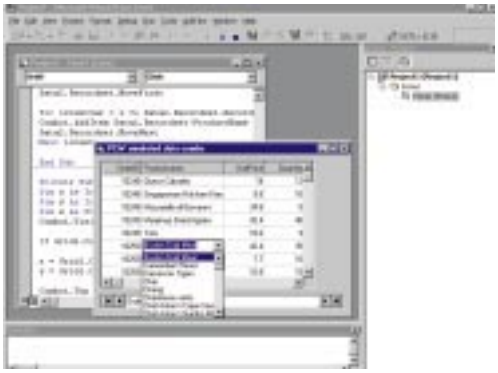


Fig 5 **It looks like an in-cell data combo, but this is really a FlexGrid with an unbound combo control superimposed over a cell**

key value in the table to which the grid is bound. Can you do this in Visual Basic? The short answer is that none of the controls supplied with VB have this functionality. You can get it by obtaining one of the third-party data grids, for example Sheridan's Data Widgets or Apex True DBGrid Pro. These have data combos that can be embedded into a grid cell, providing exactly this kind of lookup (see also, Fig 5).

That is a good solution, but if you would rather not purchase an add-on you can achieve a lot using just the controls that come with Visual Basic. For example, the FlexGrid has a CellLeft and CellTop property. When the user clicks on a cell, you can use these properties to move another control into position over the cell, simulating in-cell editing. If the other control is a combo box which you have filled with values from a lookup table, then you can achieve an end-result very like an in-cell data combo. You will have to write your own code to ensure that the right value gets stored in the table. This should work well as long as the lookup table is not too large, in which case a drop-down list is not a good idea. A snag is that since FlexGrid cells are not editable, you will have to do the same trick with an edit control for any other fields where you want to simulate in-cell editing.

There are many other ways to design an interface. A move from Access to Visual Basic is a good opportunity to rethink and perhaps come up with a different approach.

Q I am trying to write some software for my children and want to play sound files in response to events. I have no problem with this, using a hidden MM Control, but wish to make up a response from a sequence of files depending on the event. The way I am approaching it only plays the last of the sequence of sound files. For example, "NoNO.Wav" and "TryAgain.Wav" and "a.Wav" only plays "a.Wav". Can you point me in the right direction? (I am using VB 5.0.)

Richard Norton-Hall

A This problem is one of timing. You need to set the filename property of the multimedia control to the first .WAV file, open it, play it, wait for it to finish playing, close it, and repeat the process with the second and subsequent .WAV file. Simply putting all these statements in a procedure won't work, as VB has no way of telling when the multimedia control is ready for the next command.

When you ask the multimedia control to play a sound file, you are initiating a process outside the immediate control of Visual Basic. If you simply put one play command after another, your VB routine won't wait for the first to finish before sending the second, and the multimedia control will report an error.

There are a couple of solutions. One is to use the control's Wait property. This tells it not to return control to Visual Basic until the command has finished. You have to reset the Wait property after each command. If you put the filenames for a sequence of three .WAV files into an array called SoundsToPlay, then you could write code like that shown in Fig 6.

A neater but more complex approach is a callback function. The Multimedia control has a Done event which you can configure to fire when a command has executed. The Notify property determines whether the Done event fires. You could set the event to call a PlayNextSound function, to play the next sound in your sequence, but care is needed to ensure that the Close command executes before you change the filename property and re-open it. The advantage is that your application remains responsive while the sounds are playing. This is an important technique for all kinds of asynchronous programming; communications is the most common example. It is better to do things this way than to use polling, where your application repeatedly tests for a condition to be true before proceeding. Polling is a crude solution because it wastes processing time.

Fig 6: Reset the Wait property

```
Private Sub Command2_Click()
Dim iCountVar As Integer

For iCountVar = 0 To 2
MMControl1.filename = SoundsToPlay(iCountVar)
MMControl1.Wait = True
MMControl1.Command = "Open"
MMControl1.Wait = True
MMControl1.Command = "Play"
MMControl1.Wait = True
MMControl1.Command = "Close"
Next iCountVar

End Sub
```

PCW Contacts

Tim Anderson welcomes your Visual Programming tips and queries. He can be contacted at the usual *PCW* address (p10) or at visual@pcw.vnu.co.uk
Active TreeView £163.33 (£139 ex VAT) and **Calendar Objx** £135.13 (£115 ex VAT) both from Contemporary Software 01344 873434 www.contemporary.co.uk
AnswerWorks can be downloaded from www.wextech.com and is stocked by Grey Matter 01364 654100
Object-Oriented Programming in Java (Waite Group, £56.49 book and CD) from Computer Manuals 0121 706 6000

Tapping into **SAPS**

The problem of outbound comms in organisations can be eased by sharing modems using third-party software, and your best bet might be to make use of SAPS, advises Bob Walder.

After a couple of heavy months on the tutorial front I am sure most of you are sick to the back teeth of netmasks, octets, subnets and all things TCP/IP related. So this month, by way of a break, I am going for a more eclectic approach with a few questions, product reviews and book reviews.

I am going to start with a question I received from Steve Barry, which I will deal with here rather than in our general Q&A section because it leads into a relevant product review.

Steve says: "*I am trying to find out how to share a modem as a 'resource' on the network. In a recent column you referred to sharing resources but did not say whether a modem was included. In the Windows 95 manuals and the help files it intimates that a COM port can be shared, but does not tell you how. I have even got hold of a Microsoft Windows 95 Training Manual and although this talks about it, it does not tell you how to do it. Can you help?*"

LANs were introduced, and have become increasingly popular, on the back of their ability to share scarce or expensive resources between large numbers of users. On most networks these will include the obvious such as printers, plotters, scanners, tape drives, optical drives and large disk sub-systems.

Many companies, however, continue to purchase a number of modems and dedicated phone lines to provide users with outbound data communications. As an increasing number of users take up web surfing, the requirement for high-speed modems is increasing and so, therefore, is the cost. This is all well and good, but few users require outbound communications for more than a few minutes each day. This means that expensive modems and telephone lines, for which rental is being paid even when not in use, are lying idle.

What is required is the ability to share a small pool of modems and phone lines between a large number of users. Provided that the pool is populated with enough modems to cater for peak usage requirements, few users should ever have to wait for their data comms. It is also far more palatable to see relatively few communications resources lying idle during the quiet periods.

SAPS

Until Microsoft puts some real effort into COM port sharing, third-party solutions remain the best bet. SAPS (SpartaCom Asynchronous Port Sharing) is actually a family of software products which allows peer-to-peer sharing of COM ports between Windows and Windows NT LAN workstations. This allows network administrators to share one or more modems over a network without going to the expense of providing each user with a dedicated modem and telephone line. The product is designed to run on most NetBIOS-compatible Network Operating Systems (NOS) and also supports the Microsoft LAN Manager and IBM LAN Server COM port sharing on OS/2 servers.

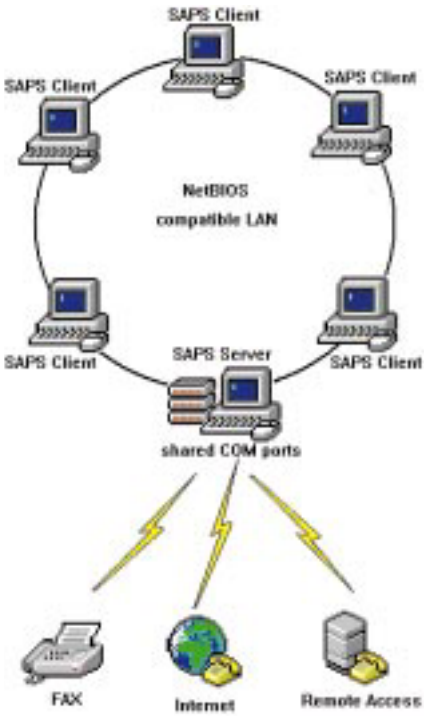


Fig 1 **Sample network using SAPS**

SAPS is made up of two components: namely, the SAPS Server and the SAPS Client. The SAPS Server component is available for Windows for Workgroups, Windows 95 and Windows NT. Clients available include DOS, Windows 3.x, Windows for Workgroups, Win95 and NT.

With SAPS, all Windows workstations on the network are allowed to share the modems (or any other asynchronous devices such as ISDN adapters, X.25 PADS etc) attached to the COM ports of other Windows PCs or NT Servers on the network. Each network station with one or more COM ports to be shared must have the SAPS Server software installed and each client wishing to use the shared COM port resources must have the SAPS Client software installed. A SAPS server does not have to be dedicated to the task of sharing COM ports and can function happily as a normal network client while other stations are using its communications resources. It is possible to install the SAPS Server and Client software on the same machine, which is necessary if a SAPS Server wishes to use its own COM ports.

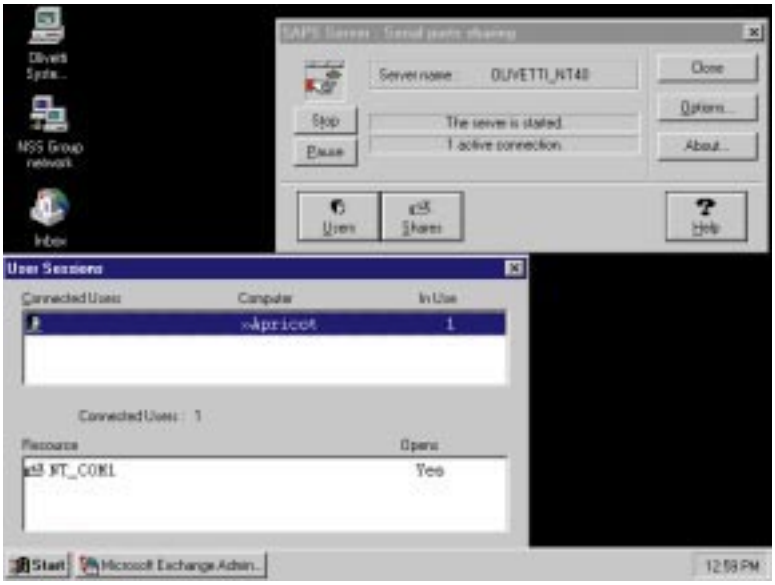
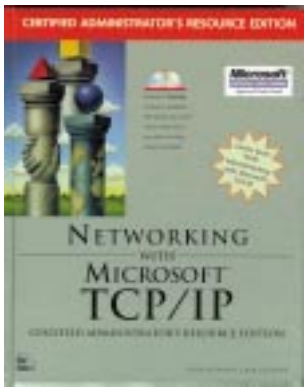


Fig 2 SAPS Server and Client in operation

Book Review



■ **Title** Networking with Microsoft TCP/IP
Author Heywood & Scrimger
Publisher New Riders
Price £51.49

Given the topics covered in my column over the past couple of months, I thought it might be an idea to try and find another good book on TCP/IP. For those with a few weeks to set aside — this book has 650 pages and a CD-ROM — and a leaning towards the Microsoft environment, this book could be worth a read.

If you have struggled with my brief tutorials on TCP/IP addressing, then this book covers the basics of TCP/IP theory, including the OSI model, subnetting and routing, far more thoroughly than I have space to do here. And that is only the opening chapters.

Other topics covered include Microsoft TCP/IP Services such as Internet Information Server, printing, DHCP, WINS and DNS. The NT Browser service and its effect on TCP/IP is covered and there is a chapter on TCP/IP utilities, management, and RAS with TCP/IP.

For anyone with a Microsoft network this is great stuff, since the theory is closely coupled with actual relevant product examples rather than being aimed at Unix buffs, as with most TCP/IP books. The writing style and layout make this book easy to read.

Although a tad on the expensive side, this title covers every TCP/IP-related topic you are ever likely to encounter on a Microsoft network and is an approved study guide for exam 70-59 "Internetworking with Microsoft TCP/IP". The included CD even contains TestPrep software which simulates the actual Microsoft exam.

• *My thanks to Computer Manuals for keeping me supplied with review samples.*

The SAPS Server for Windows supports the sharing of up to nine COM ports (COM 1 to COM 9) while the NT version supports an unlimited number of COM ports. With NT 3.51 and above, SAPS can even share a COM port that is assigned for use by RAS.

Installation is a breeze, with all client and server software supplied on a single disk. Running the SETUP program takes only a couple of minutes and copies a few programs to the local or server hard disk, as well as adding a SAPS icon to the Control Panel. This icon is used to configure the SAPS system, which is no more complicated than specifying which ports are to be shared, giving them a name and assigning them a password if required. Access security is provided via the use of passwords for each shared COM port. While only share level security is provided under Windows, Windows NT offers both share and user-level security, as you might expect. Client installation is similarly straightforward.

Once SAPS is installed and configured, the workstation users can run their favourite Windows communications program to access the shared COM port resources just as if the shared devices were attached locally to their computer. The client software

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does not have to be network-aware to use SAPS, with either NetBIOS or Int 14 being used to redirect comms traffic transparently across the network.

The "Asynchronous Port Manager" allows manual connect and disconnect to shared COM ports, although SAPS can be configured to provide automatic reconnection (transparent to the user) to a shared port or pool. In this case, connection is made automatically whenever a communications application attempts to open the local COM port. SAPS also provides for automatic disconnection from a shared resource when an application closes the COM port or after a specified period of inactivity.

Pools of COM ports (modems or asynchronous devices) can be defined and shared as a single logical device, and the ports can reside on a single PC or be located across several network stations. When a workstation COM port is then redirected to a shared COM-port pool, SAPS will locate the first available COM port in the pool and assign that port to the requesting application.

This would probably be the preferred method of working for most environments, since it would allow the selection of the actual shared port to be removed from user control, thus streamlining the procedure, as well as making it as transparent as possible for the user.

SAPS is packaged and priced well, and it is extremely simple to install and use. Even sharing a single modem between as few as five users, SAPS could pay for itself in no time at all, especially given the price of today's high-speed modems and telephone lines.

For further product details or current pricing information, contact the UK distributor, ICON, on 0181 357 3600.

Questions & Answers

Q I am desperately trying to get file sharing working across a Novell 3.12 thin ethernet running Windows 95. All seems to be going according to plan — drivers loaded and so on — but when I attempt to access a shared drive on my colleague's PC there is nothing in their folder to access, even though full rights have been granted.

I note in a recent column of yours that you mention using share-level security, but when I attempt to set up sharing with Novell, this option is not available to me. What am I doing wrong?

Chris Smith

A First of all, I would ask that you re-read that column and make sure you have followed the steps exactly. Can you see the other PC when you browse the network from yours (check out the My Network folder in Windows Explorer)? If not, you have not installed the networking components correctly.

If the remote PC is visible, can you see any shared drives? If not, you did not share the drives correctly — that, too, is covered in my previous column (check out our *PCW* CD or web site if you do not have the magazine). It is important to remember that this peer-to-peer stuff is a function of Windows 95 and has nothing to do with NetWare. Therefore, there is nothing you need to set within NetWare to enable sharing at the client.

However, this is an ideal point at which to cover a topic I promised to revisit some issues ago: that of using Windows 95 as a client to an NT or NetWare server, rather than just as part of a peer-to-peer network. For the sake of clarity I will stick to a Microsoft environment, but the same procedures I am about to describe work equally well for those who have installed the Client for NetWare Networks and wish to authenticate to a NetWare server.

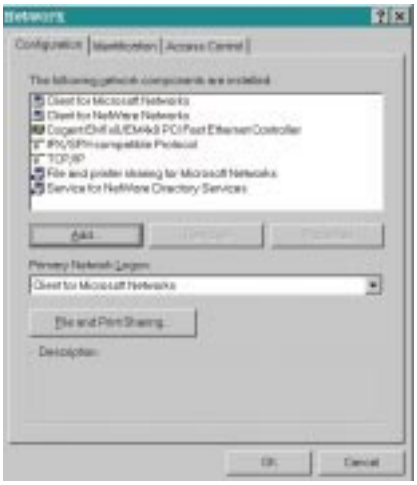


Fig 3 **Select the appropriate Primary Network Logon**

p306 ➢

Questions & Answers (cont'd)

In addition to the share-level security covered previously, user-level security is also supported under Windows 95, which allows either an NT or NetWare server to authenticate all Windows 95 clients against the Domain database, NetWare Bindery or NDS tree. This provides a much higher level of security than when using share-level security alone.

1. Select the Network Icon from the Control Panel and ensure that the "Primary Network Logon" field contains the appropriate client (Fig 3), depending on the type of server to which you wish to authenticate (NT or NetWare).
2. Next, select the Access Control tab (Fig 4) and check the "User Level Access Control" box. Enter the name of the authenticating system, which can be an NT Server, and NT Domain or a NetWare server. This is the system from which Windows 95 will obtain a list of users and groups for you to set the security on your shares.
3. It is time to share our drives again: select any drive or directory in Windows Explorer and right click on it, then select the "Sharing" option. You will see this screen is different from the share level security version, since you now have the ability to determine security on a user-by-user basis, the list of users having been obtained from the NetWare or NT authentication source specified in step 2 (*above*).
4. Click on the Add User button to see a screen like that in Fig 5. Select those users or groups you wish to allow access to your shared resource and click on either the Read Only, Full Access or Custom buttons. It's as simple as that.

Fig 4 Setting User Level access control

Q I am using Windows 95 with a US Robotics 33.6 Modem on COM 1, but I also have a 3Com Sonix Remote Office 500 Router. As this router is sitting idle, I wanted to take advantage of ISDN speeds when connecting to Pipex Dial. My problem is that I am being pushed from pillar to post by Pipex, Microsoft and 3Com trying to get the router configured. As the router cannot be detected as an ISDN terminal adapter, any configuration I try to set up through dial-up networking is automatically trying to apply to my modem through one of the COM ports. I have configured the router internally via the QuickLink Configuration Manager and have entered my ISP-allocated User name and password, the ISP address and so on, but I cannot get it to do anything. I keep getting referrals to ISDN accelerator packs and SYNCPPP but cannot make head nor tail of this.

One further thing: in the Pipex ISDN help notes, it says at some point "Note that your modem/TA should already have been installed from Add New Hardware in control panel. If you have a Network card adapter select the primary channel, usually B1." Well, I can't even find this!

Marc Derricutt

A It is difficult to give any sound advice on this without seeing the configuration, but here are some pointers:

1. Pipex Dial is a single-user dial-up account. It is designed to provide a single dynamically-allocated IP address to a single client each time a connection is made. Thus, it is impossible to configure this as a routed account (i.e. you need a single machine with either a modem or an ISDN TA to make a direct connection).
2. Your Sonix device is a router, not a TA. Referring to my previous article on TCP/IP which touched on routing [*PCW*, Jan] you will remember that the router is attached directly to the network and is configured as the "default gateway". This is used to connect more than one user to the net and provide dial-on-demand net access. In other words, each time a user tries to make a net connection, the request is forwarded to the default gateway, the router raises the ISDN line and the connection is made.

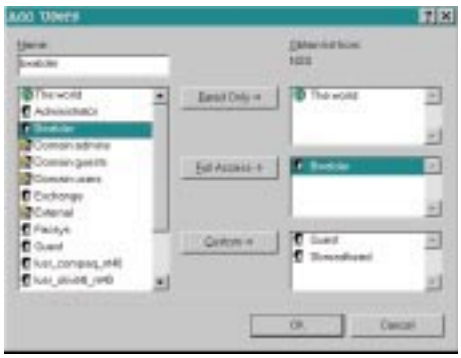


Fig 5 Setting User Level security

Trying to put together the single-user dial-up account and the router, then, is clearly not going to work. But there are a few possible solutions:

1. Get an ISDN TA and use that instead of your modem to get ISDN speeds with a dial-up configuration (provided this is supported by your ISP). This is probably a non-starter, though, given the fact you are trying to make the best use of existing kit (i.e. the router).
2. Use Network Address Translation (NAT). This is where your router pretends to the outside world that there is only one IP address using the ISDN line, even though your entire LAN is behind it.

NAT operates on a router, usually connecting two networks, and translates private (unregistered) IP addresses in the internal network into legal (registered) IP addresses before packets are sent to another network (such as the web). As part of this functionality, you can configure NAT to advertise only one IP address for the entire network to the outside world. This is exactly what you need to provide a routed connection via your single-user account — and this approach provides added security, too, because it effectively hides your entire internal network from other networks. I do not know, though, whether your router supports NAT (check with 3Com).

3. Get a "LAN account" from Pipex. It allows you to have some or all of your LAN clients attached to the network as per my article [*PCW*, Jan]. This may be your only solution, but it costs far more than you currently pay for your single-user account.

PCW Contacts

Bob Walder can be contacted via the *PCW* office (p10) or email networks@pcw.vnu.co.uk

New beginnings

New PC? Just getting started? Worried by Windows 95? Lynley Oram's guide will get you off your starting blocks. There are some great handy hints and whizzy ways with wallpaper, too.

Did you get a new PC for Christmas, or manage to snap up a bargain in the January sales? If you are using Windows 95 (Win95) for the first time, here are some tips and explanations to help you get started.

First off

Users migrating from Windows 3.x will notice that the Program Manager no longer exists and File Manager has disappeared altogether — a disconcerting realisation, which can be followed by a momentary anxiety attack, as it gradually sinks in that you've no idea how to navigate your way around. You will also find that File Manager has been replaced by something called Windows Explorer, but more on that later. Die-hard Windows 3.x users can still run Program Manager and File Manager by typing **program.exe** or **winfile.exe** at the Run option on the main Start menu.

Have some fun with your new operating system. Right-click on everything: this will reveal either a range of specific functions, or a description of its function. Windows help can be accessed at any time by hitting the F1 button.

Taskbar and Desktop

- Everything in Windows 95 hinges on the Start button on the Taskbar. Programs, applications, utilities, games and anything else you might have on your system can be accessed with the Taskbar via a series of menus, by left-clicking on the Start button.
- The first time you switch on, the Start button will be located at the bottom left of your screen. Move your Taskbar if you're not happy with its location (former Mac users may feel more at home with it at the top of the screen). Just click anywhere on the bar with the left mouse button, hold down, and drag the bar into place.
- Every so often, Windows 95 will do a few things that you weren't expecting. Figuring out how to undo an action can be a mind-numbing experience if you haven't the foggiest idea what you did in the first place. So if your Taskbar has suddenly doubled in bulk, bear in mind that the size of the Taskbar is adjustable. Grab the edge of it with your mouse when the cursor changes to a double-sided arrow, and drag the taskbar to the size you want.
- The Desktop is less cluttered in Win95 than in previous versions. Minimised applications sit on the Taskbar as tiles inscribed with the application's name and icon. This way, you always know exactly which applications you are running at any time. Just clicking on the relevant tile will maximise the application again. You can still navigate between open applications by holding down the Alt and Tab keys.
- Do you like to keep an eye on the time? A digital clock should be visible at the right-hand side of the Taskbar. If not, left-click on the Start button, move to Settings, select Taskbar and check the Show clock box.

While you are in there, try ticking the Auto hide box to make the Taskbar disappear: it's still there, but it won't be taking up screen space. Moving the cursor to the bottom of the screen will cause the Taskbar to pop up again.

Of course, there is a quicker way to open this dialog box. In Win95 there's *always* a quicker way and it usually happens by using the right-click button on your mouse: point your cursor over the Taskbar, right-click and choose Properties.

Resting the cursor over the clock will bring up a little date box, in a format known as a tool-tip box. Both of these should be showing the current date and time. Double-clicking on the time will bring up the Date/Time properties box. Use it to adjust system date and time, your time zone and the daylight saving setting.

- Another icon which is handy to keep on the Taskbar, so long as you've got a sound card fitted, is the volume control. This looks like a little yellow megaphone. If the company from which you bought your PC hasn't already set this up, do it yourself using the Win95 Control Panel. Like everything in Windows 95, this can be accessed in a couple of ways: by double-clicking on the My Computer icon, or by going to the same Settings menu in which you found the Taskbar.

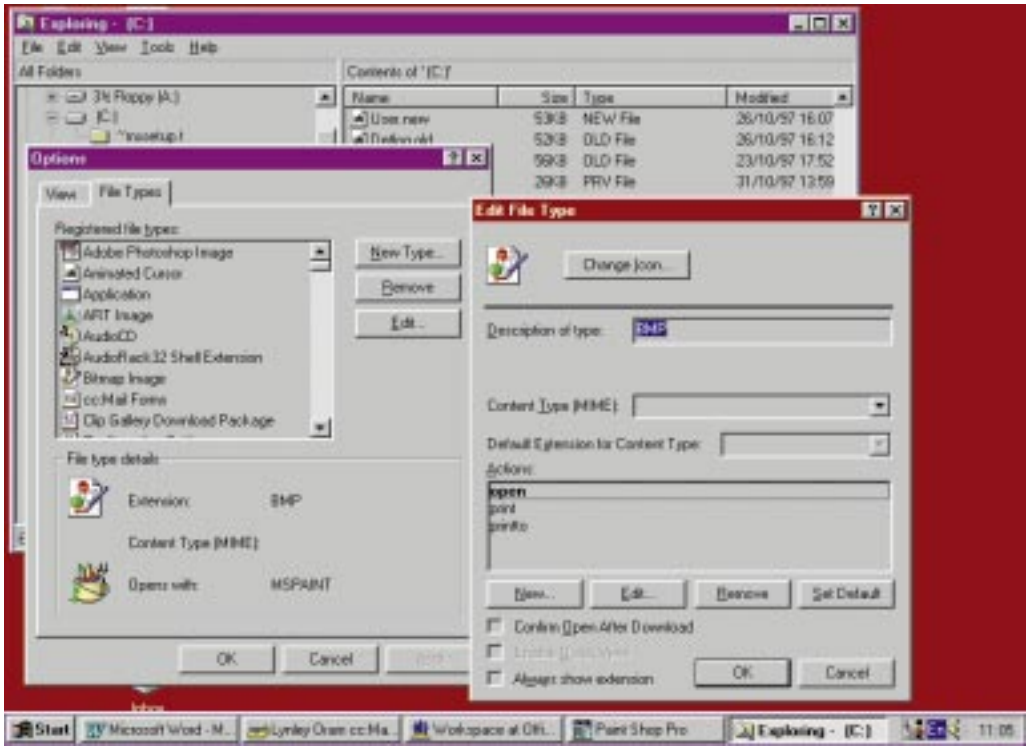
Your first instinct may be to click on the icon called Sounds, but this has nothing to do with making music using your PC. It is where the sound files are kept, for the noises the PC makes when you start up, shut down, make a mistake, empty the recycle bin and so on. Instead, click on the Multimedia icon and tick the Show volume control on the Taskbar box.

Clicking once on the volume control icon will bring up a single volume bar with a mute box. Double-clicking on the icon will bring up a range of other volume bars.

If your PC has more than one device, say a MIDI or Wave device, you can set the volume for each. If there are devices missing or you don't want them displayed, go to the Options menu and select properties. Tick the boxes next to the devices you want to see displayed.

Windows Explorer

- There are a couple of ways to find Windows Explorer. Click on the Start button, move up to Programs and down to Windows Explorer. A quicker way is to right-click on the Start button and choose Explore. This is also a much quicker way to open up the Find File dialog box.
- It is possible to change the name on any folders, but don't do it if the folders are likely to contain program files; Windows won't be able to find the right path and you won't ever be able to execute that program again. This could be particularly nasty if a system file gets moved, renamed or deleted, so be careful about how much unsupervised access you give the kids.
- There are folders which are OK to rename: the My Documents folder, for instance. Highlight the target folder by left-clicking on it once, then pull down the File menu and select Rename. Or you can left-click on it once, wait a couple of seconds, and hit the F2 button or left-click again.
- The contents of a highlighted folder will be shown in Windows Explorer's right-hand pane. These can be sorted by clicking on any of the tiles at the top of the panel, specifically name, size, type, modified.
- If it helps, you can change the file type



You can change the file-type description to anything you like. In Windows Explorer go to View, Options, File types. Select the file type you'd like to change, and press Edit. Making the type name shorter (for instance, changing bitmap image to BMP) may make it easier for you to find, and it will leave you more room for the display of long file names

description to anything you like. In Windows Explorer, go to View, Options, File types. Select the file type you'd like to change, and press edit.

If you make the name shorter — changing Bitmap image to BMP, for example — the Type column will take up less space and you will have more room for the display of long file names.

● It is true that under Win95 you can now use long file names. These can have as many as 255 characters per file, or 260 characters per folder. The catch is that a full path name is restricted to 260 characters as well. It's advisable to restrict the length of names to 70 characters or less.

Take a shortcut

Shortcuts are a handy way to keep your favourite applications and files just a couple of mouse clicks away. You could place shortcuts to your most-used applications, files, folders and drives directly onto your desktop for quick and easy access. The original files remain where they always were, but double-clicking the shortcut activates them as if you were clicking on the real thing. Shortcuts are identifiable by a small arrow pointing inwards, in the bottom left corner of the icon.

● To create a shortcut to anything, open Windows Explorer, select a file/folder, right-click on it, hold the button down and drag it onto the desktop. When you let go, another menu will pop up; choose Create Shortcut.

● To create a screensaver shortcut, scroll down to the Windows folder. Nested inside it is another folder called System. Click on System, and a whole pile of folders and files will appear in the right-hand pane. The quickest way to find the screensaver files is to click on the Type button and scroll down.

● It is a matter of personal preference, but many people like to use keystrokes to perform a task, rather than the mouse. Knowing a few of these can come in handy if you lose your mouse/cursor for any reason. If your PC is new, then it should have a Win95 keyboard. Tucked in between Control and Alt is a key with the little Windows logo on it. Hitting that key will cause the Start menu to pop up and you can navigate using your arrow keys. A combination of the tab key and the arrow keys will get you just about anywhere you want to go.

● If you don't like the colours that Microsoft has chosen for you, have a play with the Display properties. Pick an empty part of your desktop, right-click, and select Properties. At least four tabs will be visible: background, appearance, screensaver and settings.

● If you don't like any of the wallpaper patterns on offer, create one of your own. For instance, next time you are browsing the web and see an image you like, right-click on it and select Set As Wallpaper.

● The Appearance tab is a great way to while away a few hours. Customise… well, just about everything.

● I find that it's a lot easier on my eyes to maintain the background of Word documents as a light grey rather than bright white.

In the Appearance tab, left-click on the Item menu. Scroll down to select Window. There's a little colour menu next to the Item menu. Click on this to choose a new colour. The best bit is that you get to see an example of how your selection will look before applying it. Remember to save your new colour scheme under a new name, so you can return to standard colours if desired.

● While you are in the Display Properties, make sure that your Refresh Rate is set to an acceptable level. Your computer is constantly redrawing the picture on your screen. If this is done fast enough, your eye won't detect any movement.

The speed at which the picture is redrawn is known as the refresh rate. If that is not set high enough (it should be set at a non-interlaced level of 75Hz or higher), then your eye may be detecting a flicker and this will cause nausea and headaches.

● In the Display Properties box, click on the Settings tab. There will be an Advanced Properties button here, so click on that. In the Adapter tab, there will be a drop-down menu headed Refresh Rates. There should be a range of rates available. Sometimes there may only be two options, Adapter Default and Optimal.

PCW Contact

Lynley Oram welcomes feedback and suggestions from readers. Email her at beginners@pcw.co.uk

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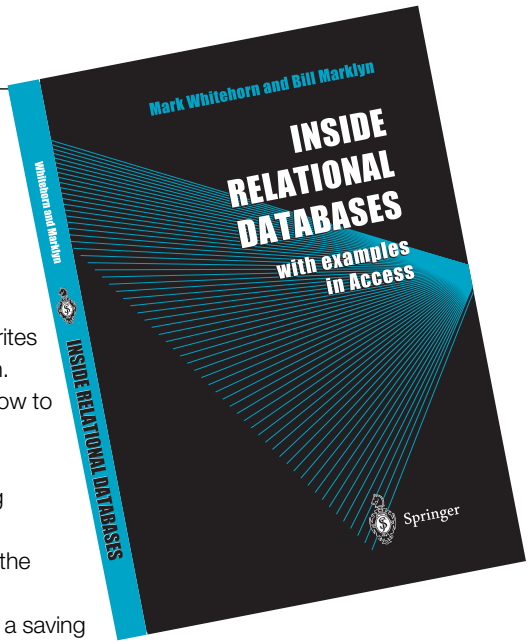

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(*reviewed in PCW November, p329*)

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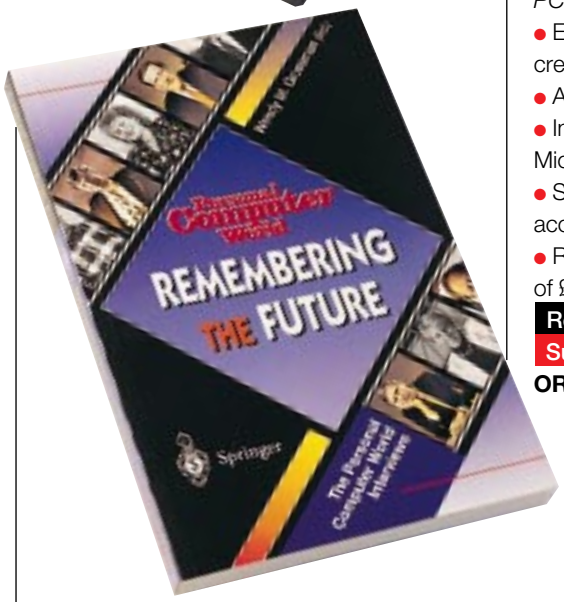

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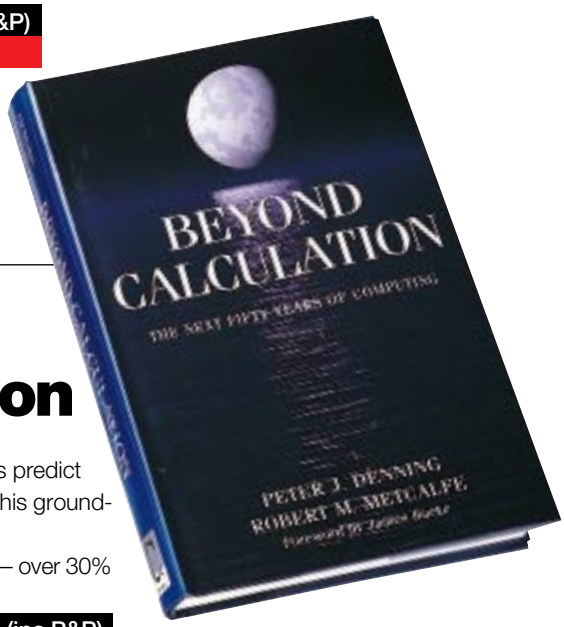

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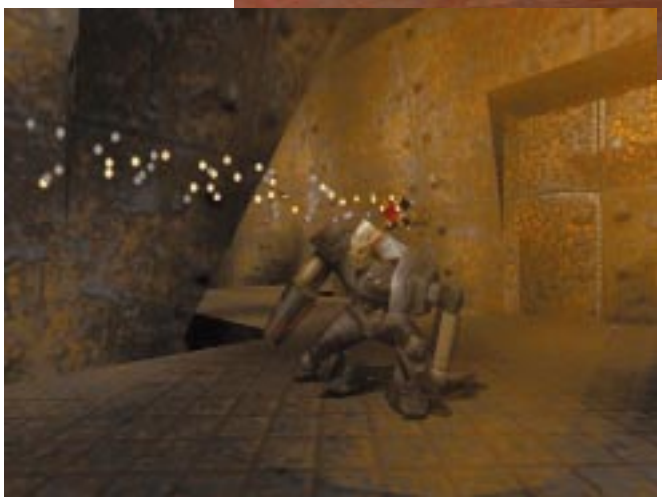
Quake II

You'll be blasting like a good 'un or quaking in your boots.

Quake II, from id Software, is the continuation of one of the most successful action adventure games ever produced. The new game isn't so different from version one, but the enemy is. You are an intergalactic marine sent to take out a new enemy of the earth, called the Stroggs. These alien beings, half-flesh, half-robot, have used a black hole in the universe to travel to earth, with the sole purpose of total conquest. Not only are they after all of earth's resources, but the human race is a target too, for we make a tasty meal at lunchtime and provide those spare body parts they need to keep alive. Like in the first Quake, you alone take the battle to the enemy, with the purpose of assassinating their leader and destroying the black-hole portal.

Left Half-flesh, half-machine, the Stroggs just want one thing. You!



Below Shoot and run! That's the only way you'll take this tank out

Quake II is divided into eight large units and each unit has a number of levels to complete before you can move onto the next unit. Unlike the first Quake, you can move back into a completed unit to collect items that you may have missed the first time around. It also has mission objectives, relayed to you via your field computer, that you must complete before you move on to the next unit. You'll find the usual tricks and traps, such as secret rooms and compartments, but there are lots of new features.

The weaponry is outstanding and, of course, out of this world. Aside from your standard blaster you get the usual shotgun and grenade launcher variants, but Quake II ups the firepower ante with lovely items like the Hyper Blaster and the BFG (we'll let you figure out what those letters stand for). There's also lots of new armour and accoutrements, such as the Bandoleer that lets you carry more ammo.

The gameplay is great but much more difficult than in the original. You'll need to have quick fingers and a good knowledge of all the right keystrokes before you master this game. You can no longer just point and shoot at your targets with ease: now you have to sight them with your crosshair to get an accurate shot, and that isn't always easy because the Stroggs duck and dash all over the place. And if you hit them, don't expect them to die with ease — they have this nasty habit of getting off one last, spasm-induced, death-throes shot at you. I'd be less than honest if I said I didn't find this aspect of the game a bit distasteful. Many of us may be desensitised to the gore of most action games, but I thought the death spasms were going a bit too far. But if you can ignore that, then you won't be disappointed by the non-stop action.

Technically, the game is brilliant. Installation is simple point-and-click but you will need Windows 95 or NT 4.0 plus a minimum of 25Mb of hard-drive space, but that's only if you run from the CD-ROM alone. Otherwise, a normal install will set you back 250Mb and a maximum install 400Mb. id has included all of the required patches for Quake II to run on the various optimised 3D graphics cards: a 3Dfx-based card (Orchid and Diamond), PowerVR (VideoLogic and Matrox), and the OpenGL drivers are ready to go — all you have to do is select the right option. You also have multiplayer games over a LAN network or the internet.

This is a game of serious action and great graphics that will test your gaming skills to the limit. If you can stand the gore and the awful death spasms of your victims, you'll love it.

Dylan Armbrust

PCW Details

Price £39.99

Contact Activision 01895 456700
www.activision.com, www.idsoftware.com

System Requirements P90 processor (P133 recommended), Windows 95 (16Mb RAM) or NT 4.0 (24Mb RAM), 100% Sound Blaster-compatible sound card, SVGA graphics card, 4X CD-ROM drive, minimum 25Mb hard-drive space (250Mb recommended).

★★★★

p314 ➢

Pawn stars

Picking up the pieces, with ChessMaster and Combat Chess.

Left With ChessMaster, your search for Bobby Fischer will be complete

Below Who says chess has to be a bore? Not with Combat Chess

The ChessMaster series has an impressive selection of teaching aids catering for all levels. Those who want to learn advanced tactics and what the program calls "Advanced Middlegame Theory" should find just as much useful information as users who will be enlightened by one of the first lessons — that you can only move one piece at a time. With 268 interactive tutorials, 30 Grand Master personalities to tackle and support for the TASC smartboard, you'll find this an impressive package. You only come to realise how much work the new 32-bit Pentium optimised engine is doing when you activate the Think Lines module to show the moves being considered. In the time it took us to place a single pawn, ChessMaster had already analysed and discarded well over a million possibilities of its own. Similarly, the Visual Thinking option lets you peek inside ChessMaster's mind to see its thought process in the form of pieces moving around on a small 2D board, while Natural Language Advice will talk you through a suggested move, and all of the likely implications, in plain English.

A wealth of board and piece designs, and the option to customise your playing area, make for a nice interface, but the limited selection of MIDI music is irritating in the extreme and we turned it off.

Fire-breathing dragons, bishops with deadly neon crosses, and knights so fierce they would make the four horsemen of the appocalypse look about as frightening as Shetland ponies, meanwhile, stamp around the forbidding board of Combat Chess. This is a fairly violent game, and the writers have offered us a "No Gore" option that can be activated to protect impressionable young eyes. Once initiated, it is impossible to deactivate it from within the game.

Characters fidget if you do not pay them enough attention, and all sound options, from the level and amount of ambient noise to the speed of the catchy percussion track, can be altered to meet individual tastes. Over 600 super-smooth animations ensure that pieces don't just take each other, they slaughter. Acrobatic knights slash the dragon pawns to death, while scantily-clad queens stab, shrink or find some similarly nasty way to despatch their adversaries.

The computer's expertise can be customised and once we had found a level to suit our rather mediocre abilities, even we were able to put it into checkmate. Five clock settings, including time restrictions and "Blitz" play where a game must be completed within a certain timeframe, will keep you on your toes, while clicking on a piece will highlight the squares to which it can move. Selecting a destination square, meanwhile, will do the reverse to show which of your pieces can move there.

Chess is a game and as such it should be fun. Combat Chess has got this right, but we found ChessMaster dull and straight-laced. This is evident as early as the loading screens. Combat Chess opened with a brutal animation and accompanying sound effects, while ChessMaster presented us with a rambling narrative from 20-year-old Josh Waitzkin, subject of the film *Searching for Bobby Fischer*, about how he "could feel all the human emotions building through the 64 squares" of a chess board. He ought to get out a bit more.

Nik Rawlinson

PCW Details

ChessMaster 5500 Deluxe

Price £39.99

Contact Mindscape 01444 246333
www.mindscapeuk.com

System Requirements Pentium 90, Windows 95, 16Mb RAM, 13Mb hard-disk space, CD-ROM drive, 1Mb SVGA graphics card.

★★★

Combat Chess

Personal Computer World Recommended

Price £29.99

Contact Empire Interactive 0181 343 9143
www.empire.co.uk

System Requirements Pentium 90, Windows 95, 8Mb RAM, 7Mb hard-disk space, CD-ROM, 2Mb SVGA graphics card.

★★★★★

A Bridge Too Far

The grim realities of real WWII combat brought vividly to life.

The latest addition to the war-game genre, A Bridge Too Far, is based on Operation Market Garden from WWII. Put all thoughts of the star-studded 1977 Dicky Attenborough film aside; this is a game filled with the grim realities of war. The WWII operation was an attempt to take control of five strategic bridges in a sixty-mile corridor stretching from Eindhoven to Arnhem.

Surprisingly, Operation Market Garden was not set in a market garden

We all know war is hell, but it isn't until you play A Bridge Too Far that you realise how complicated it is. True line-of-site (if you can't see 'em, you can't hit 'em) means that you have to manoeuvre your forces into the right positions before engaging the enemy. Even taking the most weakly-defended enemy position needs strategy and patience, and will probably result in more than a few casualties. Each soldier in A Bridge Too Far has a name and a set of statistics, including fatigue, morale and ammunition. The precise state of a soldier's wellbeing will determine how quickly, if at all, he responds to your commands.

The manual and well-constructed demos make getting to grips with all the features of this game relatively painless. Great if you can spend hours immersed in battlefield strategy and real-time combat.

Adam Evans

PCW Details

Price £34.99

Contact Microsoft 0345 002000
www.microsoft.com/games/

System Requirements Pentium 90, Windows 95 (16Mb RAM) or NT 4.0 Service Pack 3 (24Mb RAM), 45Mb free hard-disk space, 4X CD-ROM, 2Mb SVGA graphics card, 16-bit sound card, 28.8Kbps modem for internet play.

★★★★

VirtuaCop2

Go gunning for the big boss, in a game where the good survive.

The two VirtuaCops are back on the PC in pursuit of the criminal underworld, but without the arcade's hefty plastic guns, will they be any good? The stunning 3D graphics are incredibly faithful to the arcade original, with the action taking place from the two cops' shared perspective. The game's swooping camera angles scroll swiftly and smoothly, and you'll be reassured to know there is an absence of blood and gore because apparently your gun only stuns the bad guys. Action-film fans will love the end of the game where you must hunt out the big boss in his lair, a labyrinthine uber-base full of everything a master-criminal's pad should have — gantries, sentries, lift shafts and massive, pointless computer screens.

Sadly, it's not all a beautifully choreographed ode to pixellated mayhem. The Options menu is accessed through Windows 95 that is running the game in the background, and it feels cumbersome in use. It claims to allow one or two people to play, but try as I might, I couldn't manage to switch out of two-player mode, where two players' gunsights are shown on the screen. The menu also allows you to alter the game's parameters so it becomes a simple matter of blasting your way through to the end. The three levels can be completed in half an hour, before you are returned to the start, representing a shocking rate of bang to buck. Where this game will really score is in the network link-ups, which should ensure that many an office echoes to frenzied gunfire in the coming months.

It would have been more fun with a chunky plastic gun

Paul Trueman

PCW Details

Price £39.99

Contact Sega 0181 995 3399
www.sega-europe.com

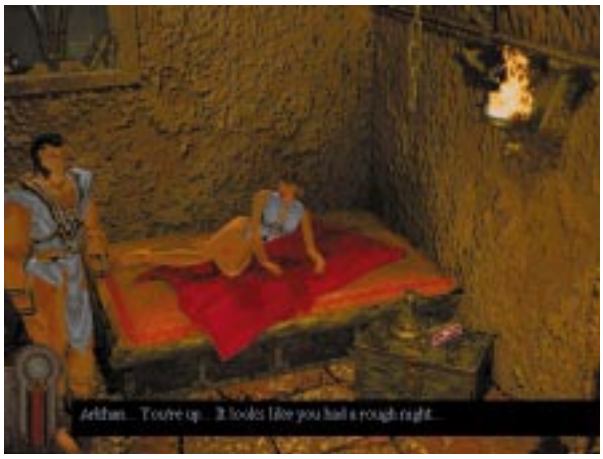
System Requirements P90, Windows 95 (16Mb RAM), 40Mb hard-disk space, 4X CD-ROM drive, SoundBlaster 16-compatible sound card, SVGA graphics card.

★★★

p316 ➢

Dark Earth

Good graphics and great action, shame about the dumb dialogue.



Some great action overcomes the cringeing conversation in this stunning-looking game

Dark Earth is actually our Earth, three hundred years in the future. Meteorites have bombarded the planet, creating a killer dust cloud. Survivors huddle in the Stallites, fortified cities under the protection of the Sun God. You play the warrior Arkhan, whose mission is to discover the secret that will restore light to Dark Earth. It won't be easy, as Dark Earth is populated by a motley cast of knife-wielding characters. You can fight in either manual or automatic mode, depending on your taste for carnage, and you can switch your mood from light to dark to fit the occasion. One minute you're all sweetness and light, the next you're doing a rather credible Grant Mitchell impression. The game's major faults are the script and the acting. Luckily, if you slip into a coma listening to Arkhan's moronic attempts at conversation (the bit when he's in bed with his girlfriend is particularly cringeable), you can always re-read it later for clues. If credible character portrayal isn't your chief requirement, though, you'll probably enjoy your time in Dark Earth.

Susan Pederson

PCW Details

Price £35 (expected street price)

Contact Microprose 01454 893893
www.microprose.com

System Requirements P75 or higher, 8Mb RAM, 4X CD-ROM drive, Windows 95-compatible DirectX 5-supported sound and video cards, 60Mb hard-disk space.

★★★

Monkey Island

Curses... Not just action and fun, but lateral thinking too.

Don't be fooled by this cartoon — Disney it ain't

The Curse of Monkey Island is like a cross between the Krypton Factor and the Muppets. As Threepwood, the would-be pirate with the heart of gold, you must woo your damsel, Elaine, rule the seas, win plunder and fame, and work your way through as many other salty clichés as the game will allow (a lot). It's all the rage these days to step outside a genre and poke fun at it, and Monkey Island is never slow at mocking itself or its company. See if you can spot the JFK gag, or the numerous Star Wars lines, like "Aren't you a little short for a pirate?"

The artwork is beautifully drawn, if a little twee in a cutesy Disney fashion, and the characters move against a largely static 2D backdrop, which means that almost any PC should be able to run the game smoothly. Interaction is through the point-and-click interface, and you can converse with the game's characters by choosing from a selection of lines on offer. Only through pursuing the right avenue of enquiry will you avoid the cul-de-sac of frustration and teeth-gnashing that can befall the unwary. If patience isn't a virtue, then you might find yourself giving up surprisingly early, because lateral-thinking is the key in this game. Keep talking long enough to *some* characters, though, and you can find yourself asking for information on anything from variable-rate mortgages to vacuum cleaners. Don't fall for this shameless attempt to make thinking fun, though. The Curse of Monkey Island is a thoroughly post-modern ripping yarn that never lets you forget that for all the sea-shanty shenanigans, it's all just a piece of well-fashioned software.

Paul Trueman

PCW Details

Price £44.99

Contact Virgin Interactive 0171 368 2255
www.lucasarts.com

System Requirements Pentium 90, Windows 95 (16Mb RAM), 1.2Mb free hard-disk space, 4X CD-ROM, DirectX-compatible SVGA graphics card, 16-bit sound card.

★★★★

Brainteasers

Quickie

Not-so-difficult logic problem:
MARY's special number is 5
JOHN's special number is 21
SALLY's special number is 17
FRED's special number is 7
JIM's special number is 6
What is **TOM**'s special number?

This Month's Prize Puzzle

This problem isn't difficult, but it requires a bit of programming effort for its solution. The first two numbers in an integer series are 0 and 1. Thereafter, each new number in the series is formed by adding the previous two values. Hence the series is:
0,1,1,2,3,5,8,13,21,
and so on to infinity.

Clearly, 4,6,7,9, etc are numbers which are not members of this series.

Now, suppose we use initial values of 0,2 instead of 0,1 to generate a second series:
0,2,2,4,6,10,16, etc.

The values 4 and 6, omitted from the first series, are now members of this new series. If we generated series using every possible pair of starting numbers less than 100, there would still be many integers that never appeard in any of the series. What would be the lowest of these?

Send your answers on a postcard, or on the back of a sealed envelope, to: *PCW* Prize Puzzle — March 1998, P.O. Box 99, Harrogate, N. Yorks HG2 0XJ, to arrive no later than 20th March 1998. *Do not send solutions on floppy disks or in envelopes*.

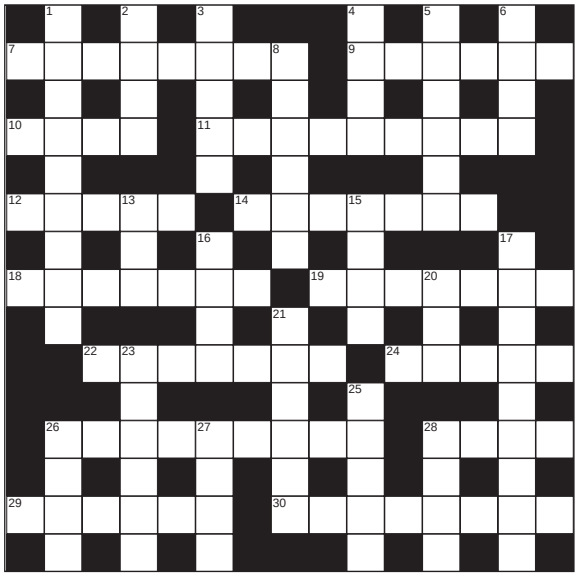
Winner of December 1997 Prize Puzzle

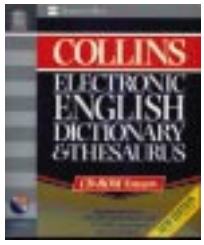
A good entry for our December logic puzzle. From the 150 or so entries received, the winner, selected at random, was a lady — Mrs Carol Vile of Trowbridge, Wilts. Congratulations, Mrs Vile, your prize is on its way. The winning solution, which most entrants managed to get, was that **Bill** was the discus thrower.

Meanwhile, to all the others — keep trying. You could be the next winner.

JJ Clessa

Prize Crossword No. 5





Haven't got a clue? Maybe you could do with the help of the Collins Electronic Dictionary & Thesaurus. Each month, we're offering one lucky *PCW* reader the chance to win a copy. Send your completed crossword to PCW March Prize Crossword, VNU House, 32-34 Broadwick Street, London W1A 2HG, to arrive by 13th March 1998.

• *Please state clearly on your entry if you do not wish to receive promotional material from other companies.*

ACROSS

7 Linked PCs (8)
9 Go-anywhere computer (6)
10 Key for when you're lost (4)
11 Usual memory units (9)
12 Rapid additional memory (5)
14 Screen's pixel-change speed (7)
18 Distinct disk parts (7)
19 Internet personal data parcels (7)
22 Uses the top-left 20 down! (7)
24 Co-ordinates timers exactly (5)
26 Screen overuse danger (9)
28 Peripherals slot (4)
29 7's co-ordinating computer (6)
30 Grab data (8)

DOWN

1 Demoted (9)
2 Exchange (4)
3 Legal offence (5)
4 Big slice (4)
5 Deliberately annoys (6)
6 Manager (4)
8 Autographed (6)
13 Shack (3)
15 Space (4)
16 Zone (4)
17 Inconsistent (9)
20 Crucial (3)
21 Insist on (6)
23 Put off till later (6)
25 Is aware of (5)
26 Regular (4)
27 Rotate (4)
28 Tug (4)

February Solutions

Across

7 Integrated 8 Bugs 9 Services
10 Engine 11 Bureau 13 Digital
15 Network 17 Merging 19 Service
21 Assign 24 Search 26 Provider
28 Head 29 Initialise

Down

1 Ensemble 2 Weaver 3 Bric 4 Stash
5 Edge 6 Agenda 8 Begging
12 Bric-A-Brac 14 Ideas 16 Wavered
18 Nonsense 20 Eleven 22 Icicle
23 Split 25 Hair 27 Omit

That marvellous **MZ80K**

It was a Maserati in a world of Ford Prefects; the Sharp desktop ran at a hair-raising 2MHz! And there is still a fan club.

I have always found that drawing on personal experience ensures, memory permitting, a reasonable chance of accuracy. I mention this because I have used the treasures in my attic as the basis of each of my *Retro* columns so far. This month, I had wondered which of my dusty delights to cover, but fate played a great part in the selection as I stubbed my toe on a large, heavy box labelled "MZ80K".

The Sharp MZ80K was a wonderful desktop computer, launched in the good times of 1980 — about the same time as the Commodore PET. Its overall market share was significant.

Buying a computer in those far-off days was quite different from today's superstore ethos. When I bought my MZ80K, I had to make an appointment with a specialist office supplier in Staines, near London, almost to prove that I was capable of using the machine. What I got for my £600 was a large, heavy, steel box styled with daring 1970s aerodynamic principles. It was low, sleek and a much groovier machine than the lumpy old PET. Sharp chose to power the MZ80K with the Zilog Z80 processor, hence the cunning model number thought up one breakfast-time.

I am a great Z80 fan and have always stuck by it. I never saw the attraction of the 6502 (the rival processor used in the PET and, later, the BBC computer); nasty machine code and no easy way of extending the hardware. However, this is purely my own blurred and biased view!

The Z80 processor was driven at a frantic 2MHz and provided enough power to run Sharp's version of DOS or CP/M, together with a BASIC interpreter that was the main way of creating new software. The MZ80K was fitted with 24Kb as standard but most users expanded this to 48Kb by grubbing around on the motherboard to press in extra memory chips. This might sound sad compared to today's requirements, but other home computers were generally fitted with 16Kb (or just 1Kb in the case of the Sinclair ZX80).

Reviews of the Sharp spent most of the first few paragraphs on the look of the machine. Nowadays, all computers look alike, but at the time the MZ80K was a Maserati in a field of Ford Prefects. It had a neat 10in screen to the left, a cassette tape drive to the right and a hideous keyboard, all mounted onto the cream steel case.

In retrospect, Sharp should really have asked someone about keyboards before it produced this attempt. The keys were all the same size and arranged in a regular grid; each key was a transparent plastic shell with the letter or number on a scrap of cardboard underneath. This made it easy to create custom keyboards but fast typing was out of the question.

If you managed to ignore the keyboard, you could enjoy the rather nice black and white monitor which offered a 40 x 25 character display. I lived on the edge, so I expanded my MZ80K with an extra memory-mapped card that gave me full access to the 320 x 200-pixel display. There were versions of arcade games available that made use of this, but it was so slow that the games were unplayable.

So far, you might wonder how this computer fitted into the grand scheme of machines. It was a home computer because it was small and compact and ran games, but I had the distinct impression that it was only me and a man in Manchester that used the MZ80K for hobby use. Every other model sold was used for business and there was a mass of applications available. Small software companies sprang up with catalogues full of MZ80K software: for a few pounds you received a couple of cassette tapes and a sheet of instructions. True computing!

Many MZ80K enthusiasts loved the machine because of the simplicity of its hardware. The user manual even included the full circuit diagram schematic of the main motherboard and this was a great help when hacking into the chip design. The simplest add-on was a turbo switch to boost the clock rate. Actually, you had to disable the clock divider chip, so providing a 4MHz clock, but not for too long or the processor over-cooked.

Where the MZ80K really scored with the business community was in its range of expansion products. These were better looking than the machine itself and, if they were on your desk, it showed that you were very important. There was a disk storage unit, about the size of a couple of boxfiles, sleek and sophisticated. A dot-matrix printer sat low and purposefully on the desk. For the adventurous there was an expansion box which let you connect external input devices to your beloved machine.

I would end this column by sadly saying that the MZ80K is long past, but for anyone who is just as mad keen on the beast today as they were then, it is something of a surprise to find that there are several memorial web sites to keep the flame alive (try searching for MZ80K on Alta Vista, on the net, for the best list).

Sharp used the MZ80K to enter the home and business computer market. It was soon followed by the MZ80A, a home-only computer with none of the charm nor features needed in the new marketplace.

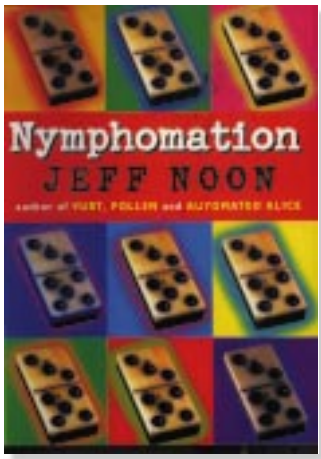
It astonished me to find that Sharp has launched around 80 different computer systems. And it all started with the wonderful MZ80K.

Simon Collin

Books

Dominoes is a dangerous game in the techno-future world. Plus, how to start on the net, and one woman's view of net communities.

Nymphomation



Manchester is in the grip of Domino Bones. This is a new lottery game which is being piloted in the city prior to its national launch. Every Friday night the inhabitants of the city sit and clutch their "Bones", awaiting the draw by Lady Luck: she will make someone a millionaire.

With *Nymphomation*, Jeff Noon returns to familiar territory. Taking his own brand of cyberpunk, he weaves his usual mix of strong characterisation set in an environment that is always less than ordinary. Throughout the novel you are aware that Noon is playing with the elements of the story to produce something familiar as well as unusual.

Noon produces a heady mix of characters including beggars, mathematicians, DJs, computer hackers and Vaz-transformed humans. The techno-future, of which many Cyberpunk authors write, is replaced here by a more organic setting. Nymphomation, for instance, is the product of information having sex with itself to produce Baby Data, the key to the high-level maths which will brake the game theory behind the Domino Bones.

Nymphomation is the prequel to Noon's other books, *Vurt* and *Pollen*, for which we have all been waiting. It is a baroque narrative teeming with ideas, jumping off the page. Towards the end we slide into the horrific — but stomach-turning visual themes sit well with Noon's visceral ideas.

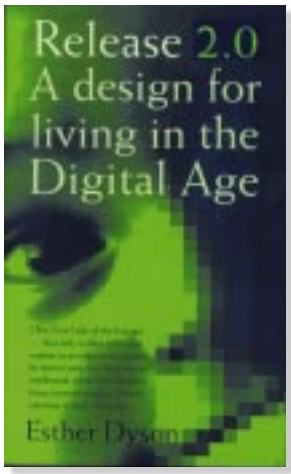
The story follows a group of young people who are attempting to understand the probability mathematics underlying the game in order to make themselves rich. But the game itself has sinister overtones; the populous have an unhealthy symbiosis with Domino Bones.

Daisy Love, a mathematics student of game theory, is recruited to the team which will crack the game. Thrown into this melting pot is Little Miss Celia, a down-and-out child who has an innate winning gene that makes her the target of the AnnoDomino company which is intent on killing any players who are just too lucky. And there is Jazir Malik, the son of the owner of the curry house above which Daisy lives.

Jaz discovers that the mechanical flying advertisements called Blurbflies have an organic substance which seems to be sentient and so we learn the early history of Vaz, which we have come across in Noon's previous novels. We also see the creation of the Vurt feather which is welcome information if, like many others, you marvelled at this invention.

Dave Howell

Release 2.0: A Design for Living in the Digital Age



Press profiles of the diminutive author of "Release 2.0" have tended to focus on her other-worldliness and contradictions. Author, Esther Dyson, is seen as a freakshow product of the Digital Age.

She is the woman who left academia to become a Wall Street securities analyst, a workaholic venture capitalist who doesn't care about money. A woman who is obsessed with the possibilities of creating communities on the net and yet has no personal relationships — nor, indeed, a home telephone. She is a confidante of Bill Gates and US Vice-President Al Gore. The former eloquently describes her work as "What she writes is what I care about". Unfortunately for Dyson, this is interesting stuff and the easiest way for the press to attach a handle to her work. But what readers won't get from Release 2.0 or Release 1.0 (the industry thinksheet which spawned it) is a definitive recipe for how to use the net nor, indeed, many answers at all.

Design for Living is a misnomer as Dyson doesn't provide maps for the digital territory. What she does is to ask a lot of questions and point up the inherent conflicts in a landscape still being charted. She then gives some pointers on where we might go. Chapters on Communities, Work, Privacy and Intellectual Property are predictable staging posts. People want the net because they hope it will make them money, contacts and perhaps friends, yet they worry about personal information being traded without their knowledge, and the implications for credit scoring, obtaining insurance cover and so on. They even worry that people may be able to spam them with obscene material. And the flip-side of you posting your work on the net is someone ripping off your creativity for financial gain.

Dyson is particularly strong on education and the net changing the way children work, and she descends from the theoretical with a good and detailed update on rating and filtering systems.

"I'm trying not to speak as an American but as a member of multiple communities," she writes, though what colours her arguments is a very American assertion of individual rights to privacy and the right to design your own life. That's coupled with a very American suspicion of corporatism in business and government and those monoliths' obsession with control: privacy battles openness, security versus freedom.

If Dyson does have an answer, it is that new communities must design new rules. Her proviso is that she is not going to

Top Ten Books

1	The Internet & World Wide Web: The Rough Guide 1998	Rough Guides	£5.00
2	C++ Programming Language, 3rd Edition	Addison-Wesley	£27.95
3	Software Project Survival Guide	Microsoft Press	£22.49
4	Windows NT in a Nutshell	O'Reilly	£14.95
5	UML Distilled: Applying the Standard Object Modelling Language	Addison-Wesley	£23.95
6	Microsoft Excel 97 Visual Basic Step by Step	Microsoft Press	£32.99
7	Java in a Nutshell, 2nd Edition	O'Reilly	£14.95
8	Java Examples in a Nutshell	O'Reilly	£14.95
9	Inside Microsoft SQL Server 6.5	Microsoft Press	£46.99
10	Effective C++, 2nd Edition	Addison-Wesley	£25.95

Prices include VAT on disks and CD-ROMs. List supplied by The PC Bookshop, 21 Sicilian Avenue, London WC1A 2QH. Telephone: 0171 831 0022. Fax: 0171 831 0443

guarantee what rules will work. Critics will say that is woolly thinking, yet it is the downside of being a visionary. Perhaps it is no accident that her cash comes from investing venture capital in emergent Eastern European markets — a realworld Klondike, scarier by far than the net.

John Rennie

The UK Internet Starter Kit

Digital technology guru Nicholas Negroponte recently described the UK as "the Third World" of the internet. And it's true that compared to the US, where pre-school kids and smarter household pets regularly surf, we Brits have been slow to embrace the digital age.

The main reasons? Fear and confusion. There's too much of it. People don't know where to start and it's expensive. No guide can do anything about the cost: with BT bucking the global trend and continuing to charge for local calls, the best advice is to download fast and get off-line.

Nevertheless, Rob Young takes a good stab at giving plain advice and demystifying the net.

His pitch is resolutely non-technical. At times, this makes for cloyingly twee reading. So chat "isn't chat as in yackety-yak, more like clickety-click" and "the web is the net's new baby… a very lively gurgling baby." But it's to his credit that he makes 400-odd pages readable and lastingly useful.

The problem with a lot of net guides is that they get completely hung up on the web and its content: "Interested in growing marrows? Then point your browser at www.marrow.com" can quickly turn into an exhausting, but not exhaustive, list of URLs and unless you are renaissance man, 99 percent of them will be of no interest whatsoever.

Young's UK approach serves him well. He admits that British consumers presently get a rough deal on content compared with their US counterparts. Instead, he concentrates on giving readers the tools to use the net creatively for themselves.

So, we get an idiot-proof guide as to what is the internet, what it can give you and how to get online. But then, rather than plunging straight onto the web, he covers Usenet and FTP in some detail. There is a brief but comprehensive trot through multimedia prior to an extensive chunk on creating your own web pages and, encouragingly, gauging audience reaction.

The inclusion of a startup disc for Virgin Net and Explorer is probably a smart move. To a newcomer, the Branson tag lends a reassuring familiarity and Explorer will be bundled with most new PCs. Sussed readers, however, may baulk at a bias which restricts ISP suggestions to CompuServe, AOL, MSN and Virgin and describes Explorer as "the most capable browser", with Netscape mentioned merely as "another popular browser".

It does not offer much to any Mac starters, but as a one-stop trip from absolute beginner to netmaster and with an excellent index, glossary and useful phone numbers directory, it's hard to beat.

John Rennie

PCW Details

Nymphomation
Author Jeff Noon
Publisher Doubleday
ISBN 0-385-40812-9
Price £15.99
★★★

Release 2.0: A Design for Living in the Digital Age
Author Esther Dyson
Publisher Viking
ISBN 0-670-87600-3
Price £15.99
★★★★

The UK Internet Starter Kit
Author Rob Young
Publisher Prentice Hall Europe
ISBN 0-13-648602-9
Price £14.99
★★★★

Win a high-res projector or a multimedia kit

Win an Electrohome EPS800 Plus projector worth £3,995 — just think, you could have your own home cinema! *And* Creative Labs is giving away three multimedia kits worth £149 each.

Win an Electrohome EPS 800 Plus projector

Here is your chance to win this beautiful Electrohome EPS800 Plus projector worth £3,995.

Electrohome Europe is a leading manufacturer of high-resolution video and data/graphics projection systems. Its EPS800 Plus projector delivers 800 x 600-pixel resolution and comes complete with three polysilicon LCD panels, a power zoom lens with vertical offset, and an in-built audio system to cope with a wide range of presentation needs.

For great, wide-screen gameplay you can plug the Electrohome projector into your computer, to replace the monitor. Or perhaps you would like to create your own home cinema by plugging the projector into a video source to play a movie.

Designed with the end-user in mind, the EPS800 Plus is simple to use. It is easy to set up, and features language software and a handheld backlit remote control.

ELECTROHOME
Visionary Thinking

Weighing in at just 11kg, the EPS800 Plus is fully portable, making it an extremely versatile projection system.

■ **To enter this competition, just write the answer to the following question on a postcard, or the back of a sealed envelope, marking your entry "Projector Comp" (*see box, below*):**

Q ***How many polysilicon LCD panels does the EPS800 plus have? Is it:***

A) 2
B) 3
C) 4

Win one of three Creative Labs multimedia kits

Creative Labs is giving away three of its multimedia kits — each worth £149.

Each kit consists of an AWE64 Value sound card, 24x CD-ROM drive, CS120 speakers and an Accu-Soccer game.

Creative Labs is committed to providing PC users with high-quality audio experiences. The AWE64 Value sound card delivers a sensational 64-voice audio experience with the latest in Creative's Advanced WavEffects™ technologies. Put the AWE64 together with the CS120 speakers, and you will experience fantastic sound quality.

■ **To enter this competition, write the answer to the following question on a postcard, or on the back of a sealed envelope, marking your entry "Creative Comp" (*see box, below*):**

Q ***What game is Creative Labs giving away with the Multimedia Kits? Is it:***

A) A hockey game
B) A tennis game
C) A soccer game

Rules of entry

These competitions are open to readers of *Personal Computer World*, except for employees (and their families) of VNU Business Publications, Electrohome Europe and Creative Labs.
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 prizes.

How to enter the competitions

1. Via our web site at www.pcw.co.uk or,
2. Write your name, address and answer on a postcard, along with your daytime phone number. Mark your card with the correct name of the competition and send it to: PCW/February Competition, P.O. Box 191, Woking, Surrey GU21 1FT.
Entries must arrive by 27th March, 1998.

• *Please state clearly on your entry if you do not wish to receive promotional material from other companies.*

■ DON'T FORGET THE ELECTRONIC VERSION OF THIS ORDER FORM. SEE THIS MONTH'S CD-ROM.

Personal Computer World

Order form

Use this form when you order by phone, fax or post.

ALWAYS KEEP A COPY !

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SALESPERSON'S NAME .....

ADDRESS .....

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..... POSTCODE .....

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ORDER REFERENCE NUMBER (IF QUOTED) .....

DISPATCH REFERENCE NUMBER .....

CUSTOMER DETAILS

NAME .....

COMPANY .....

ADDRESS .....

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ISSUE DATE ..... PAGE .....

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SUB-TOTAL

DISCOUNT

CARRIAGE

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VAT

TOTAL

METHOD OF PAYMENT

❑ PERSONAL CHEQUE ❑ PURCHASE ORDER ❑ CREDIT CARD

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No-nonsense Buyer's Guide

The *PCW* Buyer's Guide is packed with sensible advice about what to buy and how to buy it safely. Buying direct through our pages can save you hundreds of pounds, but do stick to our 12-point guide to buying direct.

Twelve rules for buying safely

1. Always use a *PCW* order form.
2. Keep the original advertisement.
3. Keep copies of all correspondence. If you speak on the phone make a note of to whom you spoke.
4. On large orders, obtain a written quotation.
5. If possible, pay with a personal credit card. All transactions over £100 should be covered by the card company's insurance scheme.
6. Does the price quoted include everything discussed? Is VAT extra?
7. Check how the supplier will deliver and whether or not delivery times are guaranteed.
8. Is free telephone technical support included in the price? Some suppliers offer support only on premium 0891 numbers. Is it easy to get through? Try dialling the number to test it out.
9. Is the warranty return-to-base or onsite? "Return-to-base" means that you'll have to pay to ship the product back to the supplier.
10. If you're paying extra for online support, does the manufacturer offer guaranteed response times? If you rely on your PC for your business you'll need it fixed, pronto.
11. Is the supplier reputable? Does it comply with BS5750 or ISO900? If in doubt, ask to see customer testimonials.
12. When your PC arrives, check that all branded components are genuine.

Buying a PC

PCs get cheaper and faster all the time and your state-of-the-art PC can quickly become outdated. That may not matter, though, if it still does what you require. But if you're buying a new general-purpose PC now, it should be fitted with a CD-ROM drive, sound card and speakers so that you'll be able to play games and run a wide range of modern software.

Minimum specifications

- It is a false economy to buy a new PC with less than 16Mb of RAM. The jump from 8Mb to 16Mb of RAM makes a huge difference to performance.
- Ensure Pentium motherboards have an Intel Triton 430 VX, HX, TX or compatible chipset.
- Avoid 14in monitors. The difference between 14in and 15in doesn't sound much but means the screen is 15 percent smaller. If you can afford it, buy a 17in monitor.

Other things to consider

Most small PC manufacturers buy their motherboards from Taiwanese or far eastern manufacturers. Larger companies either design their own motherboards (e.g. Apricot, Compaq, IBM) or get motherboards built to their specification (e.g. Gateway). Intel chips are no longer the only choice. AMD's K6 processors are well worth considering, too. It is amazing how hard disks fill up and it's unusual to have *too much* disk space.

Some suppliers offer you the choice of Windows 95 or Windows NT. For general home or small office use, Windows 95 is still the best choice. You may need to consider NT for some specialist applications like programming, DTP or CAD.

Practically every month, CD-ROM drives get faster. Higher speeds and bigger numbers just mean you can access files from them more quickly and that video clips on them play more smoothly.

Look closely at the software that's bundled with your PC. If you want an Office suite it's usually cheaper to buy it bundled with your PC. Software bundles can also be an excuse for manufacturers to unload piles of old or second-rate software. Check whether you get the original media if you need to re-install.

For this Buyer's Guide we've drawn up four specifications. We haven't mentioned particular manufacturers because you'll find up-to-date PC reviews in every issue of *PCW*.

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Buying a **Notebook**

Notebooks belong in the one area in which it is often safer to stick to brand names. It is not so much that some of the Far Eastern kit doesn't work perfectly well, but reliability seems to be a problem and it can be fiendishly difficult to obtain spares. A useful guideline when choosing a notebook is to try before you buy.

Remember that standard notebook specifications are generally a step or two behind their desktop equivalents.

What to look for in a notebook

- **Pointing device** There has been a move away from trackballs to trackpads. Some notebooks, notably IBM Thinkpads, use stick technology (a device which looks like the rubber on top of a pencil and is controlled by the use of one finger).
- **CD-ROM drives** These are rapidly becoming standard in notebooks. If your notebook is going to be your only machine, it's worth getting one.
- **Floppy disk drive** Often, there is a choice between a CD-ROM drive and a floppy disk drive. If the notebook is to be your only machine, make sure that the CD-ROM drive and the floppy drive can be used simultaneously.
- **PC Cards** Modern notebooks all have at least one PC Card slot. They take credit card-sized expansion cards which add a fax-modem, a network interface card or even an extra hard disk to your computer.
- **Battery life** Battery life varies, from as little as 30 minutes to over six hours. Lithium Ion and Nickel Metal Hydride batteries have now replaced the older NiCad (Nickel Cadmium) batteries.
- **TFT screens** TFT screens are of a higher quality than dual-scan or passive-matrix screens, using a sharper picture and no shadowing or ghosting.
- **Warranty** Drop a notebook and it may break, so it is vital to check the terms of your warranty. How long is it? What level of service is provided? Remember — better safe than sorry.

PCW Second-hand spec

Buying second-hand or discontinued kit is the cheapest way to get started. This is the minimum spec we think you should choose for general business use, playing games and accessing the internet.

- Windows 3.1 or 3.11
- DX2 66MHz 486 processor
- 8Mb RAM
- Graphics card with 512Kb of memory
- 200Mb hard disk
- 3.5in floppy disk
- CD-ROM drive
- 14in colour monitor

PCW Minimum specification

This is the absolute minimum spec we think you should consider if you are buying a new PC. Suitable for general business use: word processing, databases, spreadsheets and, with a modem, accessing the internet.

- Windows 95
- 133MHz Pentium-class processor
- 16Mb RAM
- Graphics card with 1Mb of memory
- 1.2Gb hard disk
- 12-speed CD-ROM drive
- 15in colour monitor
- PCI local bus

PCW Recommended spec

If you are not short of cash, this is the specification we recommend. No-one at *PCW* would settle for less.

- Windows 95 or Windows NT 4.0
- Pentium or equivalent 166MHz processor
- 256Kb secondary cache
- 32Mb EDO RAM
- Graphics card with 2Mb of memory
- 2Gb hard disk (modern computer software takes up a lot of space)
- 12-speed CD-ROM drive
- 17in colour monitor
- 16-bit SoundBlaster-compatible sound card

PCW Best specification

This is as good a PC as you are likely to need for most software. For some specialist applications, like professional DTP or CAD, you may need even more memory, a bigger hard disk, a more powerful graphics card or a larger monitor.

- Windows 95 or Windows NT 4.0
- Pentium 233MHz MMX or Pentium II
- 512Kb secondary cache
- 32Mb EDO memory
- 4Gb hard disk
- 16- or 20-speed CD-ROM drive
- 17in colour monitor
- 4Mb VRAM or WRAM graphics card (this means your graphics card can display more colours, and at a higher resolution on your monitor: 16 million colours at a resolution of up to 1,280 x 1,024
- 16-bit wavetable sound card

PCW Minimum specification

Notebooks change quickly. It is possible to pick up end-of-line machines with Pentium processors from brand-name manufacturers like Toshiba and Compaq at discounted prices of £1,000 or less. These can be a very good buy. Just make sure they can run the software you need to use.

PCW Recommended spec

- Windows 95
- Pentium 133
- Quad- or six-speed CD-ROM drive
- 16Mb RAM
- On-board graphics with 1Mb of memory, PCI local bus
- 850Mb hard disk, 3.5in floppy disk drive and/or dual-speed CD-ROM drive
- TFT 800 x 600 screen

PCW Best specification

The state-of-the-art notebook: either you're loaded, or your company's picking up the tab.

- Windows 95 or Windows NT
- Pentium 233MMX
- 512Kb secondary cache
- 32Mb RAM
- On-board graphics with 2Mb of VRAM memory, PCI local bus
- 3.2Gb hard disk
- 3.5in floppy disk drive
- 20-speed CD-ROM drive
- Active matrix 1,024 x 768 TFT screen
- Long battery life

Glossary of computing terms

A

Access time
The time it takes for a device to access data. The access time, quoted in milliseconds (ms) for hard disks and nanoseconds (ns) for memory, is usually an average as it can vary greatly. Together with the transfer rate, it is used to gauge the performance of hard disks and other devices. The lower the number, the better the performance.

Applications
An application, or package, is one or more programs used for a particular task. For example, word processing, invoicing or spreadsheeting. Applications are bought shrink-wrapped (wrapped in cellophane for general use) or custom-built for specific uses.

ASCII (American Standard Code for Information Interchange)
Usually a synonym for plain text without any formatting (like italics, bold or hidden text). Since computers naturally use binary rather than Roman characters, text has to be converted into binary in order for the processor to understand it. ASCII assigns binary values to Roman characters. RTF, a Microsoft standard, adds extra formatting features to plain ASCII.

B

Backwards compatible
Compatibility of hardware or software to older versions of the product or standard.

Baud rate
The number of electronic signals that can be sent along a communications channel every second. In common usage, it is often confused with bits per second. These days modem speeds are normally measured in bits per second. (See V and Bit).

BIOS
Basic Input/Output System. Software routines that let your computer address other devices like the keyboard, monitor and disk drives.

Bit
Binary digit, the basic binary unit for storing data. It can either be O or 1. A Kilobit (Kbit) is 2^{10} (1,024 bits); and a Megabit is 2^{20}, which is just over a million bits. These units are often used for data transmission. For data storage, megabytes are more generally used. A megabyte (Mb) is 1,024 kilobytes (Kb) and a Kb is 1,024 bytes. A gigabyte (Gb) is 1,024Mb. A byte (binary digit eight) is composed of eight bits.

Bug (See Crash)

Boot
Short for bootstrap. Refers to the process when a computer loads its operating system into memory. Reboot means to restart your computer after a crash, either with a warm reboot (where you press CtrlAltDel) or a cold reboot, where you switch the computer off and back on again.

Bus
A "data highway", which transports data from the processor to whatever component it wants to talk to. There are many different kinds of bus, including ISA, EISA, MCA, and local bus (PCI and VL-bus).

C

Cache (See Memory)

COAST
Cache On A Stick.

CD-ROM
A CD-ROM is the same as a normal audio CD, except it can store data as well as sounds. A CD-ROM player can be attached to your computer to read information from the CD-ROM into the computer's memory in the same way that a domestic CD player reads information from the CD into your hi-fi. The advantage of distributing information on CD-ROM rather than other media is that each one can hold up to 680Mb of data: equivalent to about 485 high-density 3.5in floppy disks. The disadvantage, however, is that you can only write once on CD-ROMs, yet this makes them ideal for archiving.

CISC (See **RISC**)

CPU
Central Processing Unit. Normally refers to the main processor or chip inside a PC. (See Processor.)

Crash
Common term for when your computer freezes. Can be caused by a power surge, a bug (which is a fault in software) or a GPF.

D

DRAM (See Memory)

DOS (Disk Operating System)
Once the standard operating system for PCs, it is now being replaced by Windows 95 and Windows NT.

DPI (Dots Per Inch)
Common measure of the resolution on a printer, a scanner or a display.

Drive controller card
An expansion card that interprets commands between the processor and the disk drives.

Drivers
Pieces of software that "drive" a peripheral. They interpret between the computer and a device such as a CD-ROM. If you have a SCSI CD-ROM drive connected, you will be able to use it on a PC or a Mac just by loading up the relevant driver on each machine.

E

EIDE (See IDE)

EISA (Extended Industry Standard Architecture)
A bus standard designed to compete with MCA. Now being replaced by PCI.

Electronic mail (E-mail, email)
Still the biggest single use of the internet. When you sign up with an ISP you are given an email address. Usually you can incorporate your name, or part of it, into your email address to make it easy to remember.

Expansion card
Circuit boards which fit inside PCs to provide extra functionality. For example, one might be an internal modem, providing the same functions as an external version (which is more common) but sitting inside the PC. Expansion cards are designed to be fitted and removed by people with little knowledge of PCs.

F

Floppy disk drive
Practically all PCs come with a floppy disk drive: 3.5in HD (high density) 1.44Mb floppy disks are now the standard. They come in hard plastic cases and have replaced the older, literally floppy, 5.25in disks.

Fonts
A font is an alphabet designed in a particular style. Fonts apply both to screen and printed letters. TrueType and Type 1 fonts are stored as shape descriptions, scalable to any size.

Format
To wipe a floppy or hard disk in order to prepare it to accept data.

G

GPF
General protection fault.

Graphics card
An expansion card which interprets commands from the processor to the monitor. If you want a better, higher-resolution picture or more than your existing setup, you'll need to change your graphics card and/or your monitor.

GUI (Graphical User Interface)
(See Windows)

H

Hard disk
Sometimes called a fixed disk, hard disks are hermetically sealed rigid disks able to store data and programs. Disk capacities increase all the time. The standard is now 1Gb but disks of up to 9Gb are available.

Hardware
All electronic components of a computer system, including peripherals, circuit boards and input/output devices.

HTML (Hypertext mark-up language)
The standard language used in the creation of web pages, which can be read by web browsers.

I

IBM-compatible
Originally meant any PC compatible with DOS.

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Now tends to mean any PC with an Intel or compatible processor capable of running DOS or Windows.

IDE (Integrated Drive Electronics)
A control system designed to allow computer and device to communicate. Once the standard for PC hard disks, now being replaced by EIDE (enhanced IDE) which offers improved performance and extra features.

Internet
Millions of computers interconnected in a global network.

ISP (Internet Service Provider)
ISPs provide access to the internet. You use your modem to dial the ISP's modem. The ISP has a high-bandwidth permanent connection to the internet.

IRDA (Infra-Red Data Association)
The standard for exchanging data using infra-red, typically from PDAs or notebooks to a PC or printer.

ISA (Industry Standard Architecture)
This was the original bus architecture on 286 PCs. Also known as the AT bus (the 286 was known as the AT), it remains in use today. Slow by modern standards, but so widely accepted that expansion cards are still made for it. (See EISA, PCI.)

ISDN (Integrated Services Digital Network)
Offers significant advantages over analogue telephone lines. It can handle multiple transfers on a single connection and is faster. In the UK, however, costs of installation and rental remain high.

J

JPEG (See MPEG)

K

Kbit (kilobit), Kb (kilobyte)
(See Bit)

L

LAN (Local Area Network)
(See Network)

Local Bus
PCI (Peripheral Component Interconnect), developed by Intel, is now the standard for local bus architecture. It is faster than the older VL-Bus (Video Electronic Standards Association local bus) it replaces.

M

Macintosh (Mac)
A personal computer made by Apple and which is incompatible with PCs. Developed as a rival standard, its operating system looks like Windows but pre-dates it and (in some people's view) looks and works much better.

Maths co-processor
A specialised chip that handles mathematical calculations (floating point operations) for the processor. Modern processors such as the Pentium have a co-processor built into them.

Mbit (megabit) (See Bit)

Mb (megabyte) (See Bit)

MCA
A type of bus designed by IBM to beat EISA. Although faster, it never became popular: this was because every machine that used it had to pay a royalty to IBM, and because it was not backwards-compatible with ISA.

MPEG (Moving Picture Expert Group)
A standard for compressing video, available in several flavours: MPEG 1, MPEG 2, MPEG 4. JPEG (Joint Photographic Expert Group) is a standard for still image compression.

Memory
The term normally refers to RAM (Random Access Memory). This is the kind which disappears when you turn off your computer and is much faster to access than a hard disk. It acts as a staging post between your computer's hard disk and its main processor.

- **Cache memory** Temporary memory set aside to store the information that is accessed most frequently. The Pentium processor has 8Kb of in-built cache. This can be further speeded up by a secondary cache, typically 256Kb. Part of your DRAM is often used to cache your hard disk.
- **DRAM (Dynamic Random Access Memory)** This requires its contents to be replaced every one thousandth of a second and is the most common form of memory found in PCs.
- **EDO (Extended Data Out RAM)** Memory that is cached to improve performance.
- **FPM RAM (Fast page mode)** Like EDO Ram but without the onboard cache
- **ROM (Read-Only Memory)** A type of memory which can only be read: you can't make changes to it as you can to RAM. It is commonly used for things that will never need to be changed, like the information the computer requires when you start it up.
- **SDRAM (Synchronous DRAM)** The latest type of fast memory. This runs at the same speed as the processor and allows the input and output of data at the same time.
- **SRAM (StaticRAM)** Retains memory until the power is switched off.
- **VRAM (VideoRAM)** Faster than DRAM, this is used by graphics cards.

MMX (Multimedia extensions)
(See Pentium)

Modem
The word is a contracted version of "modulator/demodulator", which means that a modem is a box (or, less commonly, an expansion card) that lets your computer talk over phone lines to other computers.

Monitor
Your computer's screen. Signals are sent to it from the video card.

Motherboard
The main printed circuit board which houses processor, memory and other components.

N

Network
A network is a group of computers linked together with cable. The most common form of network is a LAN (Local Area Network), where electronic mail and other files can be exchanged between users without swapping floppy disks. Printers and other resources can be shared. All the PCs on a LAN are connected to one server, which is a powerful PC with a large hard disk that can be shared by everyone.

O

OS (Operating System)
The operating system communicates with the hardware and provides services and utilities to applications while they run, such as saving and retrieving files.

P

PC Card
Formerly PCMCIA. A standard to allow PCs, particularly notebooks, to be expanded using credit card-sized cards.

PDA (Personal Digital Assistant)
Small electronic organisers. The Psion 3a is a typical example.

PCI (See Local bus)

PCMCIA (See PC Card)

Package (See Applications)

Parallel ports
Used by your PC to communicate with the outside world, usually via a printer. Information can travel in parallel along a series of lines, making it faster than serial ports which can only handle one piece of information at a time.

Pentium
Fast 32-bit processor with a built-in 16Kb cache. Now the standard on PCs. It is about to be replaced by the Pentium MMX chip which has extra instructions and a 32Kb cache. The Pentium Pro is a higher-end workstation CPU with 256Kb cache meant for full 32-bit operating systems like Windows NT.

Pixel
Picture element. The smallest addressable dot displayed on a monitor.

PowerPC
This family of RISC chips is the result of a collaboration between IBM, Apple and Motorola. It is now used in all Apple Macintosh computers and many IBM workstations.

Processor
Chip which does most of a computer's work.

Programs (See Applications)

Public domain
Software that is absolutely free. The author usually retains the copyright but you can make as many copies as you want and pass them to other people. "Public domain" software is often confused with "shareware".

Q

QWERTY
The name of a standard English-language keyboard, derived from the first six letters in the top row. French equivalent is AZERTY.

R

RAM (Random Access Memory)
(See Memory)

Reboot
(See Boot)

RISC (Reduced Instruction Set Computing)
These are beginning to replace CISC (Complex Instruction Set Computing) as they're usually faster. The PowerPC chip is a typical example.

ROM (Read Only Memory)
(See Memory)

RTF (Rich Text Format)
(See ASCII)

S

SCSI
Small Computer System Interface is a bus that comes as standard in a Macintosh and is beginning to rival EIDE on PCs.

Serial port
Serial ports (com1 and com2) are used by your PC to communicate with the outside world. Mostly used by modems and similar devices which communicate quite slowly. Faster communications are achieved through the parallel port.

Shareware
A method of distributing software. It is freely available, but not free of charge. You are honour-bound to pay a small fee to the software's developer if you continue to use the program after a set period.

SIMM (Single Inline Memory Module)
The standard modules for memory expansion on PCs. Older 30-pin SIMMs have now been replaced by the 72-pin variety available in capacities up to 16Mb.

T

Tape streamer
Magnetic tape recorder for backing up data from a hard disk.

U/V

UART (Universal Asynchronous Receiver Transmitter)
Pronounced "you-art", this is a chip that allows your PC to cope with high-speed communications.

V.34 Plus, V.34, V.32bis
A series of CCITT standards which define modem operations and error correction. There are more than 20, but the key ones are:
- **V.32bis**, the standard for 14.4Kbps (kilobits per second) modems.
- **V.34**, the standard for 28.8Kbps modems (see Baud).
- **V.34 Plus**, the new standard for speeds up to 33.6Kbps.

VESA (See Local Bus)

VGA
Video Graphics Array is the name given to a popular display. VGA graphics have 640 pixels horizontally and 480 vertically, and can display 16 colours. SuperVGA (SVGA) graphics can display 800 x 600 or 1,024 x 768 in as many colours as the memory in your graphics card will allow: up to 16.4 million, or true colour.

VL-Bus (See Local Bus)

VRAM (See Memory)

W

Windows
A GUI (Graphical User Interface) developed by Microsoft. Windows is intended to make programs easier to use by giving them a standard, mouse-driven interface.
- **Windows 3.11** 16-bit operating system.
- **Windows NT** Robust, fully 32-bit operating system from Microsoft. The latest, version 4.0, features a Windows 95 interface.
- **Windows 95** Major improvement to Windows 3.11, with a redesigned interface. Less prone to crashes and easier to use, but requires more memory.

Winsock
Short for "sockets for Windows". The Winsock.dll is an extension for Windows which is necessary for connecting to TCP/IP networks.

World Wide Web
Service on the internet using special software called web browsers (Netscape and Internet Explorer are two best-known browsers) to give access to pages of information with text, pictures and multimedia.

WYSIWYG
"What You See Is What You Get": what you see on the screen is exactly what you will get when you print out your work.

Z

ZIF (Zero Insertion Force)
Sockets used for large CPUs. Lifting a handle enables you to remove the processor.

ZIP
The common standard for compressing files so that they take up less space. Zipped files have the extension .zip and are compressed and decompressed using shareware utilities such as Winzip and PKZip.

Buying a **Printer**

There are two main types of printer: laser and inkjet.

Lasers

Most office printers are lasers. They work much like photocopiers. They are cheap to run and print quickly. The disadvantage is the higher initial cost and mono output. Laser printers are available in all sizes and all prices. Small desktop printers cost as little as £300. You can buy colour laser printers but they are still expensive; typically £5,000 or more.

Types of laser

PCs print by sending a description of the page to be printed down a printer cable. There are three commonly-used page description languages (PDLs):

- PostScript

This sends an outline in vector form (see Drawing Software) to the printer where it is rasterised (converted into dots) and printed to the device's best ability. PostScript is device-independent so the image looks the same on a monitor (75dpi), a laser printer (300dpi) and a professional image-setter (2,400dpi).

- PCL (Printer Control Language)

Hewlett-Packard's alternative to PostScript, licensed to many clone-printer manufacturers. Printers using PCL tend to be cheaper than PostScript ones, but output will vary from one machine to another, making it less well suited to professional use.

- GDI (Graphical Device Interface)

These printers download the description of your page, already used by Windows, straight to your printer. They only work with Windows but are cheap and fast. They are only suitable for a personal printer and will not work across a network.

Inkjets

Inkjets work by spraying ink onto paper. There are still some mono inkjet printers available, but it is best to stick with a colour inkjet as the price difference is negligible. They are cheap to buy but more expensive to run, and slower. Even cheap inkjets can print in good-quality colour, especially on high-resolution paper.

PCW Recommended products

Inkjet printers

Canon BJC-80: RRP £233;
Canon 0121 680 8062 (*PCW* January 98)

ALPS MD-1000: RRP £299;
ALPS 0800 973405 (*PCW* January 98)

Laser printers

- **Cheap: Panasonic KX-P6300** £217;
Panasonic 0500 404041

Kyocera F5-600: £280; Kyocera 01734 311500 (*PCW* February 1998)

- **Sub-£750: Hewlett-Packard 5P:**
HP 01344 369222 (*PCW* November 95)
- **Network lasers**

Hewlett-Packard 5M: RRP £1,659 ex VAT;
HP 01344 369222

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Buying a **Multi Function Device**

For home use and in small offices, a hybrid device could be the answer.

Typically, MFDs combine a printer, a fax machine and photocopying and scanning capability into one device. And while this saves space, it does have some drawbacks. For one thing, they tend to be based on inkjet technology which means higher running costs and lower speeds than laser-based units. Many only offer black-and-white printing: while colour models are appearing in greater volume, they tend to be based on earlier inkjet printing technologies rather than the current state-of-the-art models. Also, the scanning quality is no match for a dedicated scanner: it's normally only 200dpi, which is the same quality as a fax machine and, worse, often black-and-white only. Finally, there's one fundamental problem — if your MFD breaks down, you won't be able to print or receive faxes. That said, they are here to stay, and some people love 'em.

PCW Recommended products

Hewlett-Packard OfficeJet: £650; HP 0990 474747 (*PCW* January 97).

Buying a **Digital Camera**

Just about every camera manufacturer now offers a budget-priced device and prices start from as little as £135.

A digital camera works like a conventional camera except that instead of a film, it has a grid of light-sensitive elements. These convert light into a voltage proportional to the brightness, which is then converted into digital information the PC can understand.

The elements produce a colour bitmap file, typically of 640 x 480 pixels, although models boasting 800 x 600, 1024 x 768 and even higher resolutions are becoming increasingly common.

Most digital cameras use flash memory to store images, and offer a wired connection to a computer — slow serial on budget models or fast SCSI on professional ones.

Some cameras feature removable memory cards, usually compatible with the PC Card standard. Quality is getting better all the time, but to match the print quality of a 35mm film camera today, you'll still have to spend thousands of pounds. The current crop of entry-level to mid-range cameras are, however, more than suitable for electronic publishing on CD-ROM or the internet.

PCW Recommended products

Sony DSC-F1: £546; Sony 0990 424424 (*PCW* January 98)

Sanyo Digicam: £449.99; Sanyo 01923 477295 (*PCW* January 98)

Epson Photo PC: £781.38; Epson 0800 289622 (*PCW* Jan 98)

Choosing an **ISP**

With over 100 ISPs to choose from, choosing an Internet Service Provider has never been so difficult.

All ISPs (Information Service Providers) allow you to send and receive email across the Internet, browse and surf the world wide web and download files from Internet servers. But there are big differences between the quality of service that each provides in terms of technical support and the quality of software supplied when you first sign up. Usually they charge a flat monthly rate for Internet access of around £10, but on top of that you also have to pay for your phone charges

Choosing a Content Provider

There are really only three players in this field: AOL, Compuserve and MSN. They are not the best or fastest way of browsing the world wide web. Instead they aim to supply their own content in the form of discussion areas, online magazines and easily searchable file libraries. All these services offer free trials which is a good way of finding out if they're for

PCW Recommended products

Our PCW Award winners in July 97:

Pipex Dial: Major player with an excellent reputation.

BT Internet: BT has now got its act together with internet service provision.

Direct Connection: One of the best of the smaller ISPs.

Content providers

AOL: 0171 385 9404; Consumer-orientated service that offers good performance even for users of older 14.4K modems.

CompuServe: 0800 289378; more business content than AOL.

Buying a **Monitor**

Regardless of your computer application, you'll be looking at your monitor all day, so make sure you get a good one.

Some people claim not to see monitor flicker, but your brain does, resulting in fatigue and headaches. A refresh rate of 70Hz or higher will produce a flicker-free image on most monitors.

Interlacing also results in flicker. Always run in non-interlaced modes and ignore interlaced quotes. The resolution refers to the number of dots (pixels) horizontally and vertically on-screen. Standard VGA mode runs at 640 x 480 pixels, while other typical modes include 800 x 600 and 1,024 x 768. The more pixels, the more you'll be able to fit on the screen, but everything will be smaller and may only be suitable on a larger screen. Go for a 15in or 17in monitor capable of running a resolution of 1,024 x 768 non-interlaced at 70Hz or higher.

The visible area of most monitors (and TVs for that matter) is smaller than the model implies: a 15in screen may only have a 14.5in visible area, and a 17in may have only 16in visible. Aperture grille tubes such as Sony's Trinitron or Mitsubishi's Diamondtron are very bright, but need two fine but visible wires running across the screen for stability.

PCW Recommended products

Panasonic Panasync 5G (£385 ex VAT); **Taxan EV750** (£493 ex VAT); **ADI 5G** (£369 ex VAT); **Iiyama Vision Master Pro 17** (£510 ex VAT). See *PCW* May 97 for reviews.

Contacts Panasonic 0500 404041; Taxan 01344 484646; ADI 0181 236 0801; Iiyama 01438 745482

Buying a **Scanner**

Scanners are used to import text, graphics or pictures into a PC. They vary from low-cost hand scanners not much bigger than a mouse, to drum scanners costing thousands of pounds. The latter are designed to scan photographic transparencies to professional standards.

■ Flatbed scanners

These are the most common type of scanner, and cost from around £300 to more than £3,000.

They are capable of scanning colour pictures to a high standard. Most have transparency adaptors as optional extras.

■ Document scanners

A new category of scanner which aims to combine the reliability of a flatbed scanner with speed and portability. They are intended for OCR and document management. Most will cope with photographs and some with colour, but it's not really their forté.

PCW Recommended products

Document scanners

Visioneer PaperPort VX: street price £299; Computers Unlimited 0181 200 8282
Logitech PageScan Colour: street price £155; Logitech 01344 894300

Flatbed scanners

• **Intermediate**
Agfa Studio Star: street price £499 (ex VAT); Agfa 0181 231 4906 (*PCW* August 97)

• **Budget**
Umax Astra 610P: £99; IMC 01344 871329 (*PCW* February 1998)
Microtek Phantom 4800: £147; Midwich Thame 01379 649200 (*PCW* February 1998)

Buying a **Storage Device**

For backup and storage there's a range of devices available — conventional tape backup devices, superfloppies like the LS120 and proprietory systems like the Iomega Zip drive.

Additional storage devices, taking removable media, offer endless capacity. Iomega's ZIP drive and OR Technologies' a: drive (aka LS120) offer 100Mb and 120Mb respectively. The a: drive is an alternative to a floppy as it is compatible with normal floppies. The ZIP drive only works with ZIP cartridges.

Iomega's Jaz drive and SyQuest's SyJet, take 1Gb and 1.5Gb respectively. The SyJet is quicker and boasts cheaper media, but it's new as against Iomega's proven device.

Larger storage means slow, cheap tape drives with big capacity, perfect for overnight backup. Most quote compressed capacity, double "native" uncompressed capacity. DAT DDS-2 drives offer 4Gb native, which Seagate matches with faster Travan TR4 cartridges on its TapeStor 8000. Iomega's cheaper, slower Ditto 2000 offers 2Gb compressed backup.

CD recorders, offering double-speed writing and quad-speed reading, are around £400 ex VAT. The fastest are 24-speed, but there's little benefit in anything over 12.

PCW Recommended products

Iomega ZIP drive: internal £89 ex VAT; 100Mb media £10 ex VAT; Iomega 0800 973194 (*PCW* August 97)

Iomega JAZ drive: internal £189 ex VAT; 1Gb media £60 ex VAT; Iomega 0800 973194 (*PCW* August 1997)

Iomega Ditto 2000: external £89 ex VAT; Iomega 0800 973194 (*PCW* July 97)

Seagate TapeStor 8000: internal £220 ex VAT; Seagate Technology 01628 890366 (*PCW* July 97)

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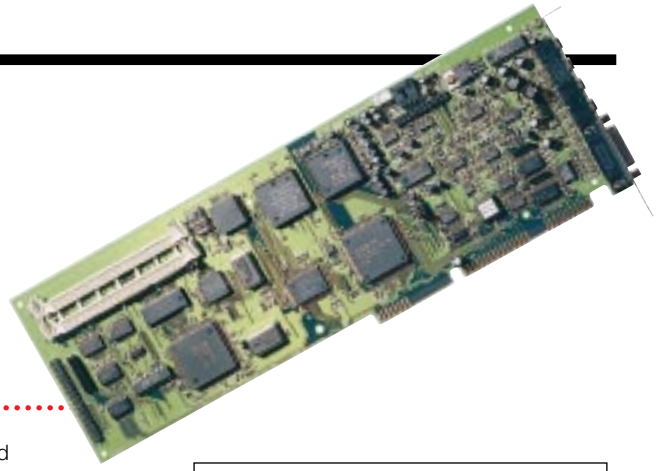
Buying a **Sound Card**



You need one of these to add sound capability to your PC.

Check compatibility with your CD-ROM drive, and remember that 16-bit cards capable of 44KHz provide higher-quality sound than slower 8-bit cards. Better sound cards now include wavetable synthesis which means they have samples of real instruments held in ROM.

The quality of wavetable synthesis still varies widely. Even cheap cards which have the inferior Frequency Modulation synthesis should have a daughterboard connector allowing them to be upgraded to wavetable. The newer cards are also plug and play which means, in theory, that you should be able to plug them straight into a PC without any extra configuration. Most cards are bundled with extra software, normally sequencers, wave editors and audio players.

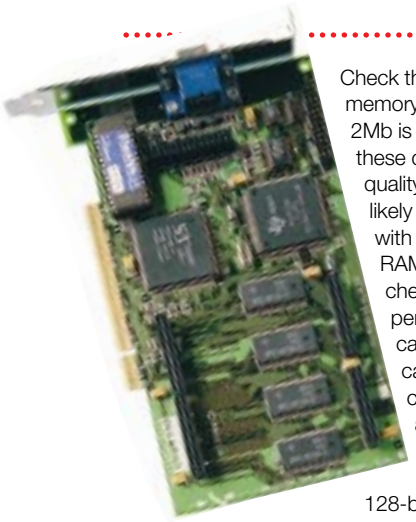
PCW Recommended products

AWE 64 Gold: £199; Creative Labs 01734 344322 (*PCW* June 97)

Maestro 32/96: £139; Terra Tec 01635 294394 (*PCW* June 1997)

Buying a **Graphics Card**

The graphics card sits inside the PC and controls the features which the software displays on the monitor.



Check the amount of memory on the card. 2Mb is standard these days. Better-quality cards are likely to be fitted with VRAM (Video RAM). Also, check out the performance capability of the card. Video cards come as 16-bit, 32-bit, 64-bit and even 128-bit: a large number of bits means faster performance.

The most important aspect of your video card, and the most frequently quoted feature, relates to the resolution that the card supports in Windows. This is measured by the number of pixels the card displays on-screen. The absolute minimum these days is 1,024 x 768 with a refresh rate of 70Hz.

A 2Mb card can display 16-bit colour (65,000 colours) at 1,024 x 768 pixels. A 1Mb card can manage only 8-bit colour (256 colours) at 1,024 x 768 pixels. To display 24-bit colour (16 million colours) at 1,024 x 768 you'll need 4Mb of memory. The refresh rate (measured in Hz) is important, too. It represents the number of frames displayed on-screen per second. A flickering display is very tiring to use.

Find out if your video card is "local bus". Local bus (PCI or VL) is an interface which connects your video card to the motherboard. It allows the memory in the card to be addressed directly by the CPU, which makes it a lot faster than the standard ISA interface.

PCW Recommended products

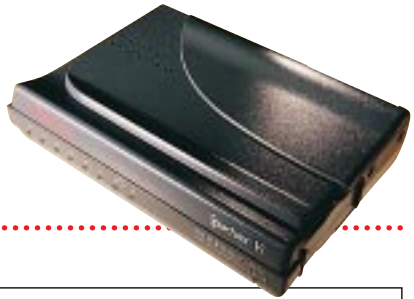
ATI Xpert@ play: £163 (4Mb); ATI 01628 533115

Hercules Stingray 128/3D: £210 (6Mb); Hercules 01635 294300

Orchid Righteous 3D: £132; Orchid 01256 479898

(*PCW* January 1998)

Buying a **Fax Modem**



You'll need a modem to connect to the internet or an online service, such as CompuServe or AOL, and also to send and receive email.

Modems are available in three formats: either as PC Cards to plug into notebooks, or as external boxes, or as expansion cards. PC Card modems are the most expensive, while external modems cost slightly more than expansion cards.

Apart from the casing and the external power supply, there is often very little difference between the internal and external versions of a modem. Most now have a built-in fax capability, which means you can receive faxes on your personal computer to view or print out.

Go for a V.34 28.8Kb/sec modem or one of the new V.34+ 33.6Kb/sec modems. Or, look out for the new 56K versions: these use one of two rival technologies but as yet are unsupported by Information Service Providers.

PCW Recommended products

Fax modems

- **Internal**

Pace 56 Voice: £169; PMC 0990 561001 (*PCW* November 97)

Buying **Software**

Only a few years ago there were dozens of different software applications in each category. During the past two years or so, however, there has been rapid product consolidation. Other magazines list large numbers of packages, most of which are out of date and not worth considering. We've distilled each category down to just one or two recommended products.

A

■ ACCOUNTS SOFTWARE One of the few categories in which there are still masses of packages on the market at a huge range of different prices. Accounts is also one of the last bastions of DOS.
Recommended products:
MYOB, Intuit QuickBooks.

B

■ BROWSERS are programs which are used to navigate the internet. A modern browser lets you navigate web pages, download files and send and receive email.
Recommended products:
There are only two worth talking about: Netscape Navigator and Microsoft Internet Explorer.

C

■ CAD SOFTWARE Computer Aided Design covers everything from architectural drawings, through office planning, to complex engineering drawings.
Recommended products:
AutoCAD is the industry standard but we think MicroStation 95 is a more capable product at the high end of the market. At the cheap end, DesignCAD 3D offers astonishing value for money.

■ CONTACT MANAGERS
(See PIMs)

D

■ DATABASE At its simplest, an electronic card index. For just a few hundred names and addresses an electronic-type Filofax, such as Lotus Organizer, may be more appropriate. But for more sophisticated applications like tracking products and customers, the power of a relational database is required. Databases are generally the least user-friendly of the main suite applications. In most offices you are likely to use a database application that somebody else has written for you.
Recommended products:
Lotus Approach, Microsoft Access.

■ DESKTOP PUBLISHING SOFTWARE (DTP) This is software used to create newsletters, magazines, books, brochures or advertisements.

Typically, it enables you to incorporate graphics, lay out text in multiple columns and run text around graphics. You also have control over how text appears, in varying degrees of sophistication.
Recommended products:
The high-end market leader is Quark XPress on the Mac. On the PC, PageMaker is strong. For serious work on a budget we recommend Serif Publishing Suite, and for sheer ease of use, Microsoft Publisher.

■ DRAWING SOFTWARE Programs for drawing, which work using vectors. This means each shape drawn is described using mathematical equations.
Recommended products:
At the budget end of the market, MicroGraphx Windows Draw 5 stands out. At the professional end, Corel Draw 7 gets our vote.

■ IMAGE EDITING SOFTWARE A program for editing bitmap files (files made up of pixels). Typically used for converting graphics files, retouching photographs and preparing pictures for printing.
Recommended products:
For simple image editing the popular shareware program, PaintShop Pro, is fine. For professionals, Adobe's Photoshop is the industry standard.

■ INTEGRATED PACKAGES Typically, these combine the functionality of a database, word processor and spreadsheet in one application. This makes it easy to move data from one component to another but integrated packages tend to lack some of the advanced features of individual applications.
Recommended product:
Microsoft Works.

J

■ JAVA. A language based on C++, but easier to learn and use. Java runs on a "virtual machine" interpreter, so programs can run on many different platforms.
Recommended products:
Borland JBuilder

M

■ MULTIMEDIA AUTHORING TOOLS Programs designed for producing interactive multimedia applications; typically for training applications or for CD-ROMs. The software lets you control and manipulate different types of media such as sound files, audio files, video clips and graphic files.
Recommended product:
Macromedia Director, the product used to produce *PCW*'s cover-mounted CD-ROM, gets our vote.

O

■ OCR SOFTWARE Optical Character Recognition software converts printed text into computer text you can edit. You will need a scanner or fax card to get the printed text onto your PC. OCR saves re-keying documents and can cut down drastically on paper filing systems.
Recommended products:
OmniPage is the best product we have found, but TextBridge offers most of the same capabilities for less cash.

P

■ PERSONAL INFORMATION MANAGERS (PIMs) PIMs are an electronic way of storing names, addresses, phone numbers and appointments. Contact managers take the idea one step further to include business information about dealings with clients.
Recommended products:
SideKick 95 and Organizer are excellent PIMs. For contact managers we would recommend Goldmine for Windows.

■ PRESENTATION GRAPHICS Increasingly, the trend is towards doing presentations on a PC and the latest packages tackle this by including sound, sophisticated transitions between slides and support for video clips.
Recommended products:
Powerpoint and FreeHand are both capable products sold with Microsoft Office and SmartSuite respectively.

■ PROGRAMMING TOOLS Applications designed for writing software. These range from "low-level" languages which are powerful but difficult to learn and use, to "high-level" languages which, although much easier to use, generally sacrifice performance and flexibility in the process. Commercial programs like Word for Windows are written using low-level languages. Bespoke applications and prototypes are often written using Delphi or Visual Basic.
Recommended products:
Delphi 3.0 is a great example of scalability, catering for beginners and serious developers working on major projects. Optima Power++ is the pick of the high-end Windows development tools.

■ PERSONAL FINANCE PACKAGES These help manage home finances. They are also well suited to some small businesses and tend to be easier to use than full-blown accounts packages.
Recommended product:
Quicken is the outstanding product in this category and has no serious rivals.

■ PROJECT MANAGEMENT Programs for managing large projects — anything from building a power station to planning a

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marketing campaign.
Recommended product:
SuperProject 4.0 for Windows.

R

■ REMOTE CONTROL S/W Lets you access and control a PC remotely, usually via a modem.
Recommended product:
ReachOut, for its simple interface and support for different networks, particularly TCP/IP.

S

■ SPREADSHEET This is an electronic version of what would be an old-fashioned ledger. Excellent graphing and charting facilities are included.
Recommended products:
Lotus 1-2-3, Microsoft Excel.

■ SUITES Most general business software is now sold in suites.
Two suites are widely available: Lotus SmartSuite and Microsoft Office. Lotus SmartSuite also contains a database. With Microsoft Office, you pay extra for Office Professional which contains Microsoft's Access database.
Recommended product:
Microsoft Office is close to the industry standard. Its high level of integration gives it the edge over the opposition.

V

■ VISUAL PROGRAMMING (see Programming Tools)

W

■ WEB EDITORS Programs designed to do for web page design what DTP did for magazines and newsletters. They let you create web pages without writing HTML. You can incorporate graphics, backgrounds, tables, images and sounds.
Recommended products:
HotMetal Pro 3.0 is our first choice, while Adobe Pagemill is a capable alternative.

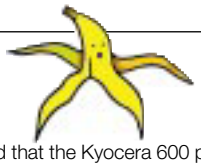
■ WORD PROCESSOR An application in which you can write letters and prepare reports, or produce a simple newsletter. The latest word processors have advanced features such as outliners, table editors and facilities for adding columns of figures.
Recommended products:
Microsoft Word is the clear market leader but WordPro is a capable alternative.

A-Z of Recommended **Software Products**

■ *If you would like to read any of the reviews of software listed here and do not have the original issues, you can order* Personal Computer World *on CD-ROM. It costs just £9.95 (including postage and packing).* *See pages 310/311 for full details.*

	Category	Product	Supplier	Contact	Price (ex VAT)	Date of *PCW* review
A	Accounts	MYOB	Bestware	01752 201901	£195	April 1997
	Accounts	QuickBooks	Intuit	01932 578501	£125	April 1997
B	Browsers	Netscape Navigator	Netscape	0181 564 5100	£49	Mar 1997
	Browsers	Internet Explorer	Microsoft	0345 002000	Free	Jun 1996
C	CAD	Microstation	Bentley	01344 412233	£3,495	Jan 1997
	CAD	DesignCAD 3D	BVG	01874 611633	£149.95	Jan 1997
D	Database	Approach 97	Lotus	01784 455445	£40	Oct 1997
	Database	Access 97	Microsoft	0345 002000	£235	Oct 1997
	Desktop publishing	XPress 3.3	Quark	01483 454397	£795	May 1997
	Desktop publishing	Publisher	Microsoft	01734 270000	£70	May 1997
	Desktop publishing	Publishing Suite 3.07	Serif	0115 9421502	£99	May 1997
	Drawing	CorelDraw 7	Corel	0800 973189	£495	Sept 1997
	Drawing	Windows Draw 5	MicroGraphx	0345 089372	£38.30	Sept 1997
I	Image editing	Photoshop	Adobe	0181 606 4000	£382	Dec 1996
	Image editing	PaintShop Pro	Digital Workshop	01295 258335	£49.95	Jun 1995
	Integrated package	Works/Win 95	Microsoft	0345 002000	£93.61	Apr 1997
J	Java programming	JBuilder	PowerSoft	01628 597100	£399	N/A
M	Multimedia authoring	Director 5.0	Macromedia	0181 200 8282	£99	Oct 1996
O	OCR	PaperPort Plus	Visioneer	0800 973245	£58.72	Dec 1997
	OCR	Presto! OCR Pro 3.0	Guildsoft	01752 895100	£58.72	Dec 1997
P	Personal finance	Quicken	Intuit	0800 585058	£34	May 1996
	PIM/contact manager	Organizer 2.1	Lotus	01784 455445	£99	Jun 1997
	PIM/contact manager	Goldmine for Windows	Elan Software	0171 454 1790	£395	Jun 1997
	PIM/contact manager	Sidekick 95	Starfish UK	0181 875 4400	£39	Jun 1997
	Presentation graphics	Freelance	Lotus	01784 445808	£42	Mar 1998
	Presentation graphics	Powerpoint	Microsoft	0345 002000	£277	Mar 1998
	Programming tools	Power ++ 2.0	PowerSoft	01628 597100	£345	Sept 1997
	Programming tools	Delphi 3.0	Borland	01734 320022	£89	Apr 1997
	Project management	SuperProject 4.0	Computer Associates	01753 679679	£495	May 1996
R	Remote control/Access	PC Anywhere	Symantec	01628 592320	£139	Nov 1997
S	Spreadsheet	Excel	Microsoft	0345 002000	£220	May 1995
	Spreadsheet	1-2-3	Lotus	01784 455445	£365	May 1997
	Suite	Office (Standard)	Microsoft	0345 002000	£360	Jul 1997
	Suite	Office (Professional)	Microsoft	0345 002000	£460	Jul 1997
W	Web authoring	HoTMetal Pro 4.0	SoftQuad	0181 387 4110	£69	Jan 1998
	Web authoring	FrontPage 98	Microsoft	0345 002000	£99	Jan 1998
	Word processing	Word	Microsoft	0345 002000	£220	Oct 1996

ChipChat



■ We said that the Kyocera 600 printer featured in the laser printer group test, *PCW* February 98, did not support native DOS printing. It does.
■ The price of the ACi Icon (notebooks group test, this issue) is now £1,795 ex VAT (£2,109 inc VAT) rather than £1,995 ex VAT.
We apologise to readers for any confusion caused by these errors.

Gotcha again
Move over, Tamagotchi. In Vietnam, children are forsaking the beeping handheld beasts and are begging their parents for…real pets. A Ho Chi Minh City newspaper reports that kids are buying baby birds and bringing them to school, disrupting classes once again. A Tamagotchi costs approximately $30 in Vietnam, whereas a newly-hatched chick is only 25 cents.

I got you babe
And in Japan, the latest hot gadget is "My Lover", a Tamagotchi-like toy that requires owners to woo virtual partners with karaoke dates, chocolates and love letters. If users earn enough affinity points they can win a virtual kiss and even a virtual marriage. But as in real life, if they neglect their loved one, it may leave them for someone else.

Some dates to remember…2-8 March is National Procrastination Week, but the organisers say that it may be postponed. And following on quite nicely is 8-15 April — National Panic Week.

Caption competition

Above **"Didn't you know shoulder pads went out with Dynasty?"**

Think you can do better? Email captions@vnu.co.uk or enter via our web site, or write to the usual *PCW* address with your own captions on a postcard marked March Caption Compo before 15th February. We'll print the funniest entry and the winner will receive a £20 book token.

Congratulations to Tony Gilbert, who won January's caption competition with this: **"Computers can be a real drag, especially when you get your nails caught between the keys."**