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PERSONAL COMPUTER WORLD

Expert opinion you can trust

May 1999
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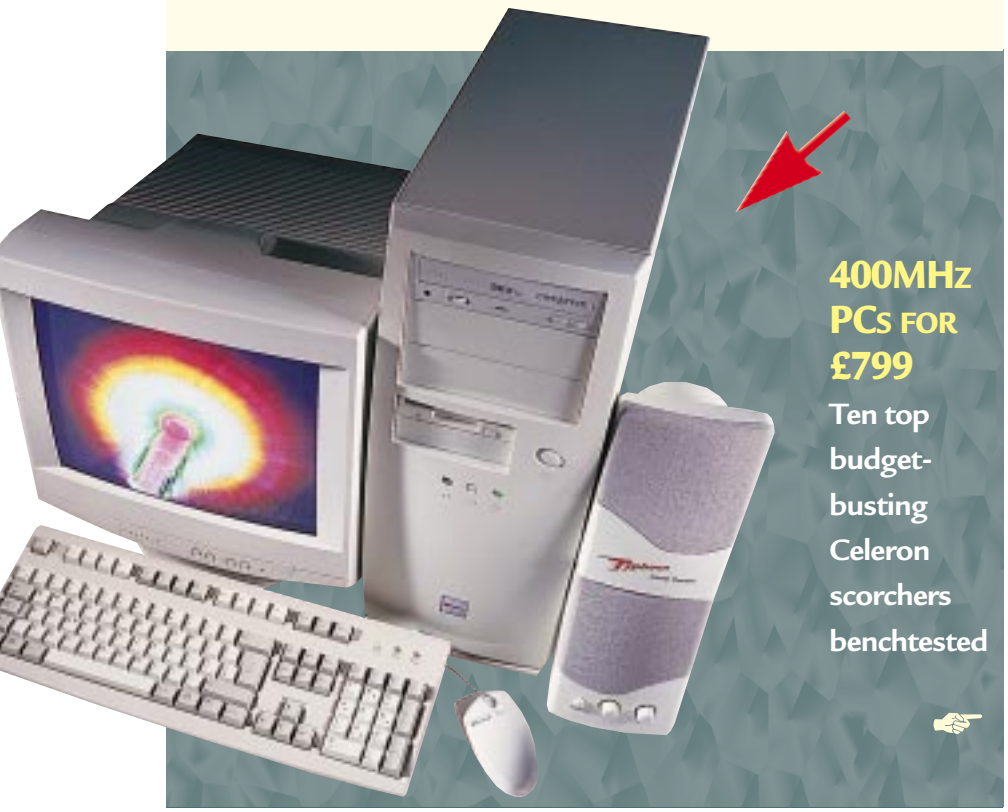

400MHz PCs FOR £799

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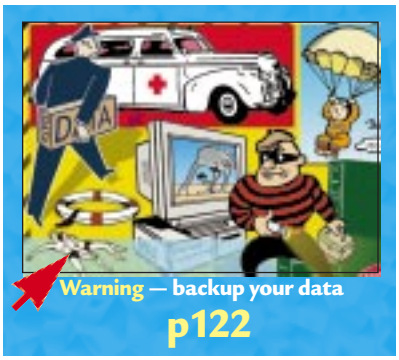

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Upgrade your motherboard for **maximum effect.**

Board meeting

I had a good look at my home PC recently and decided it was time to upgrade. Not to a new processor, nor even to a hot graphics card. No, the upgrade for which my system was crying out was more fundamental — a new motherboard. The time had come in my PC's life when the lure of new interfaces, increased bus speeds and support for exotically-fast memory had become too hard to resist.

If you have never fitted a new motherboard, I can understand your apprehension. The first time I even thought about it, it seemed an insurmountable process compared to just sliding in a new interface card or fitting a niftier processor. But once I had identified what shape and size case I had, it really was as simple as undoing a few screws, removing the old board and swapping it for the new one. The old motherboard looked a lot smaller and less scary out of its natural environment, and without its cables.

> **Like all phobias, the old motherboard looked A LOT SMALLER AND LESS SCARY out of its natural environment**

After my first board-swap, I couldn't get enough of it, and my latest motherboard has brought my PC a 100MHz front-side bus, support for the fastest memory, the ubiquitous array of ports and plenty of opportunity to tweak and overclock — and all for less than £100. Here at *PCW* we thought we were more than overdue to present a motherboard group test, so we've gathered together 18 models covering Slot 1, along with Socket 7 and 370 technologies, and the prices start at £49. So get that screwdriver out!

Being a keen amateur photographer I've been keeping an especially close eye on digital cameras. At first, their low resolutions, high prices and tricky connectivity restricted them to hardcore enthusiasts wanting to update their web site or publish tiny images in exchange-style newspapers. Admittedly, I saw some forward-thinking estate agents brandishing early models around local properties, but such examples were rare. This month we've been able to compare ten brand-new digital cameras, each boasting more than one million pixels, at very reasonable prices. These so-called mega-pixel designs provide image quality sufficient to fill an A4 colour inkjet page, or enough margin to crop for use on-line without worrying that you'll run out of pixels. Our winning model was even good enough for us to start using it for various product shots within this issue.

Exciting exclusives appear in our *New Products* pages this month and 3D gamers can look forward to seeing how ATi's 128-bit Rage Fury compares to the new 3Dfx Voodoo3. And, we grab a first look at AMD's K6-III processor running at 450MHz. AMD claims it will outperform an Intel Pentium III running at higher clock frequencies — find out what happened when we put it to the test. We also review a pair of Sony notebooks, one pocket sized and the other a desktop replacement, but both running Windows 98 faster than most office PCs. We've also got backup solutions for small businesses, part II of our Year 2000 countdown, a test of free ISPs, and a chance to win three digital cameras by taking part in our annual Reliability Survey.

By the way, it's our 21st birthday this month and I'd like to say thank you to all our readers for giving us our highest circulation yet!

Gordon Laing, Editor

WELCOME TO THE MAY 1999 PERSONAL COMPUTER WORLD CD-ROM

May COVER DISC

GAMES | APPLICATIONS | LIBRARY | ENTERTAINMENT | INTERNET

If you are an aspiring Delphi programmer, look no further. This month, we bring you a *full version* of Delphi Developer 2. This version of the popular development tool contains all the functionality you will need to create exciting and complete applications. But if programming is not quite your cup of tea, everyone should be able to find a use for the *full version* of Quicken 6 SE that is also on our disc. Additionally, there's an amazing collection of trial and free Internet Service Provider software, so if you are contemplating going online, get that disc loaded now and see what's on offer.

The Employment & Personnel Desk (version 1.2 special)

help you prepare job descriptions, employee specifications and job advertisements, or you can develop and maintain company practice documentation for output as handbooks or statements. And you can produce detailed customisable reports on members of staff, automatically. All functions are password protected so only those who 'need to know' will have access to the data.

If you run a small business and employ staff, you will appreciate the importance of keeping accurate personnel information. So Employment and Personnel Desk's extensive range of tools may be just what you need to maintain all that staff and employment data. But this package offers many facilities in addition to the the option of keeping individual detailed records for each employee. A range of recruitment tools will

☛ **The version of Employment** and Personnel Desk on this month's disc is limited to ten current employees and does not support 24-hour legal help, but it is fully functional in all other respects.

PCW DETAILS

Platform *Windows 95/98 and NT*
Limitations *Up to ten employee records.*
Sales Contact *01483 888608*
Technical Support *tech@risk-management.co.uk*

Technical information to help you use the CD

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

✔ **How to use our CD-ROM**
Put the disc into your CD drive.
Win95 — 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
Win3.1 — From Windows Program Manager choose File/Run, then type in <CD Drive>:\pcw.exe and press enter.

✔ **Faulty Discs**
If you get messages like 'Cannot read from drive D:', or your drive continually scans the disc without starting, you may have a faulty disc. In this event, please return the disc with a covering note bearing your name and address, and clearly marked 'PCW CD MAY 1999', to:
TIB plc
HelpLine Returns
Unit 5
Triangle Business Park
Pentrebach
Merthyr Tydfill
Mid Glamorgan CF48 4YB
A replacement disc will be sent to you by post. Please use only the above address, as replacement discs cannot be supplied from our VNU offices.

✔ **Technical Support**
• If you have technical problems with individual products, please check in the magazine or on the CD for the manufacturer's support contact details.
• For general problems with the CD, our **Technical Helpline** is open weekdays from 10:30am - 12:30pm and 1.30pm - 4:30pm, on **01685 354726.**
• A live technical info page is also available via CD Online, direct from our CD (see p20).
• For replacement disc information, please see *Faulty Discs*, above.

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

IMPORTANT NOTICE

Macromedia Shockwave 7

If you spend a lot of time surfing the web you will no doubt have come across sites using this very popular and widely-used utility for enhanced graphics and functionality. You need to have the plug-in installed in your browser to view Shockwave content, otherwise you will be restricted to a company's more 'restrained' pages.

Unfortunately, the plug-in is normally only available from Macromedia's own site, and being so popular it can be quite a long process getting connected and then downloading the software. So, this month we've got it on our CD to save you download time and to give you a hard copy to keep. If you want further information about Shockwave technology, you should visit the Shockwave Technology section on the Macromedia web site at www.macromedia.com.

Shockwave 7 has been redesigned to work more closely with today's browsers and includes an option to auto-update, so you will not have to download the player each time a new version is released.

PCW DETAILS

Platform *Windows 95/98*
Limitations *None*
Sales Contact *Available for download free, from www.macromedia.com/shockwave/download/*
Technical Support *www.macromedia.com/support/shockwave/*

Advanced Client EASYCOM/400 for VB

Some people might think that computers begin and end at the humble desktop PC but seen as an intelligent workstation attached to a larger computer, the PC takes on a very different role. Enter Advanced Client EASYCOM/400 for VB, a complete set of tools, controls and functions for accessing AS/400 databases and resources from Visual Basic or Visual C++ applications. Built on existing EASYCOM Technology, it provides fast access to an AS/400 over native TCP/IP or APPC protocol connections. Key features include native access to any physical or logical file with no ODBC required, support for keyed and non-keyed reads, database update, delete, and insert record, the facility to open SQL statements, execution of AS/400 commands, and calls to existing AS/400 programs written in languages like RPG, COBOL and CL.

Methods provided by Easycom Data Control are compatible with the original Microsoft DAO control so you can write the same statements that you use for an MS Access table. Wizards assist in generating the Visual Basic code and forms needed to access the AS/400 resources.

PCW DETAILS

Platform *Windows 3.1/95 and NT*
Limitations *Fully-working version, 14 days limited on a new AS/400 machine.*
Sales Contact *0033 1 690 70145*
Technical Support *tech@easycom-aura.com*

Software Library

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

New This Month

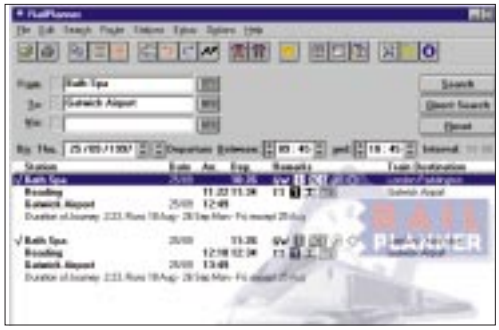
• **Assorted Games Patches**
Includes Grim Fandango, Heretic II, Starcraft, Wargasm and the Tomb Raider 3DFX Patch.

• **Audition It! 2.02** *(Win95 and 98)*
If you're sick of going through Wav samples for your current musical or multimedia project, having to select each one manually and play it until you find what you are looking for, Audition IT! provides the answer.
(30-day shareware).

• **Axialis Cursors 4.5** *(Win95/98/NT)*
Axialis Cursors is a cursor editor and manager for Windows 95.
It is a fully integrated multi-document application. Ax-Cursors creates all kinds of static and animated cursors with sizes up to 72 x 72 and up to 16.8m colours. It also features numerous editing tools.
(Shareware).

• **Budgeteer 1.5a** *(Win95, 98 and NT)*
Budgeteer is a software package which helps you keep track of your personal finances. If you ignore your bank balance you will quickly incur charges for exceeding credit limits. But, with a little time and effort, Budgeteer will tell you exactly when you need to curb your spending.
(30-day trial).

• **Knightsmith's Bits & Bobs 2000** *(Win95/98)*
A suite of Windows desktop utilities including Midi/Wav Player, BMP Viewer and Printer, Clock, Calculator, Calendar, Quick Notes, Video Player, Quick Acronym Reference, Lottapicka, Junk Sweeper and more.
(Evaluation copy).



• **Microsoft Office 97 Service Release 1 & 2**
The Office 97 Service release patches combine Office 97 product updates into a single installation providing you with various new viewers, converters and enhancements.

• **Net Proxy 3.03** *(Win95/98/NT)*
NetProxy is a secure, reliable and highly cost-effective way to provide simultaneous internet access to multiple network members using just a single dialup account with only one internet connection of almost any type, including a dialup modem account, ISDN, leased-line, etc.
(30-day time-limited use for multiple users, reverting thereafter to single-user mode).

• **Rail Planner 4.04** *(Windows)*
You will need this serial number to run the software:
9QPM-G3NX
Rail Planner is an 'Autoroute' equivalent for trains, ferries and the Underground. It is ideal for personal and corporate use and displays all essential journey information. It will establish the optimum route alternatives and connections, with information such as availability of on-board refreshments and whether reservations can be made. Your PC can then print a copy of the journey information and train details.
(Time-limited demo).

CD-ROM HELPLINE 01685 354762

PCW CD OnLine

ACCESS THE INTERNET DIRECT FROM OUR OPENING SCREEN!

CD Online offers an extension to the normal content contained on the disc by taking you directly to the on-line web sites of the companies featured. Find out more about their products or about the company itself, or send them an email and talk to them direct. If you're connected to the internet, you can visit these sites via the Content Links of the CD-Online section. If you don't already have a browser installed, you can install the latest version of Netscape straight from the disc.

☛ **To access CD Online**, click on the banner at the top of the main screen.

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JOBWORLD.CO.UK

WWW.JOBWORLD.CO.UK

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Win a Sony Trinitron Flat Screen KV28 FX60 monitor!

PCW and Demon Internet bring you a great prize draw. Amongst the thousands of our cover discs distributed this month, one is unique. By installing the FREE 30-day trial of Demon Internet from the 'Lucky CD', you could win a fabulous Sony Trinitron Flat Screen KV28 FX60 monitor!

☛ **To discover** whether your cover disc is the lucky one, run Demon Internet's FREE 30-day trial online registration from the disc. Once Demon has processed your details, you will see a message informing you if you are the winner. If the prize is not claimed within 90 days, every person who tries Demon Internet using the software on the disc will be entered into a second prize draw and the first name 'out of the hat' will be awarded the prize.

☛ **In addition** to the main prize, one out of every 25 people who use the free trial will, instead of the standard 30 days, receive ***90 days' FREE subscription*** to Demon Internet. Winners will be notified by email.

☛ **Your 30-day trial includes:**

- Unlimited access to the web, email, newsgroups and other Demon Internet services.
- 15Mb web space for your own web pages.
- An unlimited number of email addresses.
- Nationwide 0845 local call access.*
- Experienced Helpdesk support 24 hours a day, 365 days of the year, on a local-rate 0845 number.
- Access to fast, online games servers.

☛ **What do I need for the free trial?**

A PC with Windows 95, 98 or 3.1, a modem installed and connected to a phone line and a credit card (your card will not be charged if you decide to cancel your Demon Internet account before the 30-day trial period has elapsed). Put the disc in your CD drive and follow the on-screen instructions. If you need help, call Demon Internet's Technical Support Help Desk on 0845 272 4244.

**Demon provides 0845 numbers for connectivity, described by Oftel as 'BT local call rate'. Contact your phone company for details of their pricing structure. Demon Internet Standard Conditions of Use apply. Calls to the Sales & Enquiries Team and the Technical Support Help Desk may be monitored for training purposes.*

Full membership is £11.75 (inc VAT) per month with a one-off joining fee of £14.69 (inc VAT). If you decide Demon Internet is not for you, call the Sales & Enquiries Team on 0845 272 2666 during the trial period and they will cancel your subscription.

FreeZone Internet

FreeZone Internet offers you a FREE fully-fledged internet service with no subscription or online charges. It really is free, and ready for you to use right NOW.

Install the software included on this month's CD and you can start using your FREE access account today.

FreeZone Free Access account gives you:

☛ FREE UNLIMITED internet access.
☛ FREE Unlimited email addresses.
☛ 100% UK wide local call access.
☛ FREE 20Mb of personal web space.
☛ Connection at 33.6 (V.34), 56Kflex, 56KX2 & 56KV.90, ISDN 64K & ISDN 128K (bonding – fully BT Highway Compliant).
☛ Full newsgroup access.
☛ 7-day Technical Support.

Global Internet

Global Internet provides low-cost, high-quality connectivity to the whole internet for a fixed subscription fee, with no hidden costs or hourly charges. Try a one month FREE trial* from the CD. The software will get you on-line straight away for:

☛ Unlimited internet access.
☛ Unlimited email addresses.
☛ 50Mb FREE web space.
☛ All this for the cost of a local BT phone call.

Once the software has installed from the CD, click on 'Internet Explorer' on your desktop and follow the instructions on-screen. Credit/debit card details will be required to create your account.

☛ **FREE Technical Support 0870 909 8181**

** Free trials only available on single-access dial-up accounts created on-line by credit card. One free trial per household and you must be 18 years or over.*

SoftNET Free

Software Warehouse offers free internet access with no hidden charges, setup costs, time charges nor monthly fees. Your calls are charged at local call rate throughout the UK. SoftNET Free also guarantees a fast and reliable connection at all times, 10Mb of web space and multiple email addresses. Load it from our cover disc. SoftNET is compatible with 56K and V.90 modems as well as ISDN lines.

Technical Support 0890 120 4000. Calls charged at 60p per minute at all times.

MSN

MSN.CO.UK brings the best of the web into one place. The demo on this month's CD shows how easy MSN makes it to get to the information that *you* want on the internet. Get the latest news delivered from sites like the Electronic Telegraph, Megastar, FT.com and vnunet.com. Keep up to date with football news, reports and scores as they happen at Soccernet and Football365. Plan and book your travel with MSN Expedia UK and Thomas Cook, or keep in touch with your free web-based email service from Hotmail.

☛ **The demo** features a fully-animated guide with step-by-step instructions on personalising your MSN. If you have an internet connection you can then go straight to MSN, allowing you to get on with creating your own personalised home page!

AOL 4.0i GOLD

AOL 4.0i GOLD has a new look, easier navigation, and many new features. With one-step web access, enter the web address/URL in the input box, click the forward button, and you're there! A customisable toolbar allows you to go straight to web sites, and to any AOL area. Add or remove buttons, move the bar to the bottom of your screen, or collapse it to display text labels only. Specify favourite areas, and keep track of the last 25 areas or web sites you visited. Send emails with pictures & images contained in the text of the message, or with up to nine files attached.

AOL 4.0I GOLD includes:

☛ FREE – One month's membership!
☛ FREE – 100 hours online time!
☛ FREE – 5 email addresses!
☛ FREE – Technical support!
☛ FREE - 10Mb of web space!

PLUS

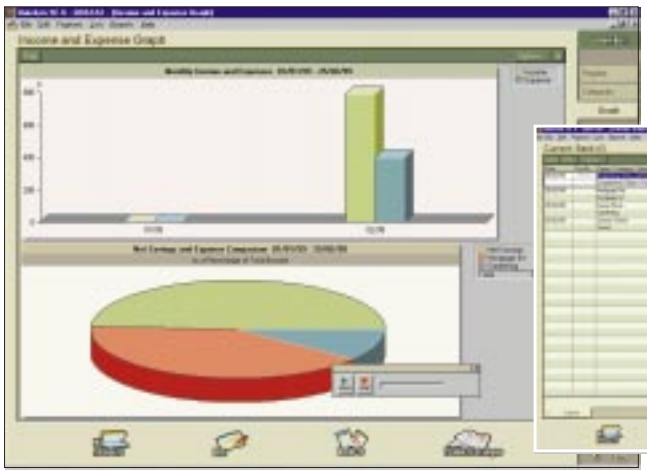
☛ 100% local access
☛ Up to 56K access speeds nationwide

Quicken 6 Special Edition

On this month's CD you will find a free, full-working copy of **Quicken 6 Special Edition**, the well known, best-selling accounting software. Quicken lets you track your day-to-day transactions in a register that looks just like a bank statement, with each transaction being categorised, letting you create reports and graphs that show you where you spend your money. The software can balance your accounts in minutes, print cheques, keep accurate tax and expense records and even track VAT for business use.

Quicken is enjoyable to use, with a colourful graphical interface and sound effects. Multimedia tutorials help you use the program efficiently.

☛ ***Note***: The installation of the software on the May cover disc does not contain the accompanying multimedia files; they will be included on next month's disc. However, you can still install the actual program from this month's disc and use it fully. The multimedia files are only required if you click any of the tutorial icons from within the software. Get next month's cover CD and simply make sure it is present in your CD drive when you run Quicken 6 SE to access the sound and video. *You will not have to reinstall the program.*



☛ **Note for existing Quicken users**

It is NOT recommend that you install the version of Quicken on the CD on to a machine where an older version of Quicken is already in use. It will upgrade your existing data files to Quicken version 6 and you will then need this or another current version to access them. If you're currently using an older version, try the version from the *PCW* disc on a different PC first, or call Intuit on **0800 585058** to discuss upgrade details.

☛ **Registering**

You may use this software a number of times before you have to register it. You can either register via your modem on **01932 578525** or via the phone on **0800 585058** (this is the preferred number; the actual software also indicates 0800 072 7433 as a telephone registering number). If you are calling from outside the UK, please call **+44 1932 578433**. After supplying name and address information, you will be given a registration number which you must enter to continue using the full product.

• *This offer is not available in South Africa.*

PCW DETAILS

Platform
Windows 95 & 3.1
Limitations
FULL VERSION
Sales Contact
0800 585058
Technical Support
None available

Upgrade offer

Intuit, in association with *Personal Computer World*, offers you the opportunity to upgrade to Quicken 98 Deluxe for just £44.95 including VAT, post and packing. After trying Quicken 6 SE the benefits of the software will be apparent, but you may wish to consider the extra features of Quicken 98 Deluxe, the latest version. These features include:

☛ **SmartAlerts** to prompt you when a specific share hits a certain price or if you're about to exceed your overdraft.

☛ **Faster, easier invoicing** as an integrated feature with three available invoice formats.

☛ **Emergency Records Organiser** for important addresses, telephone numbers and policy details.

☛ **QuickTax '98** to complete your self assessment tax return in minutes.

☛ **Payslip Wizard** to keep track of your gross earnings and key deductions.

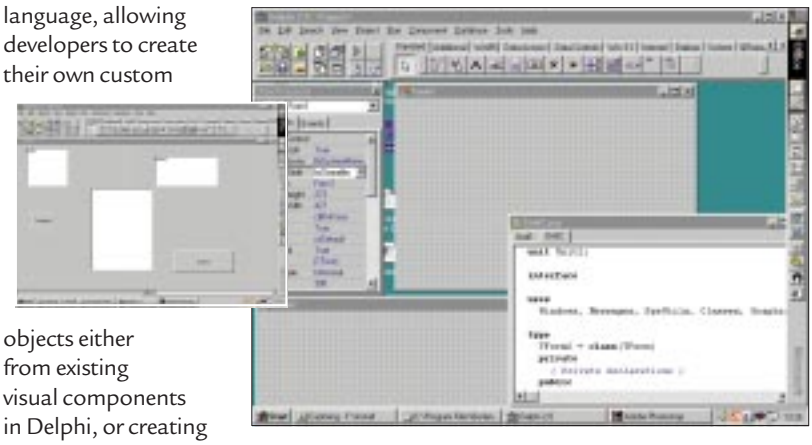
☛ **Online Currency Rate Download** to download share and unit trust prices at the click of a mouse.

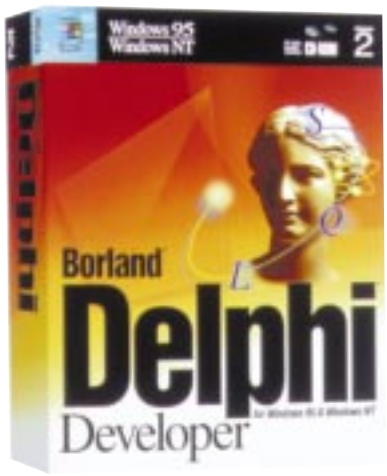
■ To upgrade to Quicken 98 Deluxe just call Intuit on its hotline **0800 585058**, quoting **Reference No. PCW99MY**, with your debit or credit card details.

Borland Delphi Developer 2

Borland Delphi Developer is a rapid application development tool for building 32-bit professional multi-user applications for Windows 95 and Windows NT. It is targeted at professional programmers who need to develop high-performance desktop applications accessing local and LAN databases quickly.

One of Delphi's most interesting characteristics is its full support for object-orientated programming, including encapsulation, polymorphism and inheritance in the Object Pascal language, allowing developers to create their own custom objects either from existing visual components in Delphi, or creating entirely new abstract business objects. And because Delphi is written in Delphi, there is no distinction between the types of objects developed by a second party or those written by Borland itself.





In addition to 32-bit support for long filenames, multi-threading and the Windows APIs, Delphi has a complete built-in suite of Windows 95 controls including TreeViews, Header controls, Status Bars and Progress Meters.

Plugging your new application into a database is straightforward. By using objects from a Data Access page, programs can be developed for Sybase, Microsoft SQL Server, Oracle, InterBase, Paradox, dBase and the Local InterBase Server.
Any ODBC-compliant server such as Access can be accessed, too.

What you ultimately get out of Delphi is quick-to-develop, high-performance client/server applications.

PCW DETAILS

Platform
Windows 95, Windows NT 3.51 or a 100% compatible operating system
Limitations *FULL VERSION software for personal use only. The software may not be used for deployment, development or teaching in a commercial or educational environment until a copy is purchased.*
Sales Contact
0800 454065 (credit card only)
Technical Support
None available

LIMITED LICENCE THROUGH PERSONAL COMPUTER WORLD

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 it. For distribution rights of owner-generated applications, the owner will additionally have to purchase a copy of one of the following: Borland Delphi 2 Developer, Borland Delphi 4 Client/Server, Borland Delphi 4 Professional or Borland Delphi 4 Standard as offered through this magazine. No resale of the CD is permitted. No support is available with this software.

Upgrade offer

After using Delphi 2 from this month's disc, you may want to take advantage of the special upgrade offer to Delphi 4, available from Inprise through *Personal Computer World*. Delphi 4 comes in three different versions: Standard, Client/Server and Professional. The many new features include an AppBrowser IDE and fully customisable IDE with task window and docking and floating toolbars. There's a suite of advanced debugging tools and an MS Office-style interface that supports window resizing component anchors, and a one-step ActiveX object. See order coupon below for prices. These upgrade offers and prices are only valid for the UK and Ireland.

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Borland Delphi 4 Client/Server upgrade	£1,199.00	D4C1		
Borland Delphi 4 Professional upgrade	£249.00	D4P1		
Web Broker for Delphi 4	£139.00	D4WB		

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Credit Card Orders Only.

Roll out the MIDI

The trouble with pipe organs is that they are big, so you have a limited choice if you fancy a touch of the Toccata and Fugues. This splendid 1.2 x 1.66m model could be the answer. It replaces big bass pipes by sampled sounds, so it's just about small enough to take around. It's MIDI controlled from twin kyboards and costs £14,000.
Artifice 01273 600634

PRIVACY

Microsoft under fire over secret logging of PC IDs

Microsoft was on the defensive last month after revelations about a **secret number identifying PCs**. The company admitted that the Windows 98 registration wizard sent the ID, derived from a machine's network card, even if the user asked for it not to be sent.

David Weeks, UK Windows product manager, echoed the company line by claiming: 'This was due to a bug in the Windows 98 registration procedure.'

The man who raised the alarm, Richard Smith, head of Phar Lap Software, said the same number is also stamped into files created by Microsoft Office programs like Word, Excel and Powerpoint.

A statement on the Microsoft web site said the company was taking steps to address what it described as 'privacy concerns'. It said that the Win98 registration wizard would be updated, all records of the ID would be purged, and a downloadable patch would remove the ID from the Windows registry.

The statement refers to 'rumours' that the ID is related to numbers appearing in Office files which are used to 'identify a document in a distributed network environment.' It said there was no way to trace the origin without an intimate knowledge of the host network.

But Smith insisted there was no question that the machine ID appeared in Office documents, although he did not accuse Microsoft of relating the two numbers.

'My own belief is that Microsoft logged the ID number in Win98 because it wants to crack down on piracy. Some PC vendors here sell machines using one copy of Windows 98. Microsoft can spot this by matching the product number with the machine number.'

Intel was embroiled in a similar dispute over IDs in PIII chips. But Smith was not arguing about the principle of the ID: 'Having your software on your PC is like being in someone's house. You should treat it with respect.'

CLIVE AKASS

• *Point of view — see page 30*

Oftel holds fire as free web access booms

Fears that a review of line charges might threaten free web access services have proved unfounded. BT asked phone watchdog Oftel to look at charges for Number Translation Services (NTS) which provide nationwide links at local call rates.

The NTS system was established to help firms set up UK-wide services such as help lines. Call lengths were typically only a few minutes and companies generating them were given a cut of the charges. But NTS began to be used for web links lasting hours and the provider's cut was used to finance free access.

An Oftel report, launched as we went to press, agreed that BT's share should change, but it called for more flexible charging for the different services. Oftel director, David Edmonds, said: 'Enabling the huge growth in the use of the internet has been a key factor in my consideration.'

SEE PAGES 52-53 FOR OUR SPECIAL REPORT ON FREE WEB ACCESS

Indeed, net use in Britain looks finally to be hitting a classic exponential leap thanks to free access, the fact that new PCs have modems by default, and emerging TV-based access.

Mike Hughes, peripherals product manager at Gateway, which has just launched a free service, said: 'Oftel has recognised the importance of the new, free ISPs.'

Richard Wood, of UUNet, which hosts the service, said the Oftel review meant some ISPs may have to alter their business model, but he doubted if any would go under. He welcomed the call for different pricing for a range of services.

Interested parties have until 7th April to reply to the review.

Gateway sign-on: www.gw2k.co.uk

So what about free browsers?

Fears over the Oftel report reflect the fact that decisions by consumer watchdogs are not necessarily welcomed by the consumer. One claim in the current anti-Trust case against Microsoft is that it acted uncompetitively in giving away its browser. A possible outcome might therefore be for Microsoft to be forced to charge for Internet Explorer. The case has been adjourned for six weeks.

'Uh-oh...looks like we're going to have to pay for breathing'

Mobile data to hit video speeds

Mobile phone companies are gearing up to offer **data rates of up to 2Mbit/sec** — fast enough for portable video phones. The technology will also be used for web browsing using portable computers.

Three licences for the so-called Third Generation Mobile (3GM) systems are due to be auctioned this autumn, though this may now be delayed until next Spring.

Orange, One-to-One and Vodaphone are trialling services using the Universal Mobile Telecoms System (UMTS) specification, which is the successor to GSM.

Cellnet has announced no plans, but majority shareholder BT is working on UMTS at its Martlesham labs.

Sadly, UMTS is universal more in name than fact, and the international ITU standards body is trying to forge it into a standard called IMT-2000.

This involves intellectual property claimed by both Ericsson and Qualcomm. The ITU says work on the technical specification will go on while the two companies battle it out. Tony Milbourne, of mobile comms specialist The Technology Partnership, says 3GM services are unlikely to appear before 2002.

Data rates will vary, up from 64Kbit/sec, the same as a single ISDN channel. Typical rates for a moving user will be 384Kbit/sec.

TTP, based near Cambridge, is one of many companies developing the technology. The service will be used inititally by large companies but will move to a wider market as prices fall.

CLIVE AKASS & ANDREW CRAIG

TTP 01763 266266

WebPad hits the DECT

Chipmaker Cyrix, which is now owned by National Semiconductor, showed off this mobile browser *(left)* at Comdex last year and was due to demonstrate it at Germany's Cebit show in late March. This one is equipped with wireless comms using the DECT standard which is coming into use in home-based portable phones. The Web Pad is also available with a 2.4GHz wireless modem. It uses a lower-power version of the Cyrix Media GX processor and boasts 16Mb RAM, 8Mb ROM, speakers, and USB ports for connecting a keyboard and mouse if required.

• *See www.vnu.co.uk for the latest Cebit news*

Office 2K ships

Office 2000, the latest version of Microsoft's office suite, will ship in June, Microsoft says.

It is a major rewrite but, unusually, its document files can be read by Office 97. Microsoft has been heavily criticised for incompatibility between versions.

Office 2000 treats HTML as a native format and includes features to allow collaboration on complex files across a network using only a browser.

Husky voice needs no line

This is perhaps the first military spec rugged PDA, the $f \in \chi^{21}$ (field explorer 21) running WinCE 3.0A. Husky has expanded the functionality with a full keyboard, separate number pad and a transflective colour LCD display. It claims the first colour-screen battery life of over eight hours, and has multiple PC Card support and wireless voice comms with no need for a mobile phone. The Open Book Design will sell for around £1,100 - £1,250.

www.wpihusky.com, 01203 604040

short stories

BOARD CONVERTER
The wonder is that no-one has done this before. Virtual Ink is selling this gadget which digitises any whiteboard up to 4 x 8ft in size. All-electronic whiteboards used, among other things, for remote collaboration can cost thousands. This one, called the Mimio, will cost a little over £300. It folds small enough to fit into a notebook case and sticks to any board using suckers. You draw on the board using standard coloured pens in a special sheath.
Details 0171 349 2200

HAYES EUROPE LIVES
Networking specialist Zoom Telephonics has bought the European division of US comms pioneer Hayes, whose assets were sold by auction last month after it failed to come out of Chapter 11 protection. Founder Denis Hayes was the originator of the Hayes command set, still used by most modems.

HEXAGON SINKS
Hexagon Information Technology, operating as Atlantic Direct, has been placed in administrative receivership. Enquiries should in the first instance be directed to BDO Stoy Hayward at 3rd Floor, Peter House, St. Peters Square, Manchester, M1 5AB.

AMD MOBILE CHIP
A new 350MHz K6-2P clocks the fastest of any mobile processor available, AMD says.
AMD 01276 803100

Faster processors 'will kill off the keyboard'

Intel is pushing speech recognition as a reason people will want faster processors.

The technology will get so good with increasing processor power that keyboard-less PCs will start to appear within five years, Intel marketing director Gordon Graylish said at the PIII launch. He predicted: 'Keyboards will be around for some time after that, just as some people still use pen and paper. But they will gradually die out.'

Tom Ruiter, regional director of speech input specialist Dragon Systems, said much the same thing during a visit to PCW Towers. He reckoned that with 550MHz processors, the time to train software to recognise your voice will fall from the current half an hour or more to just eight seconds.

He claimed all necessary algorithms are in place. I remain sceptical on that one, but I propose to try Dragon's latest product (*see review next month*) on the fastest PC I can get my paws on and I'll tell you how I get on.

● Launch prices of the 450 MHz and 500MHz PIII with 512Kb cache in bulk were £435 and £310 respectively.

CLIVE AKASS

Visual inspiration

Computers have yet to match the proverbial back of the fag packet for sketching out ideas. But a company called Inspiration Resources reckons it has an answer in its £205 (inc VAT) product, Visual Concepts. It allows you to manipulate ideas by attaching notes to icons which can be colour coded.

www.cmcsite.com/concept; 01729 830322

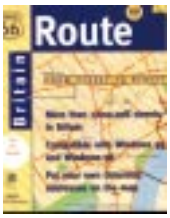
En route for mapping riches

Route planners are another software genre which is likely to boom as processors get faster and storage gets cheaper. The current generation has hardly begun to explore the possibilities of geographical information systems (GIS), the linking of data to maps. Microsoft is pouring a fortune into it, and it is not the only company to do so.

A Dutch company called Route 66 has released £49.95 routers for both Britain and Europe to coincide with the launch of Microsoft's AutoRoute Express 2000 (*reviewed, February*) at the same price. Both products show an

unprecedented level of detail, down to street level and further. AutoRoute shows nearby historic sites, pubs, petrol stations and other details, updated by a full-time team at Microsoft. The team is based in the US, which may not be a good idea. Our random selection of March, Cambs, showed Tesco and the Griffin Inn in the wrong places.

● *Route 66 review next month*.



POINT OF VIEW

Identity crisis

If you'd told me ten years ago that every other high street in Britain would be scanned by a TV camera, I'd have been horrified. Now, I have to admit, I find the sight of one of those TV eyes reassuring. This is not to say they are a Good Thing. Nor that I'd feel the same if under threat of persecution. They show how hard it can be to strike a proper balance between privacy and security.

My ambivalence extends to civil liberty groups. I don't always agree with what they say, but I am damned glad they are saying it. As someone in the nuclear industry told me once when I was questioning one of its more dishonest attempts at public relations: 'We need hecklers.'

Scientists can get carried away like anyone else, pushing technologies into use before their time. Freedoms can be eroded unnoticed. So privacy groups were right to question use of a machine-readable ID number on the new PIII. They were right to keep up their pressure even after Intel said it would provide a utility that prevents the number being read by a remote computer. But, in the substance of their complaint, they were surely going over the top.

The ID number, like TV surveillance, is both useful and intrusive. Intel says the main reason for it is to help network adminstrators address and audit PCs. But other users will also benefit.

You could, for instance, specify which machines can make a valid transaction with your credit-card number. This may limit your own freedom of action but it would also curb fraud. The ID could also let you prove a message is from where you say it is, which could have legal uses.

It could also, it is true, be used to track your movements round the muckier back alleys of the web. But you have the option to switch it off.

It seems now that Microsoft has been up to similar tricks with Windows 98. It seems Windows 98 has been sending a machine ID to Microsoft without users' knowledge. Office files are also stamped with an ID (*see page 28*). There is an issue here that goes beyond that of privacy.

Security is *the* big unresolved problem on the web. When we are all pemanently online, as we shall be, our virtual front doors will be ever open. The more stuff we allow in, especially Microsoft files with powerful embedded routines, the greater the risk of intrusion or worse.

Microsoft's answer is that you should accept files only from trusted sites. Like Microsoft's. But here it is, grubbing around our files without a by-your-leave. Microsoft's excuse of a bug in Windows 98 is somewhat implausible; but even if we accept it as true, this is a mistake that should not have been made. If you enter someone's home, you don't start rifling their drawers.

Clive Akass  *on trusting Microsoft and other jokes*

SUPERCOMPUTING

Desktop HAL thrashes Big Blue

A Silicon Valley startup has launched what it claims is the fastest and most versatile supercomputer yet — and it sits on a desktop.

Star Bridge Systems (SBS) says its HAL-4rW1 'hypercomputer', nicknamed Hal, can do12.84 trillion calculations per second (12.84 TeraOPs).

This is 60,000 times more than you can get from a 350 MHz PC and more than three times more than from IBM's Blue Pacific supercomputer.

The Blue Pacific uses 5,856 PowerPC 604 processors and draws 3.8Megawatts of power; a HAL uses 280 FPGA chips (see 'How it works') and draws just 1600 watts, about the same as a two-bar fire. It can be plugged into the mains.

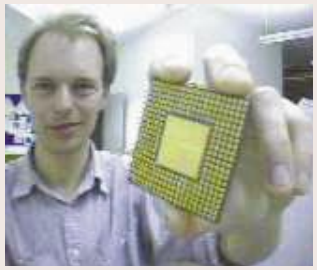
SBS president Alfred DiMora said: 'There is nothing in the world like it.'

SBS is developing it for use with Hal software called Viva, a combination of operating system, GUI, object-orientated programming language and toolset.

Applications being considered include comms, search engines, voiceover IP and video compression. But don't rush for your cheque books unless you're very rich: prices start at $2m.

FROM JOHN GERALDS IN SILICON VALLEY

How it works



The SBS hypercomupter dispenses with conventional processors in favour of what is called Field Programmable Gate Array (FPGA) chips made by a company called Xilinx. These contain up to 1 million logic gates that can perform any of the basic logical operations. Which they perform is dictated by a register of bits, which can be changed very rapidly. Sussex University researcher Adrian Thompson is pictured above with a simpler FPGA. This was used with genetic algorithms, using the same principle as natural selection, to produce what was in effect a self-programming computer which evolves a solution to a task (*see Futures, PCW April 1998*). *www.xilinx.com*

IBM claims system-on-a-chip breakthrough

IBM has developed a new way to combine logic and memory on a single chip, the company says.

The method uses a 'trench cell' structure with memory cells placed underneath the logic circuitry. IBM says the new technique will avoid the trade-off between logic and memory in chip design.

It will first be used in specialist Application Specific Integrated Circuit (ASIC) chips using IBM's copper connects. These are likely to turn up next year in products such as routers and switches. But eventually the technique will be used to create a 'system on a chip' boasting more than 100Mb of on-chip memory, an IBM spokesman said.

An ASIC with trench-cell memory will cost about a fifth more than a traditional ASIC and separate memory, but it would offer faster memory transactions and a simpler system design, the spokesman said.

DOMINIQUE DECKMYN

short stories

MONEY FROM THIN AIR

More than 1,000 people in Leeds are getting money from thin air. They are taking part in the world's first trial of mobile cash machines, which has been launched by Barclaycard and Cellnet. It is part of a 60,000-user field test of Visa Cash cards, which can store up to £50 for small-change purchases.

The new trial uses adapted Motorola StarTAC mobile phones to top-up cash cards via Cellnet's GSM network using a PIN number, as with a normal cash dispenser.

Cellnet's managing director, Peter Erskine, said: 'Withdrawing e-cash over your mobile may sound futuristic but within five years it will be commonplace.'

MAC MODEM

Pace Micro has launched the 56 Solo self-memory modem for Macs which can store up to 30 minutes of speech or 30 fax pages while your computer is switched off.

Pace 0990 561001

Microsoft plugs NT security hole

A fix will be posted shortly for a security hole in NT (versions 3.5, 3.51 and 4.0) that allows unauthorised access to critical files on a network, Microsoft says. Nicholas McGrath, Windows product marketing manager, said: 'The chances of it affecting customers are very slim, but we take all security issues very seriously.'

The hole involves replacing cached access-control dynamic link libraries. 'You really would have to be a very clever C programmer to do something,' said McGrath.

Microsoft has posted an article on its web site explaining how the registry can be tweaked to avoid the problem.

JAN HOWELLS

For epistles to the non-Romans

Standard keyboards are boring and can be confusing if you happen to be typing in a language that does not use the Roman alphabet. Stevenage-based Contech says it will create keycaps of any colour and title.

Contech 01438 325757

Digicams hit two-megapixel 'ceiling' as prices drop

Two-megapixel cameras are starting to appear from the likes of **Olympus and Nikon** (*see our digital cameras group test, p198*).

Nancy Carr, general manager of Nikon's consumer products group, said at Comdex last year that two megapixels is likely to be the ceiling for non-professional cameras, partly because it is considered sufficient for most people's needs. Also, the processing power and memory requirements are prohibitive, at least for the current generation of silicon, Carr said.

The new Nikon Coolpix 950 (*shown here*) and the simpler 700 both boast 2.11 megapixels, can shoot 1.5 frames per second and are due to ship before summer. Meanwhile, the cost of megapixel digital cameras continues to fall, with **Kodak** introducing its DC200 Plus at £250. It is an enhanced version of the DC 200, offering a longer battery life, TV output and a 4Mb Compact Flash card. Kodak also introduced the 1.6 megapixel DC265 (*shown, top*) which is an enhanced DC260. New features include a faster power-up and image processing, and triple the burst speed at up to 24 images per second. It costs £750.

Kodak 01442 61122
Nikon 0181 541 4440

Videocam swings both ways on Hi8

A new range of Sony digital video recorders takes Hi8 tapes used on analogue models but offering the same sound and video quality as its miniDV range. The TRV110, TRV310 and TRV510 have LCD screens and can play back analogue Hi8 tapes.

JVC has introduced two mini models: the GR-DVL9500 and the 9600 with a high-speed mode which is said to capture video at twice the usual speed.

Canon has launched a new digital camcorder called the DM-MV20, which features a 12X optical zoom and image stabiliser.

Sony 01932 816000
Canon 0181 669 6000

Local networks head for 10Gbit per second

A standard allowing local network backbones to run at 10Gbit/sec has begun a formal approvals process which is expected to take at least a year.

A 1Gbit Ethernet standard was agreed just a year ago. Most office networks run at ten or 100Mbit/sec at desktop level but faster pipes are needed to link them.

Vendors jumped the gun on that standard and are expected to go with 10Gb, by releasing products before the standard is finalised.

Palm wins with Italian cool

The new Palm V strikes me as style over substance and there's a reason for this. With colour models coming from rivals Hewlett-Packard and Philips, **Palm owner 3Com ordered research** which showed that people wanted lighter and sleeker designs.

It went to famous industrial designer IDEO to help create something out of Italy and use new technology that provides a crisp display. Just a week after its release, the Palm V was the hottest seller in Silicon Valley.

The colour on the new CE models is a big plus because it does increase a screen's readability, but there are big problems with the CE graphical user interface which can take days to learn. The fact remains that it is ridiculous to put a Windows-like GUI on something this small.

Microsoft should give it a complete overhaul but it is far more likely to try to get away with simplifying the menu structure. One of the appeals of the PalmPilot is its intuitive, transparent interface.

Some 20 CE vendors are vying to create Pilot-beaters, but without a rethink by Microsoft, I don't see any threat to 3Com's dominance this year.

Speaking of which, it looks as if the **Palm VII**, which is equipped with a wireless modem, won't ship before summer. It is much larger than the Palm V but looks like a winner.

Products at **Demo 99** included Hypercosm's OMAR (Object-oriented Modelling And Rendering) technology which lets you **interact with 3D models** on the net. Hypercosm president, K. Kivolowitz, who won an award for the work he did with his former company, Elastic Reality, won the biggest round of applause following an eight-minute demonstration.

ActiveTouch showed an interesting way to share documents over the web. The **Webex Meeting Centre** lets users collaborate on documents using only a web browser. The software is free, as ActiveTouch plans to get its reward from subscription services.

InfraCom, an Israeli company, received a lot of attention with its **omni-directional infra-red technology** which lets you link devices which are not in line of sight.

Tim Bajarin
letter from Silicon Valley

Linux shorts

MERCED PORT
VA Research is to head efforts to port Linux to Intel's forthcoming IA-64 processor, codenamed Merced. Intel is taking an unspecified stake in the company as part of the deal. The port is expected to be ready by mid next year when the processor is due to ship. But you can be first to see a picture of the new Merced on page 47 of this issue.

HP SUPPORT
Hewlett-Packard (HP) has set up a new organisation to coordinate its Linux strategy, which involves increasing support for Linux across its product line. 'We see [open source software] as an important business model to explore,' said Wayne Caccamo, head of the new Open Source Solutions Operation (OSSO). HP will also back an independent effort by The Puffin Group to port Linux to servers based on its PA-Risc processors.

NETSCAPE LINK
Netscape says its directory software, messaging service software and delegated administrator software now support Linux.

DESKTOP DOUBT
Linux is growing fast as a server platform, especially among web service providers, but is unlikely to make inroads on to the desktop, said Pat Gelsinger, Intel's senior vice president of desktop products. This was because of a lack of applications and the fact that there was still no agreed interface to match Windows' ease of use, he said at the Intel Developers Conference.

ABIWORD UP
Abisources is to launch an open source word processor for Linux, called Abiword. It will be available for free download, or as a package for a small fee.

Dominique Deckmyn reports from Linux World in San José

Gnome gives Linux friendly face

A facility that is aimed at encouraging mainstream use of the open-source operating system, Linux, was introduced last month.

The **Gnome Desktop Environment** can be customised to look like a familiar Windows or Mac desktop and is already being shipped by the Free Software Foundation.

Gnome, introduced at last month's Linux World show in San José, provides an advanced toolkit for customising graphical user interfaces. It will also become the standard GUI for Red Hat Linux, the most popular Linux implementation.

Some 250 programmers have been working on the project for the last 18 months, most of them in their free time, but it has also been supported by a number of full-time Red Hat developers. Miguel De Icaza, 26-year-old leader of the Gnome initiative, says it will help Linux to break out of its techie circle and appeal to consumers.

▲ TECHNICALLY DEFICIENT? THE KDE INTERFACE SHOWN AT WWW.KDE.ORG

Linux does not have a standard GUI of its own, but provides a range of GUI libraries for developers to use. The most popular Linux GUI to date is the K Desktop Environment (KDE).

But De Icaza said: 'KDE has technical deficiencies, and not only uses up too much memory, but also does not include many features that developers want.'

However, Ransom Love, president of Linux vendor Caldera, said: 'There's a lot of momentum behind KDE.'

But he said Caldera may support Gnome as an option.

Battle against fragmentation

A three-pronged plan is under way to prevent Linux being fragmented like its parent, Unix. The **Linux Standard Base (LSB)** has to ensure compatibility between Linux versions without stifling innovation, project leader Daniel Quinlan said.

He spoke shortly after Corel announced it is shipping its own version (*see box, right*).

The development of the Linux kernel is tightly controlled by its author, Linus Torvalds. But the commercial and non-commercial Linux distributions have considerable freedom. This means that applications written for one version will not always run unmodified on another.

Quinlan said applications written to LSB will run on all supporting Linux versions. He would also like to make Linux distributions look and behave more alike.

'We don't want to tread on the distributions. We want them to be unique,' said Quinlan. 'It's good that there are five or six major distributions which are each good at different things.'

The three prongs of the project are: first, to define basic Linux functionality; second, to create suites to test applications and distributions for compliance; and third, to deliver a sample implementation.

LSB is at an early stage but is supported by most Linux vendors.

Corel, which has posted a free Linux-based WordPerfect, is to ship its own version of the operating system, its chief executive Michael Cowpland (*pictured*) said in a keynote speech. The version, aimed at increasing Linux use at desktop level, will feature a simplified setup procedure and automatic hardware detection. It will also come with a Java virtual machine. Corel Desktop for Linux, set to launch in November, will probably come with a suite of Corel applications for about $50; it may be available alone or preinstalled.

Adobe dishes up dynamic design

Adobe has unveiled what it claims is a revolutionary new page design technology, with the first showing of an early beta version.

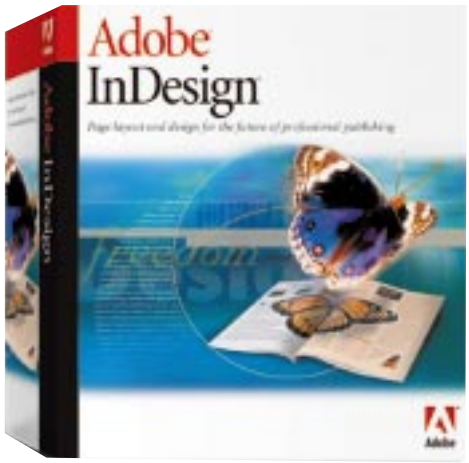
InDesign, codenamed K2, can open and edit Portable Document Format (PDF) files, as used in Adobe's Acrobat, although its native file format is a database of collected objects. And it will output directly in PDF, bypassing the PostScript stage, resulting in exceptionally clean Acrobat documents.

It is actually little more than a very small plug-in handler, but Adobe is quick to point out that it is entirely customisable. Upgrading will be a simple matter of swapping one plug-in for another, avoiding major rewrites, and it can be set to update itself automatically.

Innovations include frames that can be reshaped along bezier curves, frames defined by clipping paths, and text that dynamically resizes to retain proportions as the user resizes a text box.

InDesign is expected to ship this summer for both Windows and Mac.

Adobe also announced **PressReady**, for colour proofing with inkjets and ICC (International Colour Consortium) profiles rather than expensive printing presses. Inkjets have been renowned for inaccurate results. PressReady includes Acrobat Distiller, with which proofs can be sent for approval as PDF files.



Other launches slated for 1999 include FrameMaker 6.0, the technical document generator, PageMaker 6.5 Plus, positioned to rival Microsoft's Publisher, and Adobe GoLive 4.0 (known to Mac users as CyberStudio) for handling graphically rich web sites of 100 pages or more.

NIK RAWLINSON

From little Acorns, Element 14 grows

Silicon, element 14 in the periodic table, is the building block of IT. Not surprising, then, that **Element 14** is the new name chosen for the company that was Acorn.

Its 100 or so engineers, still under the Acorn Group umbrella, will focus on the next generation silicon and software intellectual property (IP) for multimedia devices, initially in the digital TV market — including its Active range of interactive set-top boxes.

Three years ago, Oracle chose Acorn to make reference designs for its set-top box. It sounded too good to be true, and it was. The company has also turned from an early focus on Video on Demand systems for which a business case did not exist, says sales director Andy Mee.

Element 14 is now working with Canadian digital TV specialist ImagicTV, an affiliate of both NBTel and Newbridge Networks, to provide 10,000 Active Digital Video Receiving Devices in the first commercial roll-out of broadcast TV over standard phone wires.

ImagicTV technology allows service providers to deliver digital broadcast television to residential subscribers over Internet Protocol networks, Mee said. 'Their business software sits on our RISC software. We can integrate all the required multimedia services into their software and provide a user interface to the [telephone company's] end customers.'

It sounds like a cash cow. But can Element 14 stay ahead of competitors? Element 14 claims to be the only company selling a system that can be used down an ordinary phone line. 'We have specifically chosen telcos as it is the area set to explode,' says Mee. 'Satellite and terrestrial is pretty much a done deal from the technological perspective.'

At the time of going to press a European telco had signed up and two more had pens poised. Element 14's second focus will be on media processors, which Mee says are the 'cutting edge of future technology.'

In January Element 14 took on a team of people who were previously at ST Micro Electronics in Bristol. 'This is a crack silicon implementation team working alongside our site to create a new, licensable IP (Intellectual Property) for the media processors of the future. That way, we will continue to build set-top boxes — which will be the shop window for silicon IP — and look to integrate set-top boxes into home control units.'

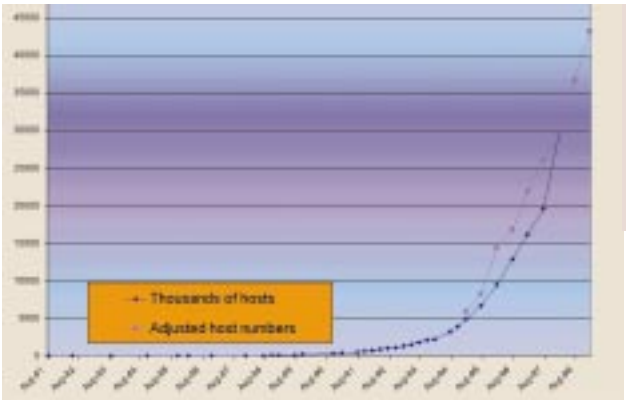
The interactive set top box is intelligent and will extend its reach into home-based wireless communications as network infrastructure increases. 'As the pipes get fatter, we can send more multimedia and internet entertainment and better quality pictures down the line,' says Mee.

'In the next 10 years it will be possible that when the front door bell of your house rings, from your mobile phone you will be able to view the person standing there, from wherever you are, and then communicate with them direct. This will be possible because every appliance with a chip in it will be linked up through a home controller unit — and at the heart of that will be our set-top box.'

www.e-14.com

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

Internet tops 43 million



NET GROWTH SINCE 1981: A TIME WHEN THE NET TOOK SOME FIVE YEARS TO GROW FROM 231 TO 5,000 MACHINES

There were at least **43 million machines connected to the internet** at the start of this year and the number is growing at an annual rate of 46 percent, according to a twice-yearly survey by consultancy Network Wizards.

The estimate, based on a crawl around domain servers, is regarded as a minimum figure because some networks will not divulge details of linked machines. The figure for this time last year was 29,670,000 machines. Only about one in five machines are active at a time, according to a mass pinging of listed addresses.

The survey is taken seriously by the industry as it is based on figures as opposed to forecasts.

The top domain is predictably .com, which grew by 18 percent to reach 12,140,747 hosts. The domains .edu and.net saw growth rates of 13 and 26 percent, taking second and third positions.

Although the above three still have the most hosts, the highest growth rates were actually in international domains, topped by Taiwan with the domain .tw.

JAN HOWELLS

Want a picture to brighten your newsletter? Or perhaps you're a media pro looking for an instant source of images? Kodak has set up an online library of royalty-free images at www.photodisc.com/uk which lets you search on keywords. The picture *(left)* was one of scores offered for 'bathing'.

A bug's eye view

A special lecture delivered by entomologists from The Natural History Museum celebrated the release of the film *A Bug's Life* as part of Internet Month and in support of the Government's Year of Reading initiative. Many pupils across the country have been set coursework tasks based on the Disney animation in the hope of helping children to gain a better understanding of different cultures and their natural surroundings. Information can be found at www.bugslife.co.uk.

ETELKA CLARK

Trainloads of profit as Virgin puts its booking system online

Virgin launched a web train-booking service last month as part of a £50m investment in the internet. The service, which can also be used to plan journeys, covers any train operator and shows the kind of money big operators may reap when the web goes mainstream.

Virgin stands to make up to 9 percent commission on bookings made for rival lines, and it reckons already to be selling up to one in five tickets by phone — sales which could easily translate to the web.

Chairman Richard Branson hopes to match the success of American airlines, which are selling 17 percent of tickets online.

Virgin reckons that there is nothing to match its train booking service in Britain, though other companies are bound to follow suit. The interface, at www.thetrainline.com, has a couple of rough edges but is easy to use.

The company has just made its access via Virgin.Net free (*see pp58-59*) in a bid to draw users to its home site. 'You will be able to hit Virgin.com and go into Trainline and a mass of other services, including financial services. Anything anybody needs,' Branson said at the Trainline launch.

He expected Virgin to be a major player on the net because the brand is known worldwide. 'I think brands will be more important in a virtual world anywhere else,' he said. 'If you tap into a brand you have never heard of, are you going to trust them with your money?' He predicted that e-commerce will take off with the availability of easy access via TV set-top boxes. 'They avoid the complications that people of my age, the over-forties, have with the technology.'

CLIVE AKASS

▲ ON THE RIGHT LINES: VIRGIN'S ONLINE TRAIN BOOKING SYSTEM IS SET TO BE A HUGE MONEY-EARNER FOR BRANSON AND CO

● Branson interview: see www.pcw.co.uk

short stories

INTERNET EXPLORER 5.0 — THE FINAL CHAPTER
As we went to press, Microsoft was due to post the final release of Internet Explorer 5.0 at its web site. It was also available by pre-order on CD-ROM and will be available on our cover disk as soon as possible — perhaps next month. IE 5.0 includes improved search, navigation and organisational capabilities and for the first time will be released simultaneously in Windows 98, 95, NT 3.51, NT 4.0 and Windows 3.1 versions. Other versions for Sun Solaris and HP-UX will also be made available.
JAN HOWELLS

DISNEY UK
Disney has launched a UK site offering games, interactive stories, activities and educational features tailored for British kids. Attractions include Disney sounds and wallpaper, and drawing lessons.
www.Disney.co.uk

BOL BOOKS
Bertlesmann has launched online bookstores in England, France and Germany. The UK site will later sell CDs and videos. Bertlesmann Online (BOL) hopes to woo customers from Amazon with a localised service rather than heavy discounts.
www.bol.com

Open source boost for Web 3D

Platinum Technology has placed the source code to its Virtual Reality Modelling Language (VRML) software in the public domain, in a move which may boost the market for 3D web products (*reports Dominique Deckmyn from Silicon Valley*).

The code of its VRML browsers and authoring tools will be handed to the Web3D Consortium, an industry group which includes Microsoft.

The Consortium, formerly named the VRML Consortium, will decide within a couple of months how and when the code will be made available to developers. Neil Trevett, president of the Web3D Consortium, said: 'Open source is definitely the way to go. It allows technology to be developed and deployed much faster.'

Platinum has been a driving force behind 3D web technology and standards. Last year it acquired two key companies in the shape of Intervista, which developed the World View VRML browser, and Cosmo, a former Silicon Graphics unit.

Platinum recently cut 1,000 jobs, or 15 percent of its workforce.

short stories

VIDEO STAR
Belfast-based Blackstar claims that it is the United Kingdom's biggest video store, and that it is all set to become to videos what Amazon is to books. Selling over 50,000 tape and DVD titles — obscure in addition to mainstream — it will help you track down rare and deleted titles. UK delivery is free within two days and the company claims to be cheaper than high-street stores. For the time being, all titles are PAL format or Region 2 DVD.
www.blackstar.co.uk, 01232 463636

FIXED ABODE
You can buy a web and mail address that will last a lifetime, whoever your service provider, under a scheme launched by NetBenefit. All mail and web hits at the address are redirected to your chosen account under the I-Dress scheme.
NetBenefit 0800 592755

MAKING ITS MARK
The Patent Office is now publishing on the internet all its decisions on patents, trademarks and designs.
www.patent.gov.uk

Net over the mains, plugged

Trials of a system of gaining internet access via mains power supplies are continuing despite problems with electrical noise.

The Digital Powerline (DPL) system, developed jointly by United Utilities which owns Norweb and North West Water, and networking giant Nortel, offers data rates up to 1Mbit/sec.

It links a PC via a 'user terminal' through the mains to the nearest substation from where it is sent by optical fibre to a service provider. The link, as with ADSL and cable modems, is always on.

Norweb has a DPL trial running in Manchester; and Citytel, telecomms arm of Milan power utility AEM, says it is pleased with the speed and download quality of a DPL trial last month involving Italy's Cariplo Bank.

Italy's national electrical company **ENEL** began testing digital transmission in Rome four years ago. Users have yet to be offered an internet connection but they can access their electricity accounts through television links.

But Wind, a division of ENEL, recently abandoned an internet-via-DPL trial after deciding it was not commercially viable. Analysts say problems include line noise and the fact that many homes would need rewiring.

JAN HOWELLS

An udder dealer's site

PG Wodehouse fans will be aware that antique cow creamers loomed large in the lives of Bertie Wooster and his butler, Jeeves.

Cow creamers, believe it or not, do exist and are still doing the rounds of dealers. You can trace them, and any other antique, via a newly enhanced site for collectors at www.icollector.com. Moreover it uses the Empower intelligent agent engine from Cambridge-based firm, Muscat, to keep track of new objects of interest which appear on the market. Muscat <www.muscat.com> says the technology has a wide variety of e-trade applications.

Holiday trip help

Off to the delights of the Dordogne this year? You can plan your route anywhere in Europe at the French site www.iti.fr. And there's no need to dust off that GCSE parlez-vous just yet, as the site has an English option.

No-copy law may jam net

Labour Euro MP Christine Oddy is trying to overturn a proposal that threatens to **bring the web to a standstill**.

Euro MPs voted to ban the unauthorised copying of material as it is being transmitted over the internet. But the measure, part of a proposed directive on electronic commerce, would have outlawed the cacheing of popular material on local servers to speed access and minimise network traffic.

Oddy is to table an amendment to get around the problem. The move was welcomed by the European Internet Service Providers Association.

A spokesman said: 'I'm pretty sure that Euro MPs did not really know what they were doing. A definition of cacheing could undo some of the damage done in the vote on copyright.'

Oddy also plans an amendment to restrict junk email.

KIM BENJAMIN, BRUSSELS

Merced meets the press

Mike Magee gets a preview of Intel's long-awaited 64-bit processors.

Intel's IA-64 Merced processor is now far more of a reality than it seemed only one year ago. At the Intel Developer Forum, a bi-annual event held in Palm Springs, California, in February, we were able to quiz Stephen Smith, the Merced programme manager, who allowed us not only to photograph the package, but was also prepared to discuss the markets and applications Merced will be made for.

Smith said that Intel has so far booted seven operating systems on Merced, including Linux and Win64, and although the cartridge design he showed us included no silicon, he said that his development team was still on target to ship samples in June of this year.

When those samples are shipped to selected Intel PC vendors, the processor will go through rigorous testing before it is finally released as a product in June 2000.

The cartridge design, which Smith said is the size of a standard American index card (5in x 3in), weighs around 150g and is about one third of an inch thick. Level 2 cache is on a small card which slots into the packaging, with the interface between the CPU and the L2 cache running at full clock speed. Intel is using its own custom designed SRAMs for this card.

This card slides into what is called the Pin Array Cartridge (PAC), which has approximately 600 ball connectors soldered directly to a motherboard. The base (actually the top) of the cartridge is an alloy two or three millimetres thick. A heatsink will be bolted to each Merced processor.

On the side of the package are clip sockets. Initial systems are likely to be four-way, with two cartridges clipped to the underside of the motherboard, and two clipped to the top. Smith said: 'We're driven by the electricals. We deliver the power to Merced through an edge connector. Next to the microprocessor will be a DC-to-DC power pod, feeding the cartridge through a copper connector.'

The cartridge design is practically complete and he said there will be only 'minor' modifications from this point on.

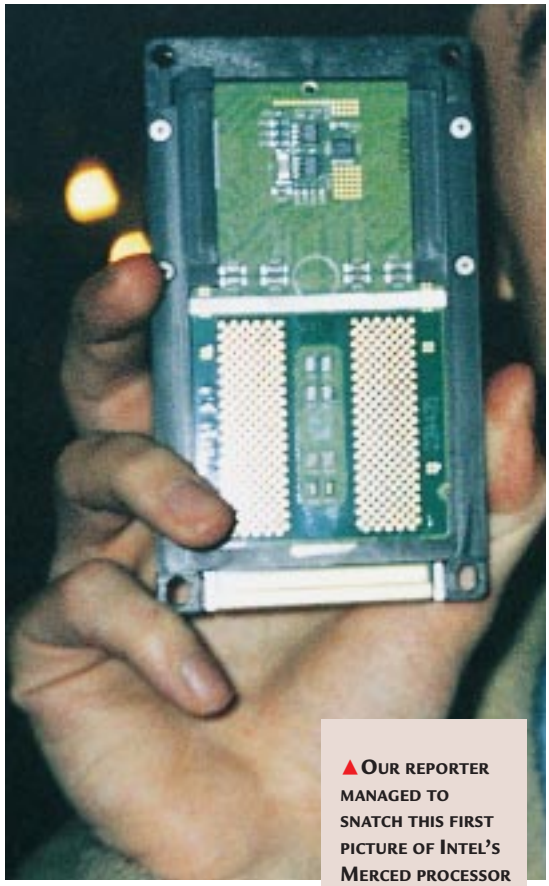
Smith was reluctant to discuss clock speeds at this early stage; but a separate presentation by an Intel executive only two days before, included information on what seemed likely to be a model for Intel's SRAM on the cartridge. A slide showed 16Mbit SRAM using six metal layers and 21 masks, with over 100 million transistors, a 207 square millimetre die size, and running at 900MHz. As Intel has demonstrated processors running at 1GHz, 900MHz is likely to be the base speed of Merced when it arrives. The chips will use .18 micron process technology and Intel is currently in the process of converting suitable fabrication plants from .25 micron to the faster and smaller technology. It will therefore not use copper interconnects, which do not arrive until .13 micron technology becomes available, probably in the next 64-bit processor, codenamed McKinley. Smith said: 'Everything is there, apart from the silicon. This is a prototype of the cartridge, with connectors similar to the pin grid array.' Intel is currently testing silicon using a large number of workstations and Smith said that it is has already managed to boot an OS at a gate level. The simulations are run on hundreds of workstations, he said.

The simulations are run on hundreds of workstations

The company is cooperating with Hitachi, NEC and Siemens to produce a four-way server chipset. Independently, HP, which helped Intel produce the EPIC software for Merced, will announce its own chipset next month.

Far fewer computer manufacturers are cooperating with Intel on the Merced design than were involved in IA-32 development, the reason being that IA-64 is aimed primarily at specialist machines running several processors in parallel. That means that in the early days, supply of the processors will be limited and the market for high-end servers will be comparatively small, compared to IA-32 architecture.

Merced is backwards compatible with practically all IA-32 based applications, using a hardware emulation mode built into the processor. Those applications will be unable to take advantage of additional registers, parallel functional units, new IA-64 instructions, new floating point instructions, new MMX instructions or the branch prediction capabilities Merced will have. That is likely to mean end-users will not see a boost to existing application software. Instead, applications aimed for the platform will need to be ported to 64-bit and run on a 64-bit OS, such as Win64.



▲ OUR REPORTER MANAGED TO SNATCH THIS FIRST PICTURE OF INTEL'S MERCED PROCESSOR

Lotus slips up as Notes R5 is delayed

The long awaited release of Notes and Domino Release 5.0 has been delayed yet again, this time until the end of March.

Lotus promised back in January that the product would ship in February. But as the deadline approached, CEO Jeff Papows (*pictured, right*) posted a statement apologising 'for attempting to predict a precise completion date during the last stages of a software development project.' He said no major new problem had emerged, but Lotus needed 'a few more weeks to wind down the final-stage development and build cycle.'

Analyst Clive Longbottom, of Strategy Partners, said Lotus had

dropped a 'massive goolie' which meant anyone implementing R5 would be expected to do so in the crucial months leading up to the new millennium.

He thought organisations might now wait until the (even more delayed) release of next versions of NT and Exchange, Microsoft's messaging product which comes closest to offering the co-operative working features of Lotus Notes.

'R5 is good — and is critical to Lotus' survival. This extra one month delay will not go down well ,' said Longbottom.

Analyst Simon Hayward, at Gartner Group, agreed: 'Every day of delay costs Lotus more revenue in 1999, and a greater risk that companies could delay implementation until 2000.'

JO PETTITT

Portable Add-ons is offering a £160 upgrade to its 33.3K and 56K FreeSpirit PCMCIA modems that will enable them to connect using ISDN on BT Highway at up to 128Kbits/sec. The FreeSpirit modems cost £159 ex VAT.

TDK is offering the Global Pro multifunction card, which can connect using ISDN or a 56K modem connection, for £229 (ex VAT).

TDK 0118 921 6230; Portable Add-ons 01256 361 333, sales@portable.co.uk

USB NET LINK

3Com is offering a link which allows mobile users to plug

directly into an Ethernet net via a USB port. It is expected to sell for around £43.

3Com 0118 927 8200

Fujitsu penpad goes vintage for ruggedness

Offering a 166MHz Pentium-based laptop for £2,049 (ex VAT) seems a little like fitting a Model T Ford engine to a modern car and trying to flog it for £15,000. But this is just what Fujitsu Personal Systems is offering with its pen-driven Point 1600 mobile.

Companies who buy these machines for niche tasks like accident reports or mapping updates are more concerned with reliability than performance and they get big discounts on bulk purchases, says FPS's international marketing director, Louis Jouanny.

'The use of the 166MHz Pentium keeps down the heat and prolongs battery life to four hours. These machines come with a three-year warranty, which you wouldn't get with a normal notebook,' said Jouanny.

In addition to twin PCMCIA slots, USB and other standard ports, the 1600 has a ruggedised 4.1Gb hard drive and docking space for a wireless-LAN module (*as above*) or a custom add-on. FPS also offers the 233MMX Pentium-based Sylistic 2300, with a dual mode 8.4in colour screen which uses natural light for illumination outside and backlight for indoor viewing, at £3,398 ex VAT.

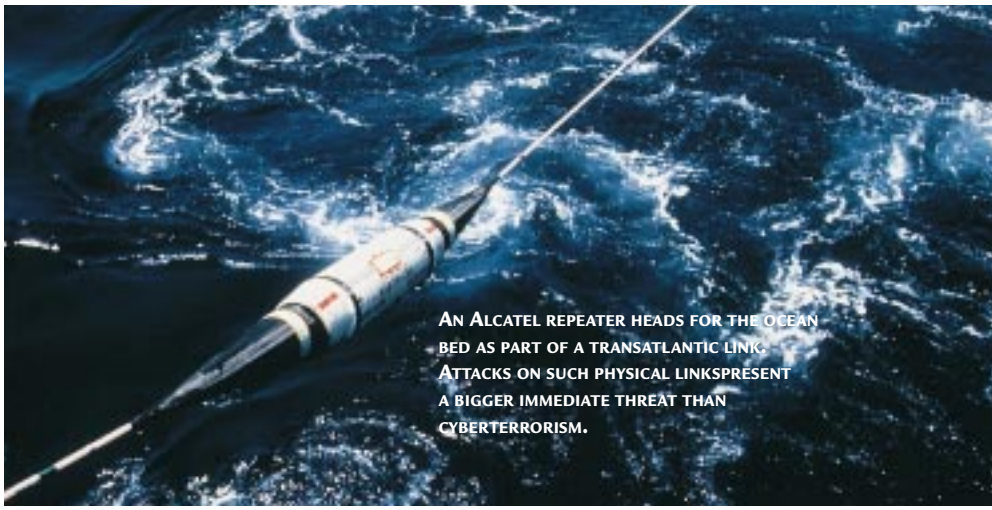
Standard laptops do have a poor reliability record: IT managers say as many as one in three fail each year. The issue was raised early this year in a US report criticising Compaq notebooks. Peter Orre, European business unit manager for commercial portables, denied last month that Compaqs have a particular problem. He admitted that historically portables had been 'plagued with customer satisfaction problems'. He claimed Compaq had improved its models a lot and that complaints may stem from 'legacy issues'.

◄ Rugged notebooks, once the domain of specialist companies like Husky and FPS, went mainstream last year with Panasonic's ToughBook line. The new Toughbook 27 uses a 266MHz MMX Pentium. Prices start at £3,199, ex VAT, including a three-year return-to-base warranty.

Panasonic 0500 40441; www.panasonic.co.uk/toughbook

Hack attack

John Leyden reports on the Government's response to the threat of cyber-terrorism.



AN ALCATEL REPEATER HEADS FOR THE OCEAN BED AS PART OF A TRANSATLANTIC LINK. ATTACKS ON SUCH PHYSICAL LINKSPRESENT A BIGGER IMMEDIATE THREAT THAN CYBERTERRORISM.

The Government has recognised that it needs businesses to help tackle the growing threat of cyber attacks against Britain's infrastructure. Classified MI5 documents indicate that the threat, long the stuff of James Bond films, is real. The PC can now be as much a part of the terrorist's arsenal as the bullet or the bomb.

The security service's last Unified Incident Report and Alerting System study showed incidents of unauthorised and criminal hacking had increased by a staggering 300 percent. Margaret Beckett, Leader of the Commons, has launched a campaign to protect Britain's information systems from attack.

She told a London conference called Protecting the National Information Structure that utilities and telecommunications were the sectors of the economy most at risk. 'I don't want to exaggerate the danger of a malicious attack on the infrastructure, but it is real,' said Beckett. 'There is a need for everyone involved to share information as openly as possible, despite the acknowledged sensitivities.'

She outlined a plan to bring together Government agencies like GCHQ and the private sector to promote best practice, as specified in the information security management standard BS7799.

The Government also pledged to work with the private sector to develop new techniques and technology to protect information assets, detect intruders and track criminals across the internet. It also promised to act as an 'honest broker' to promote the open sharing of information.

The initiative parallels one launched by the Clinton administration, which in January pledged $1.46bn to combat cyberterrorism in the US. No extra cash has been promised in Britain.

Julian Whitehead, senior consultant with security firm PCSL, said the consequences of an attack could be dire, though the risk of one is low.

GCHQ's Communications Electronics Security Group (CESG) organised the conference, the largest ever meeting between government and private data-security chiefs. The CESG is working with key companies to carry out net health checks and test for vulnerabilities, a senior official said. 'We hope very much to do it by cooperation and careful private conversations.'

But the main threat still comes from conventional terrorism. A bomb at London's Telehouse comms centre poses a greater risk than any logic bomb or cyber attack yet seen. Whitehead said: 'Cyber attacks would not provide ... the same satisfaction of revenge through bloodshed, but could achieve other important terrorist objectives.'

Key move on encryption

Best security practice will not deflect the Government from an encryption policy which involves copies of scrambling keys being concentrated in central locations which invite attack.

Under a long awaited e-commerce Bill, licensed bodies would place copies of keys with bodies called Trusted Third Parties.

These 'escrowed' spare keys will be available under warrant for covert use by police and security agencies. A consultation paper was due to be issued in time for the Bill to go through its first stages before Easter, senior DTI officals said.

This seemed optimistic, given that policy has moved forward little in the past year and that the Bill's greatest backer, Peter Mandelson, has resigned.

TERROR BY KEYBOARD

A war game conducted by the US National Security Agency showed that hackers could disable the US Pacific command and shut down the national grid.

Hackers have boasted in US Senate testimony that they can bring down the national phone network by interfering with high-speed switches that link carriers' networks.

And last year an Israeli teenage cracker, known as Analyzer, claimed to have high-level access to as many as 400 unclassified government and military computer systems.

A clearer case of cyberterrorism, defined as a politically motivated attack on information systems, occurred this year when the web servers of Connect Ireland, which hosts the East Timorese web domain, were brought down after a concerted, long-running attack.

The Irish service provider believes it may have been targeted by the Indonesian Government because it gave the annexed island of East Timor a degree of virtual sovereignty.

Still more alarming was a claim by a group called MiliwOrm that it broke into the network of India's Bhadha Atomic Research Centre and stole details of nuclear weapons and testing programmes.

It exploited a well known loophole in Unix Sendmail to gain access via BARC's web site, and covered its tracks by using a series of intermediaries. The group said: 'The world is lucky we're so nice.'

Power struggle

Everyone wants the power of the Pentium III; but when? Soon, says Tim Bajarin.

Everyone is excited about the new level of power the Pentium III chip brings. But business and home users alike are struggling with the issue of when to buy.

The problem has been around since 1992, when Intel introduced the original Pentium and users tried to anticipate future demand and balance it with current needs

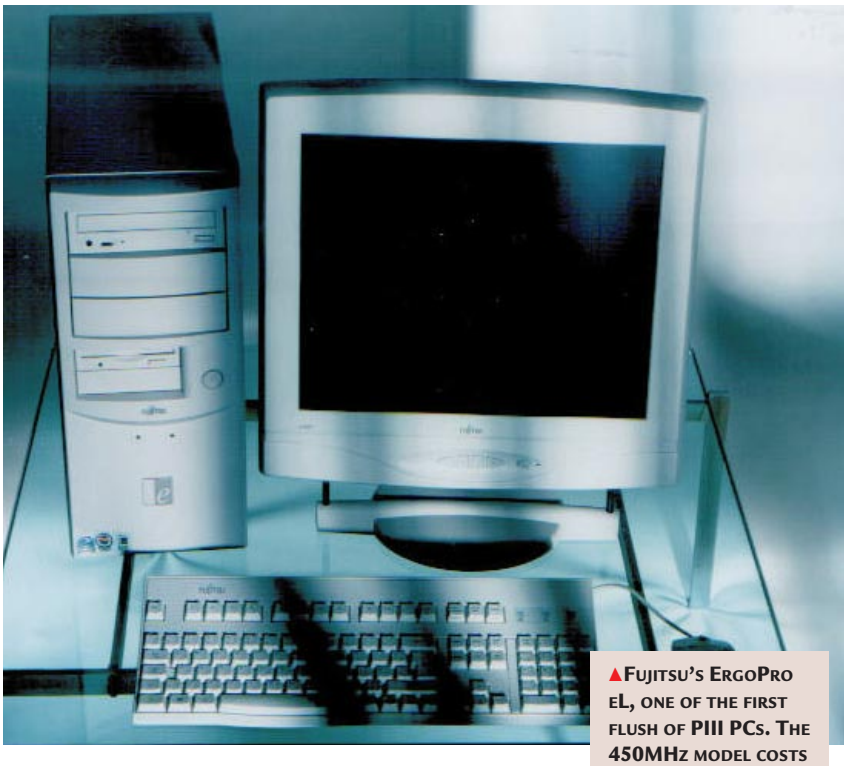
The decision is especially tricky now that PC prices have dropped while performance continues to rise. We can use Moore's law as a rough measure of how fast processors will get. Gordon Moore, a co-founder of Intel, reckoned that processor power doubles every 18 months; this means that PIIIs introduced today at 550MHz should give way to 1.1GHz designs by 2001.

Moore told me a year ago that his law would hold good until the end of this decade; but he reckoned so many bright engineers are working on semiconductor design that beyond 2001 processor speeds could start tripling every 18 months. That may be a bit optimistic, but there is no question that this power curve upward will continue for some time. That leaves users in a very interesting predicament and Intel with a serious marketing challenge.

The camp led by Sun, Oracle and the Java world believes adding more processing power to the desktop is ridiculous. It is trying to move users to the thin client model, putting all the applications on the network. The approach is gaining some steam, but is hampered by the fact that few as yet enjoy high-bandwidth networks.

The irony is that this same lack of bandwidth is making the PIII hard to push. In the thin client model, all the processing speed you need for current and future applications will be on the server: you just dial in to the application and run it off the network. In the desktop client model, you place the processing burden on the desktop and use the network to deliver the video, stereo audio and 3D animations needed for any program you run.

I see benefits from both approaches. However, after being a full-time observer of this market for close to 20 years, I have become a realist as well. Sure, there are still billions of users who have never touched a PC and would be ripe for the thin client model. But it's my belief that the way people learn how to use a PC is by watching the way people use them today and then emulate that usage themselves.



▲ FUJITSU'S ERGOPRO EL, ONE OF THE FIRST FLUSH OF PIII PCS. THE 450MHZ MODEL COSTS £1368 EX VAT

So, until cheap, high, data speeds become universally available, the desktop approach will drive PCs into new users' homes and businesses. This doesn't mean that the approach of Sun and Oracle will not dominate some day, but if they think it will be adopted quickly they are deluding themselves.

In the meantime, Intel's challenge is to convince the mainstream market that a move to PIII is worth the cost. In this arena, Intel has two major problems to overcome. While early adopters in both business and consumer markets will buy PIIIs when they come out and are still expensive, they must move mainstream users over to the PIII platform quickly if they want to continue their leadership and growth in the PC market.

The first big challenge will be to get the prices of the PIII chips down quickly. Intel will probably do this in two ways. First, it will bring out PIII Celerons at 450MHz speeds by summer and push them into sub-$1000 PCs by Christmas. And, the company will work with current vendors to get true PIIIs into consumer-priced PCs as fast as possible.

We hear that at least two vendors will have sub $2000 450MHz PIIIs by May. But the second big challenge is convincing business and consumer users that they need this much power at the desktop when high-speed bandwidth is not widely available and few applications today are optimised for the PIII.

At the PIII launch in San José in mid February, Intel did show as many as 125 applications that are being PIII optimised, but most will not be on the market until summer or early autumn. This alone could keep the PIII from fast adoption in 1999.

However, people buy speedier processors in anticipation of future applications. So although the PIII may get off to a slow start, it could be a run-away bestseller by Christmas and dominate the market by early 2000.

GAMES NEWS

Madness reigns as racers take Chicago

▲SCARY MONSTERS AND SOME SUPER GRAPHICS FEATURE IN THE NEW QUAKE, OUT SOON

We've had Tomb Raider III, and now we're **awaiting the release of Quake III** in the hopefully not-so-distant future.

The third instalment will feature a completely new graphics engine that is optimised to take advantage of the latest advancements in high-end, 3D graphics acceleration. There are new realistic environments along with phenomenal single-player action. We'll bring you updates as we get them.

Microsoft has gone all out to extend its thrill barriers. Gone are the days of racing bikes or cars on tracks or open, hilly landscapes. You can now race competitively in the heart of downtown Chicago. Due for release in June, **Midtown Madness** will apparently feature city detail that will amaze you. Over 80 city landmarks will be included, along with hundreds of interactive objects such as parking meters and working bridges. Drivers will have to navigate shortcuts through alleys and buildings, and avoid all manner of obstacles, including pedestrians. Chicago is complete with changing weather patterns, traffic jams, and police — a serious nuisance. Look for an update in *Screenplay* soon.

Gremlin has launched a new addition to its Actua Sports range. **Pool Shark** is a realistic pool simulation that creates 10 fully 3D polygonal poolroom environments including a gentleman's club, a surf shack and a casino. The game also has a full 3D physics engine so that all your ball movements are as true to life as possible. Out soon, Pool Shark will be priced at £39.99. Watch out for a review in *Screenplay* next month.

Fancy straining your eyes and giving yourself a blinding headache? If your answer is yes, try SimCity for the Psion Series 5, out now.

ETELKA CLARK

Top 10 products

Last month

Peripherals

1	**Dynamode 56K PCI Modem**	**DYNA**	**1**
2	3COM 56K V90 Voice/FX Ext	3COM	4
3	SoundBlaster Live! Value PCI	Creative	7
4	Astra 1220U USB scanner	Creative	-
5	SoundBlaster PC128 PCI	Sony	6
6	Typhoon Gold Wave 3D ISA	Typhoon	20
7	SoundBlaster Live PCI	Creative	21
8	56K Message ModemX	3Com	-
9	Dynanet 56K Ext Modem	Dyna	-
10	Sidewinder gamepad	Microsoft	-

Windows software

1	**Windows 98 UG CD**	**Microsoft**	**4**
2	Office Pro 97 + Books UG	Microsoft	8
3	AutoRoute GB 2000	Microsoft	-
4	Office 97 Stand V/Comp	Microsoft	11
5	Encarta Ref Suite 99	Microsoft	13
6	Norton System Works V1	Symantec	12
7	Paintshop Pro v5 FP CD	JASC	15
8	Office 97 C/V UG MLP	Microsoft	-
9	Partition Magic 4.0	POW	18
10	Norton Anti-Virus v5	Symantec	10

DOS software

1	**Turbo Pascal v7 DOS Educ**	**Inprise**	**1**
2	Turbo Pascal v7	Inprise	2
3	NetWare 3.2 five-user	Novell	-
4	NetWare 3.2 ten-user	Novell	14
5	NetWare 3.12-3.2, 10-25 us.	Novell	-
6	NetWare 5 U/G Server 25 us.	Novell	-
7	NetWare 3.2 5-user U/G	Novell	-
8	LapLink v5	Traveling	-
9	SuperCalc v5.5	CA	6
10	Intran'ware 25-user add-on	Novell	-

CD-ROMs

1)	**Simpsons: Cartoon Studio**	**Fox Int.**	**4**
2)	South Park Screensaver & Utilities	Telstar	1
3)	Dancing Baby Screensaver	Guildhall	5
4)	Star Wars: Behind The Magic	Activision	6
5)	James Camerons Titanic Explorer	Fox Int.	5
6)	Dancing Baby CD Player	Guildhall	7
7)	Rave Ejay	Fasttrak	9
8)	Dance Ejay	Fasttrak	8
9)	Hip Hop Ejay	Fasttrak	10
10)	Encarta 99 Deluxe	Microsoft	-

Games

1	**Alpha Centauri**	**EA**	**-**
2	SimCity 3000	Maxis/E.A	-
3	Simpsons: Virtual Springfield	Fox Int.	5
4	Delta Force	Nova Logic	-
5	Half Life	Sierra	6
6	Baldurs Gate	Interplay	2
7	Simpsons: Cartoon Studio	Fox Int.	-
8	Grand Theft Auto	Take 2	7
9	Rainbow Six	Red Storm	-
10	Starcraft: Brood Wars	Havas Int.	4

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

Is your web fee really necessary? Read our special

Free access: what's the catch?

Well, there isn't one ... yet, conclude *PCW* writers who tried six free services. Clive Akass reports.

X-stream, Britain's first fee-free web access service, celebrated its first anniversary in March by offering its nearly 200 thousand subscribers an evening's surfing via a freephone number. The service, at *www.x-stream.com*, depends on advertising for its revenues.

Launched around the same time was a similar service from Telinco (*see opposite*), one of many companies that have taken advantage of measures to break BT's hold over the UK phone market. These allow it to take a cut of charges for phone calls that it generates.

The two services exemplify the two main ways fee-free access is financed at present. A third revenue source is the sale of goods and services: e-commerce. This will be slower in developing but promises to be so big that companies are willing to treat web access almost as a loss leader to draw in users. Virgin is taking this long-term view (*see page 40*).

So what are the snags? You get more adverts on free pages, pushing up load times and thus your phone bill, so the link isn't truly free. But much web content is financed by ads, so this is nothing new.

Cornwall reader Chris Hudson-Rose reported a snag with services which need Caller Line Identification (CLI) switched on for accounting purposes. Hotel extensions and some small exchanges do not support CLI, so you may not be able to pick up email on the move. Harder to guage is ease of access. This can fluctuate wildly by the hour even on a paid-for service; and companies cannot always install capacity fast enough to keep up with rapidly increasing user numbers.

Yet no service has grown as rapidly as Freeserve, which claims a million active (as opposed to signed-up) users, and relatively few readers have complained to *PC W* about access or adverts: we've had more in the past about paid-for access.

Readers have reported slowdowns and email problems, but we had no major hiccups in our trial of six services, reported opposite. But these are early days, with a phenomenal 10,900 new users signing up a *day* in Britain alone, according to a National Opinion Poll survey.

It remains to be seen if this boom will cause slowdowns and excessive advertising. But free services are not immune to competition: if you aren't satisfied, you can freely go elsewhere. Many people seem already to be signing on to more than one service to see which is best (*see above*).

Multiple ISPs may become the norm, according to Richard Wood at UUNet, part of giant MCI World Com, which offers a package called UUDial VIP that lets companies offer free access under their own brand. This is the service Gateway is bundling with its PCs.

'UUDial allows companies to create a special relationship with users,' Wood says. 'It also provides an extra level of security if transactions are involved. We may reach a point where you go through Gateway's service for anything to do with PCs, or via a bank-provided service to deal with your account.

'Different members of the family may use different accounts. Dad might use his bank service, for instance, while little Johnny goes through *arsenal.com* because he likes to use that as an email address.'

If Wood is right, we may be moving to a situation where much web access works on a freephone number, paid for by the business accessed.

How to set up more than one account

Web access packages are notorious for irrevocably overwriting older configurations.

PC users have two ways round this. One is to create a new user profile (see Help under the Start menu for instructions) before signing on for a new service.

More convenient, though trickier for the uninitiated, is to use Dial Up Networking (DUN).

Click the *My Computer* icon, then the DUN icon, then *Make a new Connection,* and fill in the dialogue boxes. Some services do this automatically, or help you fill in details.

An icon for the new service will appear in the DUN box and you can create a short cut by right-clicking the icon

Why it may still pay you to pay

AOL claims eight to ten thousand new users join it each week in Britain. How many of these are trial sign-ups, and how many are leaving, is unclear.

What is certain is that there has been a drift to the free services, but that many fee-payers are sticking by their providers. This may be from inertia, or a feeling that paid-for *must* be better.

AOL also generates a sense of community and targets users who need a friendly way to use the net, says its spokeswoman, Rachel O'Neill.

Businesses are more likely to be swayed by the quality and variety of services on offer. Travelling staff need to be sure they can access vital information on the move, either in Britain or abroad.

Companies may want email forwarding, or copious web space and e-trade facilities. And if something goes wrong, they need to be able to call on someone to put it right. And the overhead is not high if you can claim it against tax.

The web is being woven increasingly nto the fabric of businesses, and not simply by providing a front window. It can extend a company's reach by acting as what is called a virtual private network (VPN).

A VPN is seen by staff and client companies simply as an extension to a company's internal network, though it is actually using a web link.

For this you need to be sure of a good link. UUNet business development manager, Karl Meyer, will guarantee line availabilty and reponse times.

'We can go anywhere in Europe and back in 80ms on our own lines,' he said. 'Obviously, we cannot guarantee the response from a company using a line not provided by UUNet. Neither do we have control over the speed of the server you are linked to.'

UUNet wins whoever pays for a link, because its pipes are used in any case.

Users who want a web link mainly for email have nothing to lose by trying the free services. But if your business depends on the web, you have little choice but to pay.

two-page report on the proliferation of free intenet access services

LINEONE

LineOne is a joint venture between BT, News International, and United News and Media. News is a strong point, as you get online versions of *The Times*, *The Sun* and *The Express*. Singing on via a CD was straightforward. Access was trouble free and speedy. The home page is easy to use with a choice of 12 content zones; it can be personalised. The Help page may avoid a call to technical support. Ads were unobtrusive.

Sign up: Via an 0800 number or the LineOne web site (*see below*). CDs are available. ALANA JUMAN BLINCOE

BT CLICKFREE

Double-clicking the ClickFree icon, you go straight to a customised Excite search engine. Advertising is minimal, but BT does use CLI (caller line identification) to check who is logging on. If you use CLI, you will have to switch if off before using.

Sign up: download a 6Mb executable, from www.btclickfree.com. You will not be asked for any information but are just dynamically allocated an IP number. Sign up for email access separately on the talk21 site. ADELE DYER

VIRGIN

Virgin goes free from 1st April, so I couldn't judge how the dropping of charges affected service. Access is generally reliable, however, and this is unlikely to change much. You can opt to pay £5.99 a month; all you appear to get for this is free technical support. Free loaders get full access to areas including travel and music. Virgin is pumping £50m into its online services starting with a train booking system (*see page 40*); offerings will include everything from record sales to financial services. This may mean that Virgin will be less dependent on ads to be viable.

Sign up: Call (*see below*) for disk. Plans are afoot to make CDs available in Virgin outlets. Also bundled with iMacs and other machines. CLIVE AKASS

There are scores of free access sites, too many to test. Prominent among them are: GATEWAY <www.gateway.com> is bundling a UUDial service (see opposite) with new PCs. CABLE & WIRELESS <www.cwcom.net> offers a Web Litestarter pack for £10 but access is free thereafter. Call 0800 0923013. Other services are offered by banks and football clubs. There's a list at www.freeaccess.bigwig.net/maintext.htm

And all the others...

TESCO

The Tesco CD installs Internet Explorer 4.01 SP1 over any previous version and talkes you into a fuss-free registration. For technical support I was referred to an unobtainable number. The only stumbling block was the unconfigured email for which you might need the 50p-a-minute technical assistance. The site is friendly for the uninitiated, and a first-time user's guide includes the basics of creating your own web pages.

Sign up: Get a ClubCard and 50p connection pack from your local Tesco. IAN ROBSON

FREESERVE

In a couple of months of testing we encountered only one engaged tone. There are no obtrusive ads appended to either incoming or outgoing emails, and those on the home page are discrete. The home page itself is comprehensive, providing an up-to-date news service and various lifestyle features. It's a useful springboard for internet beginners.

Sign up: Pick up a free disk from PC World, Dixons, Currys and The Link. NIK RAWLINSON

TELINCO

A licensed phone operator specialising in internet access. There is no fee for using the service; all they require in return for unlimited email aliases, 5Mb of web space and access to newsgroups is your home address and telephone number. There isn't even a catch with the technical support.

It's open 24 hours a day and charged at local rates. Connection was easy at most times of the day and at others I only needed to make two or three attempts.

Sign up: through the web site or call for a free CD-ROM. ETELKA CLARK

	Line One	BT ClickFree	Virgin	Tesco	Freeserve	Telinco
Sign up fee	None	None	None	50p starter kit to holders of (free) clubcard	None	None
Email*	POP3/SMTP via Webmail	Talk21 Browser based	POP3/SMTP Five addresses	POP3/SMTP	POP3/SMTP	POP3/SMTP
Newsgroup access	✓	✗	✗	✓	✓	✓
Support/minute	50p Free by email	50p	£1 or £5.99 per month	50p	50p	Local rate
Web space	10Mb	0Mb	10Mb	10Mb	15Mb	
Contact number	0800 111 210	0906 802 0240	0500 558800	0906 602 0111	0990 500049	0800 542 0800
Speed**	56K	56K/64K	56K	56K/64K	56K	56K
Web address	www.lineone.net	www.btclickfree.com	www.virgin.net	www.tesco.net	www.freeserve.net	www.telinco.co.uk

* Note that POP3/SMTP means you can use common email clients like Outlook Express. ** 64K = single ISDN channel

Millennium, schmillennium. A relaxed Michael Hewitt can't see what all the fuss is about.

Doom with a view

My next-door neighbour recently asked me whether she should start stocking up on tinned luncheon meat. I've received several junk emails exhorting me to cash all my savings and buy gold. And, last week, at Speakers' Corner, I was accosted by the resident 'Repent! The end is nigh!' man. Except this time, he seemed a lot more confident about it.

The usual story: Millennial Fever strikes. I wonder if, in 999 AD, there was general panic as to whether or not, come midnight on December 31st, the beads would fall off everyone's abacuses. Quite possibly. These transitional dates seem to bring out people's worst fears. Why is it so with computers, though? What everyone tends to overlook is that, even without the benefit of a Millennium Bug, they have been screwing up, often disastrously, since they were invented. Yet civilisation has endured.

In the 1970s, 'computer error' overtook 'your cheque is in the post' as *the* most common excuse for non-payment of bills and subsequent corporate bankruptcy. And who can forget the Stock Market crash of '87, initiated largely by computers going into automatic panic-sell mode?

There's always been a ready-market for Doom Merchants, of course. In the 'Protect and Survive' 80s, for instance, estate agents were selling caves in Wales where you could stock up with provisions and shelter from nuclear Armageddon. They didn't sell that many, as I recall. Possibly because, if you had to choose between being incinerated in a fraction of a second in central London or spending the rest of your life eating cold beans somewhere off Anglesey, annihilation seemed the more attractive option. Now those same Doom Merchants are at it again, thanks to the Bug.

Forget computers, they say; anything with a microchip in it — microwaves, your fridge, your central heating system, your pacemaker — is at risk. Come January 1, 2000, they'll all think it's January 1, 1900.

So what? I say. With the exception of VCRs, these things aren't programmed to recognise years, anyway. This is no doubt to stop some idiot putting a supermarket lasagne into his microwave and zapping it on full-power for a decade. (Not that, in my experience, it would make that much difference to the average supermarket lasagne.) It therefore doesn't matter to a typical piece of consumer electronics equipment whether it thinks it's operating in the late Victorian era or the late Elizabethan (II).

OK, say the Doom Merchants, but what about the chips in nuclear missiles?

If they aren't already 2000 compliant, they'll probably react the same way as those in my microwave and fridge and ignore the year. But even if they don't and they do actually think it's 1900, we needn't worry unduly. In 1900, America had just finished fighting Spain over Cuba, so I'd imagine the US missiles would try to target the non-existent Spanish fleet out in the mid-Atlantic. The Russians, on the other hand, were then engaged in territorial squabbles with the Japanese over ownership of Siberia. So their missiles will no doubt be targeting some patch of frozen tundra in the middle of nowhere. Which, come January 1, could be something of a bummer if you're living on, say, Ascension Island or in darkest Khabarovsk. Otherwise, no-one else will notice.

Elsewhere, banks and building societies have known about the problem since at least 1975 thanks to 25-year mortgages, so are on top of it. Supermarkets for at least five years because of sell-by dates on tinned food. The manager of the National Grid recently announced that all his supply systems were 2000 compliant. And you'll no doubt have read that the heads of the major airlines have been ordered to be airborne on January 1st. That should concentrate minds perfectly.

Banks and building societies have known about the problem SINCE AT LEAST 1975 thanks to 25-year mortgages, so are on top of it

So no worries. Of course, I could be quite wrong — it's a regular occurrence. But there's an easy way to find out in advance. This is the May edition of *PCW*, yet you're reading it in March. This means that the computer systems at VNU House must be set to at least two months ahead. So if anything untoward is going to happen courtesy of this Millennium Bug, it's going to happen to them first. Therefore if, on November 1st, you hear that Broadwick Street has exploded, you can expect the worst.

Mike.hewitt@mjh1.demon.co.uk

In combatting software piracy Barry Fox finds manufacturers may be their own worst enemies.

Copy cats

The record companies tried for 30 years to stop people dubbing discs onto tape. It began with the Beatles, when Magic Alex at Apple claimed he could put a high-frequency tone on Sergeant Pepper that interfered with the HF bias signal of a tape recorder, and spoil the music with a whistle. It was a non-starter because most gramophones filtered off the tone. But the same daft idea is still being re-invented.

Audio CD, like DAT and Mini Disc, relies on the Serial Copy Management System to limit digital dubbing. A digital recorder won't make a digital copy of material that's already a copy. But SCMS does not stop someone making a series of first generation copies.

All this is academic anyway. A PC CD recorder with software like Adaptec's CD Creator completely ignores SCMS, so will happily make digital dubs. One company now claims to have found a way of spoiling any digital audio dub. The bits copy, but the copy sounds awful. I await the promised demonstration with interest...

Early on, software companies were equally paranoid about home copying. They formatted their program floppies so that vital data was stored in non-standard sectors. When most of the program was copied to hard disk, the user still had to insert the floppy to load the software. Psion used this method with the Xchange integration of word processor, database, spreadsheet and graphics packages. If your original master disc became damaged, the program would not run until the company had mailed a replacement disc. By the time Psion had given up on copy protection, WordStar, WordPerfect and Lotus 1-2-3 had knocked Xchange off the shelves.

The industry has since adopted different ploys. Program CD-ROMs often store encrypted or deliberately non-standard data that does not copy accurately onto a blank. But the wealth of pirated ROMs in the Far East proves how ineffectual this is.

The companies also keep on offering new versions at upgrade prices. Customers get a manual and customer support only if they register with an authorised serial number. But if they then charge for online help, they are simply encouraging piracy. So is Microsoft, by supplying only flimsy manuals as a way of selling expensive books published by the Microsoft Press.

Microsoft obliges the user to 'insert the original Windows disc' when changing settings or recovering from a crash. This is why I would never buy any PC, whether secondhand or new, without a full set of original program discs. Notebooks have been sold with no Windows CD-ROMs and the instruction to celebrate the purchase by backing up the operating system with several dozen formatted floppies!

I recently tried PowerQuest's Lost and Found, as an interesting alternative to Norton's Utilities. L&F comes on two floppies, and does not write to disc while attempting to recover data. So there is no risk of overwriting what you are trying to recover.

The L&F disc carries a serial number which, once entered, locks the program to the PC on which it was first loaded. But I couldn't enter the number. All I got was the error message 'unauthorised duplicate'. Much worse, this left the PC's floppy drive 'invalid' and 'not ready'. So, far from repairing my PC, L&F had put it out of action. Powering down and re-booting from cold got the drive working again. I tried again a few times, always with the same result.

Notebooks have been sold with no Windows CD-ROMs and the instruction to celebrate the purchase by BACKING UP THE OPERATING SYSTEM with several floppies!

PowerQuest was helpful and sent a new disc. That too refused to load, but it worked on my laptop. PQ reckoned my desktop floppy drive might be out of alignment so I bought and fitted a replacement. The original still won't load, and I now have to wait for a fresh disc to try.

I'll report if it works, but I already fear PowerQuest's machine-locked copy protection risks losing more customers than it gains. I tried a third fresh copy of L&F on my Dell desktop, and got exactly the same 'unauthorised duplication' error message, with the a:drive disabled until re-boot. So copy-prevention has become use-prevention.

100131.201@compuserve.com

Brian Clegg is encouraged to look at alternatives to BT by readers' tales of woe.

DACS life

A while ago I commented on the careless attitude to viruses that has made them endemic in some companies. This seems particularly true of macro viruses. Where a virus that occupies an executable program seems dark and malicious, the fact that a macro virus is just a few instructions accompanying a document seems to make them less frightening. A combination of this and the way documents are emailed around (generally a good thing) makes macro viruses difficult to kill off. What I do find irritating, though, is the 'it's not my problem' attitude that many people seem to have. This week I got a Word document from the marketing arm of a large US web company. It had a virus. I replied immediately, telling them about it — I even told them what the virus was. And they ignored my reply. A timely reminder to make sure your virus checker is up to date — this particular virus was first spotted in August 1998 — and that macros in documents are disabled by default.

☛ **An update now** on the telephone connections saga. After my column a couple of months ago relating my problems with a DACS (the line splitter box BT sometimes uses to provide extra lines), I have had stacks of email from DACS sufferers. The worst case was a poor soul who was quoted an incredible £48,000 to have an ISDN line instead. One reader did find a solution accidentally. BT said they couldn't do anything about his DACS problem, but could give him Home Highway. He agreed to go ahead. The first step was to replace the DACS with two conventional lines. His line speed increased dramatically, so he cancelled Home Highway. Exit BT in a huff.

I spoke to BT, who said that since late last year they have asked what you want a second line for. If you intend heavy internet usage, they recommend Highway or ISDN-2; otherwise an ordinary line will suffice. This would be fine if they also explained the position if they have to fit a DACS (BT say they only use a DACS where existing capacity is limited). They don't mention it, apparently, because they don't want to overburden you with technical jargon. And they aren't going to start. Because despite my experience and that of a good number of correspondents, despite what BT's own fault reporting line told me, the official BT story is that DACS 'behaves exactly like an existing second line'. They say there are many reasons why line speed may vary, and that a DACS should not make your connection speed any different to having a dedicated second line. It looks like it was a coincidence that my line speed nearly doubled when the DACS was removed, along with that of the gentleman I mentioned earlier. Perhaps part of BT's reluctance to admit that the DACS makes a difference is that they don't like to admit how good ordinary line speeds can be. The BT spokesman said that a DACS will normally support 24K to 28K. By implication, this is all they expect from a normal line. It seems a lot of us are just plain lucky.

☛ **Apologies from Cable & Wireless** for the unavailability of their cheap phone calls web site www.business-made-simpler.co.uk for a good while after my last column appeared. It should be up now: if there are problems, use the main Cable & Wireless site, www.cwcom.co.uk. A reader has pointed out an alternative cheap service, Euphony, which gives free local calls with one of its packages (sadly not to the 0845 numbers used to get onto the internet, which aren't technically local). See www.euphony.com for details. There are other alternative providers out there too, but you have to shop around.

Despite what BT's own fault reporting line told me, THE OFFICIAL BT STORY is that DACS 'behaves exactly like an existing second line'

One final thought for anyone living near Reading who is plagued by DACS and doesn't fancy ISDN. Tele2 offer direct connection to the internet via a radio link, starting at around £65 per month. This sounds expensive, but compares pretty well with ISDN when you bear in mind that it gives you a 128K connection 24 hours a day. There are limits on the amount downloaded before you pay more, but it's an interesting concept that should be more widely available soon. See www.tele2.co.uk for more details.

Brian@cul.co.uk

Paul Smith shows how, with the indiscriminate use of jargon, a killing can be made in web design.

Crime and punctuation

A reader writes: 'Not withstanding your striking resemblance to George Clooney, I consider you to be one of the finest writers of our generation.' Obviously I paraphrase here. What the reader actually wrote was: 'You sad, demented fool. You're an affront to the good name of journalism. You clearly have no idea what you're talking about. And that orange hair looks ridiculous.'

Actually he, along with many others who have written to say something similar, have a fair point (not about the hair, mind) but it seems to be no bar in the development of my career. After all, I seem to be able to not only make a living out of writing — no, really — but I also have the advantage of fashioning a career in an industry in its infancy at a time when everyone wants to know about it, yet everyone thinks it's incredibly complex. And, were it not perceived thus, people like me and magazines such as this would be out of business.

However, as a direct result of this evil software-developer/technology-journalist conspiracy, computers remain difficult and mysterious even as they claim to get easier to use. And, just to keep things interesting, we throw in a new element every now and then to shake up the waters. Most recently, of course, this has been the internet. Everyone has been persuaded, and I promise it's not me doing this, that they need a web site. Sure enough, because we make web sites seem complex, these people come to us to get them written for them. These days, we're all web developers. Tim, for example, writes: 'Please could you give me some advice I understand your (sic) of the web design/consultation industry, I am looking to do some work in that area part time while I am studying at university it would be appreciated if you could give me some tips on getting clients and getting started once again thank you very much for your time.' Tim is proof of how easy it is to get into this business. You see, Tim has rather grand notions of my skill-set. Any notion that extends beyond, say, doting on Edward the cat and some facility for multiplayer Rainbow Six would probably expose my limitations and make me blush.

Funnier still, Tim has developed this notion solely on the basis, I believe, of my web site. Any of you who have had so much spare time as to visit it will know how amusing this is. Still, it is my mission to inform and so I provide the following advice to Tim and any like him throwing their help-seeking nets so wide as to include the likes of me.

1. Learn the language: it doesn't really matter what language, simply the ability to sound like you know what you're on about. Use terms such as 'disintermediation'... come to think of it, just use 'disintermediation'; it's a remarkable, possibly magical term whose use will automatically secure a contract from the most hostile of prospects.
2. Try to avoid anyone with more knowledge of the web than 'I've seen a couple of sites'. You don't want to get into the position where one of your clients realises, quite correctly, that the work you've charged them three months for only took half an hour.
3. Further to (2), never, EVER mention HTML editors apart from Notepad. This is the fundamental law of web editing. It must never get out. It is as sacrosanct as the magicians' code that prevents them from revealing how tricks are performed, and the airline travellers' code that prevents them from revealing that secret phrase we use to get up an upgrade; you know the one.
4. If you can, do contra deals. These are great. So far, next year's skiing is free and I've got all my silver trinkets for the next decade sorted out.
5. And, Tim, don't be afraid to use punctuation. It's your friend. That's my advice. Take it or (if you've any sense) leave it, but prospective clients will be put off if you are unable to string a coherent sentence together, in almost any career path you may choose.

As a direct result of this evil software developer/technology journalist conspiracy, COMPUTERS REMAIN DIFFICULT AND MYSTERIOUS even as they claim to get easier to use

Me, I'm already onto the next thing. Today is ISDN day, *chez moi*. Next month I'll tell you why exactly it represents a culmination of the most painful experience since my hard disk AND my backup crashed.

www.paulsmith.com

letters

Send your letters to >
The Editor
Personal Computer World
VNU House
32-34 Broadwick Street
London W1A 2HG
or email > letters@pcw.co.uk
or fax > 0171 316 9313

STRANGE FRUIT

As a long-time computer addict, I always turn to *PCW*'s *Retro* page first. It brings a glow to my anorak to read about all the old machines. In April's column, Simon Collin ponders the preponderance of fruity names for some of the early computers, and wondered, 'was there a Pear or Banana? Unlikely.' Funnily enough, there was a Banana and even an Orange. Sadly for Jobs and Wozniak, both were Apple IIe rip-offs, originating from South Africa and the Far East respectively. I saw both being used at a local computer society in the early 1980s. What was strange about them was the fact that the cases were obviously made from Apple moulds, but with a different-colour plastic. The PCBs were identical to Apples, but without the copyright details, the firmware had been blown into EPROMs.

TONY PENDREY
tony@pendrey5.freeserve.co.uk

LETTER OF THE MONTH

Current affairs

At the risk of labouring a subject, I must comment on the recent correspondence in *PCW* regarding battery life on the Psion 5. In normal use, a set of new Duracells should last about 20 hours. Anything less than 12, according to Psion Technical Support, may suggest a faulty machine (some examples could have a faulty battery compartment). If one assumes that a new set of batteries should have about 1750mAh of usable power, a four-hour battery life suggests a current of about 435mA, which is grossly excessive. Normal residual current without the backlight should be around 50mA, rising to 150mA with the backlight on (assuming that PsiWin is not active). My own machine started using batteries at a prodigious rate last month, and checking the current showed it to be 150mA unlit, and 250mA backlit.

A speedy warranty repair restored the original 50mA/150mA usage. So I suggest that anyone with 'battery gobblers' checks the <Information/Battery/Usage Live/Battery Current Now> reading. Anything in excess of a consistent 100mA with the backlight off must be considered suspect.

NEIL MELLERICK
NDM@BTInternet.com

PCW replies > *Neil's letter was one of many we received this month concerning Psion 5 battery life. Most users recommend the use of rechargeables, although an interesting thread emerged concerning Duracells with the built-in lifespan indicator. When squeezed, a short bar appears along the side of the battery, indicating its power status. However, the 5's battery compartment can be a tight fit, sometimes resulting in the unit squeezing the power-check button and inadvertantly draining its own batteries.*

OF MICE AND MUCK

While cleaning rollers can rectify erratic mouse movement, it takes time and can prove very frustrating. I eventually found a simple and effective solution by concluding that the problem was not really with the mouse but with the mouse mat. What was required was a stay-clean mat.

I replaced the mat with a pad of writing paper and now simply rip off the top sheet after a few hours' use, and I have had no more problems with the rollers getting dirty. The interaction between my movement of the mouse and that of the cursor now remains satisfyingly precise, consistent and reliable.

In addition to the advantages in relation to the mouse, the pad is very convenient for scribbling messages on; no, this does not get ink onto the mouse ball. It has certainly been the easiest and lowest-cost upgrade I have performed, and in practical terms actually one of the most rewarding.

DEREK DAVIES
derekdavies@fdn.co.uk

IT EDUCATION BEGINS AT HOME ...

With regard to 'Parent Power in IT', Letters, *PCW March*: good point, Jim. Parents will look elsewhere for IT and education resources, and I too have equipped myself and my children with cutting edge (ish) technology. My children are both at secondary school and at ease with sending and picking up their own email. Surfing the net to help with homework is second nature to them. They have access to a range of multimedia encyclopedias and atlases that give them an advantage in not only their directed study, but also in the knowledge that is a byproduct of the search for information.

As far as I am aware, these skills have been picked up mainly at home, not at school. However, I can afford the kit and the time to spend with my children. My wife is a teacher and a large number of the kids she teaches are less fortunate.

I understand what I think Jim is saying about parents driving forward change, but this smacks to me of a kind of trickle-down theory for IT. In reality, and in the long-term, what you are at best allowing, and at worst encouraging, is a continuation of the information haves and have-nots. Isn't (shouldn't) education about giving everyone a chance? For goodness sake, let's not throw our hands up and say 'Well, it ain't working, so there's no point in trying'. The internet is so powerful because it allows everyone access to everything. Surely we, as parents, should be insisting that all children are given the few skills they need to use that resource effectively. And equally we should be banging the desktops to make sure that schools are giving them access to practise those skills. That must be something that's in all of our long-term interests.

SIMEON JONES,
STAFFS

... AS DO THE RESOURCES FOR IT IN SCHOOLS

Re: My letter 'Parent Power in IT', Letters, *PCW March*.

In defence of schools, can I just add that it is not apathy that holds back the development of IT, but a lack of resources, equipment and technical know-how. I read a report recently that stated that something like 80 percent plus of schools had access to the net, but over 60 percent only had one access point within their walls.

It's fine for the government to set targets, but the resources must follow. In my present school internet access has been funded through present budgets and a range of grants from private enterprise. Teacher know-how tends to be down to those individuals who have a personal interest in IT.

Know-how will only increase when teachers have access to adequate training and their own equipment and internet accounts. Why should staff have to purchase their own equipment and pay for their own internet accounts/telephone bills in order to become IT literate? This very letter is written on my home computer, using my software and my printer. All of these items are used freely to produce resources for the school in which I work.

JIM FANNING
JFann16463@aol.com

DID THE EARTH MOVE FOR YOU TOO, DARLING?

Gordon Laing (*Editorial, PCW April*) comments on Intel not launching the Pentium III under the development name of Katmai, but maybe someone at Intel knows about the earth sciences.

To anyone interested in geology or vulcanology, Katmai means only one thing: the incredible volcanic eruption of 1912, which produced the temporary, yet amazing, wonder of the world called The Valley of Ten Thousand Smokes...

STORM DUNLOP
sdunlop@star.cpes.susx.ac.uk

IT IS THE MEANS, NOT THE SUBJECT MATTER

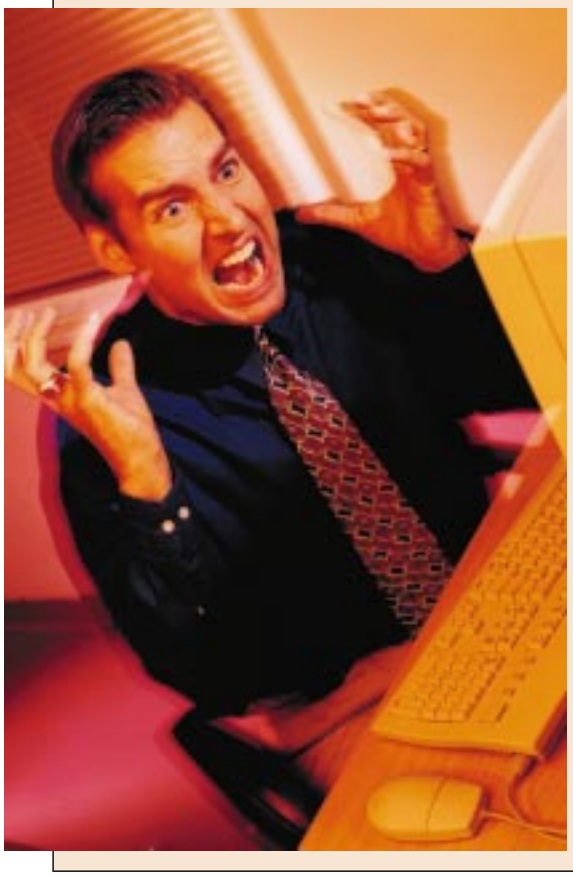
Your young reader ('IT teaching in a state', *PCW March*) wants IT to be taught as a subject in its own right, and complains that he has 'only one very basic lesson a week'.

IT simply provides tools that should be available for use within the curriculum as and when appropriate — I don't believe it is necessary for IT to be taught as a subject *per se*. In most primary schools youngsters are already encouraged to find out information for themselves, whether that be from a book, a computer database or even the internet, and to present that information using appropriate tools, whether traditional or IT based. In many Secondary schools IT permeates the whole curriculum, introducing CAD/CAM to aspiring engineers, and computer graphics and typography for budding journalists and designers, to name a few.

It is suggested that state-taught children will be inadequately prepared to do accounts on a spreadsheet; I contend that it doesn't matter how much you know about spreadsheets, since you still need to know about accounting. IT only provides the means for automating the calculations and tabulating the output: it's the core knowledge that determines the results. Anyway, who's to say that spreadsheets will still be around in another decade when your reader graduates? The IT tools of the future will be as far removed from those your correspondent wants as 1970s WordStar is from today's DTP applications. And as for waiting until higher education for PC experience, there's more than PCs out in the world.

ALISDAIR GURNEY
alisdair@agurney.demon.co.uk

...letters



CHEAP AND CHEERLESS

Ivor Bugbear (*ChipChat, PCW April*) has discovered something that we in the public transport industry have suspected for some time.
Users of free ISPs seem to complain the loudest, as do users of free or reduced-price bus passes. Also, the better the service, the more likely people are to complain about even the most minor shortcomings.
This law of inverse proportionality seems to be part of human nature, and in a way I'm glad that the moaners are gravitating towards the free ISPs, leaving the rest of the internet to users who realise its limitations.
Three months ago the annual subscription to my ISP was up for renewal so I signed up to three free ISPs and compared them with my regular provider. I had difficulty sending and receiving mail with two of them, and all three free ISPs made internet gameplay difficult (in one case, impossible) for my son. I also noticed that downloads were much slower with all the free providers I tried.
I decided to pay my two quid or so per week (equivalent) and stick with U-net, whose free helpdesk number works out at about a pound per minute cheaper than some 'free' ISPs. I believe you get what you pay for, and the quality of service provided by some free ISPs probably discourages rather than encourages internet use by the new generation (of not-so-technically-minded) computer users.

ANTHONY WRIGHT
awright@aire-worth.u-net.com

PCW replies > *Free ISPs are in the news right now. Quite literally, since the PCW team have each adopted various free internet services and have written-up their findings in this month's News section.*

FOR THE GL OF IT

I would like to correct an error in the group test of programming tools (*PCW, April*). In the review of Project 2, Tim Anderson says that Delphi supports OpenGL but provides no information. Not true. There's a large section of help files on OpenGL, but Delphi goes to some length to hide them. You cannot locate any information via the index or search, but the context-sensitive help is very thorough. Just type any gl method into the code editor and hit F1. All the standard documentation appears exactly as it would in C++, even down to the same typos! (Check out push and pop matrix to see mistakes repeated.) Notwithstanding the difficulties, I am an enthusiastic supporter of Delphi. I much prefer it to C++ and would like to see more people writing OpenGL in Delphi.

PAUL FRIEDLANDER
praskovi@clara.net

Tim Anderson replies > *True, Borland/Inprise supplies OpenGL help with the other Win32 SDK help files. But these are the standard help files for C++ developers. For example, glBegin is shown in the help file as:*

```
void glBegin (
 GLenum mode
 };
```

In OpenGL.pas this is wrapped as:

```
procedure glBegin (mode: GLenum); stdcall;
```

I agree, the context-sensitive help is useful, but I'd be more impressed if it were adapted for Delphi, as was done for the Windows API in the first version of Delphi.

WEB WISEACRE

With regard to the interview with Tim Berners-Lee [*pictured, right*] in March's *PCW*: was it a deliberate move on Michael Hewitt's part to come across as arrogant and unknowledgeable?
If he really doesn't know what the W3C is, maybe he was the wrong person to be asking questions about the world wide web. And the comments about it being 'rather fitting' that the interview was conducted by email, when the web and email are separate entities, seem odd for such an 'informed' computer magazine. The same can be said of laying the blame for the speed of the internet at the foot of the web. Basically, the whole interview came across as if Michael Hewitt had had a bad browsing experience that morning. Maybe he should spend less time browsing pornography and more time using the web for something useful?

ADRIAN BURGESS
BurgesA@intgame.com

Michael Hewitt replies > *Too busy downloading pornographic gifs to have the time to reply to this one.*

gadgets

compiled by Nik Rawlinson

Wrist Twister

It seems the world has gone blueberry mad. First we had translucent blue iMacs and now a matching mouse. It may not look like a mouse, but that's because it's specially designed to minimise your chances of developing RSI by keeping your hand in a natural vertical position rather than forcing you to twist your wrist to grab a conventional mouse.

Price £58.74 (£49.99 ex VAT)
Contact Animax 0181 351 7400
www.animax.co.uk

Water great idea

Durable, shock resistant and waterproof — those are the three main selling points of these handy new cases for four of the Olympus range of digital cameras. They'll keep the water out at a depth of up to 3 metres, and weigh a mere 211g. Looking at the wider implications, these cases make cameras impervious not only to water, but also to dust and sand — perfect for a holiday by the beach.

Price £109.99 (£93.61 ex VAT)
Contact Olympus 0171 253 0513
www.olympus.co.uk

PalmPal

Pen tablets are nothing new. They've been around for years, making it easy to digitise signatures and freehand images that would be almost impossible to reproduce with a mouse. The PalmPal shrinks the whole idea down to not much bigger than the touchpad on a laptop. Just 0.7cm thick and weighing only 100gm, it has an active area of 3in x 2in and will fit onto even the untidiest desk.

Price £29.99 (£25.52 ex VAT)
Contact Trisys Europe 0181 808 2130
www.trisys-europe.com

All mapped out

Never get lost again: the Magellan GPS-315 has a built-in database of more than 15,000 cities and gives users access to thousands of points of interest around the world through the optional DataSend CD-ROM. Its display is backlit for night-time use and should keep you on the right track for fifteen hours, non stop. Best of all, it will store up to 500 landmarks in its memory.

Price £170.38 (£145 ex VAT)
Contact Next Destination 01722 410800 www.magellangps.com

VideoLogic Sirocco

DVD brings the cinema to your desktop and you're not going to get very far with those tinny little speakers that came bundled with your PC. Maybe it's time to upgrade. These speakers may not look pretty, but they promise minimal distortion, even at extremely high volume. They've done away with separate bass and treble controls, opting instead for an innovative filter to graduate the audio profile.

Price £233.83 (£199 ex VAT)
Contact VideoLogic 01923 260511
www.videologic.com

Mini Mobile

Inspector Gadget had a phone in his watch, and while this mobile might not be quite that small, it is nonetheless the smallest we have seen in the *PCW* office. It weighs 83g and when closed is about the size of a child's toy car. It's a dual band GSM900 and GSM1800 model, offering unparalleled roaming options.

Price £299 including VAT and connection
Contact Motorola 0500 555555
www.mot.com

Mini Driver

340Mb on a one-inch square, 17 gram hard drive. Too good to be true? Not at all. The IBM Microdrive is a reality, and as it's the same size as a standard CF (CompactFlash) Type II, it's ideal for use with PDAs and some digital cameras. With the addition of an adapter, it's also compatible with PCMCIA devices. It may look like a fridge magnet, but it's a whole lot more functional.

Price TBA
Contact IBM 0990 426426
www.storage.ibm.com

Sony MVC-FD91 Digital Camera

Not only does this camera have a 14X optical zoom, but it can also record up to 60 seconds of full motion video at 160 x 112 resolution, as well as five seconds of audio annotation for each picture taken. Maximum resolution is dictated by the fact that it saves its work to a floppy, topping off at 1024 x 768 dpi, and it allows the user to specify shutter speeds of between 1/60 and a lightning fast 1/4000 sec. Watch out for a full review in next month's *PCW*.

Price £949 (£807.66 ex VAT)
Contact Sony 0990 111 999 www.suk.eu.sony.co.jp

reviews

So what do school dinners and a reviews section have in common? They come in small portions and there's chips with everything... *fnar, fnar*! No, really, it's true. It's small portions all around in the form of Sony's half-depth **PCG C1 VAIO,** a couple of new **PALM** computers from 3Com, Macromedia's **FIREWORKS 2,** perfect for shrinking your graphics before putting them on the net, Hewlett-Packard's CapShare **HANDHELD SCANNER,** the latest Nokia 9110 **MOBILE/PDA** combo and Canon's **TITCHY BJC-2000** printer. And the chips? No less than six: a UK **EXCLUSIVE REVIEW** of AMD's **K6-III**, Intel's brand new 433MHz **CELERON**, the Rage 128 2D/3D chipset on ATi's latest batch of high-powered graphics cards, the 3Dfx Voodoo III, PCs from Armari and Dan sporting 500MHz **PENTIUM III** processors, and the Sony PCG C1's big brother, with our second look at the Pentium II 366MHz mobile chip. It's been a busy month in IT, and we've distilled the highlights into these review pages. We also look at the pros and cons of **WIRELESS** networking and pit this against more conventional means of connection.

NIK RAWLINSON, REVIEWS EDITOR
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Contents

VNU European Labs

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

Ratings

★★★★★ Highly recommended
★★★★ Great buy
★★★ Good buy
★★ Shop around
★ Not recommended

EXCLUSIVE

Sony Vaio PCG-C1
Handheld Windows 98 portable

Exclusive preview of this amazing, tiny portable due for release in April.

If you thought Sony's Vaio 505 ultra-thin notebook was the bees knees, you'd be in good company. Unfortunately the international knee standard for bees will once again have to be updated for the Sony Vaio PCG-C1 is quite easily the sexiest portable I've ever had the pleasure of using.

I happened upon the PCG-C1 during a recent trip to Hong Kong. And, just as we were going to press, we exclusively discovered that Sony UK intends to launch the C1 in the middle of April. Thrilled, we persuaded Sony to fly us over a Japanese model to preview.

The C1 is certainly small, but Sony has once again opted for a full Windows 98 solution. It believes that end users prefer the power and compatibility of such a device over, say, Windows CE which the company currently has no plans to implement. Don't be fooled by the C1's size though, since it boasts a 266MHz MMX Pentium processor, 64Mb SDRAM, 4.3Gb disk, an 8.9in widescreen XGA display and colour video camera, yet weighs a mere 1.1Kg.

The first thing to strike you about the C1 is its small footprint of 240 x 140 x 37mm and its rather fetching magnesium alloy outer shell. Opening the shell reveals the quite usable 17mm pitch/2mm stroke 87-key keyboard which occupies almost the entire lower surface and a pointing nipple device sits in the centre. The upper half is dominated by the impressive display. Sure, we've seen wide aspect colour displays on portables but the C1's TFT panel boasts an amazing 1024 x 480 pixels running in 24-bit colour across an 8.9in diagonal. Powered up, it looks fantastic with tiny but clear icons and details. It will also drive an external monitor in 24-bit at 1024 x 768.

Moments later, you cannot help but notice the tiny camera fitted just above the display. This 1/6in 270,000 pixel CCD can capture still or moving images, along with synchronised sound, and the lens can be rotated 180° to capture images behind it. Sony suggests sending images or clips with emails, but with the correct software and connection there's no reason why you couldn't videoconference with the C1. The camera and supplied software also supports Sony's new CyberCode format, which can launch software by passing specific 2D bar codes before it.

The knee standard for bees will have to be updated ...

From the connectivity point of view, the C1 is a dream. Ports down one side include infra-red, headphone, microphone, USB and IEEE-1394 — known by Apple as FireWire and Sony as i.LINK. On the opposite side you'll find a Type-II CardBus/ZV PC Card slot. The C1 is supplied with a USB floppy drive (sadly not a HiFD unit) but a CD-ROM drive will cost you extra.

The unit supplied for this preview was running Japanese Windows 98 which, along with the wide aspect display, slightly confused our benchmark. Our imported model was also fitted with a slightly slower 233MHz processor under which SYSMark returned an approximate figure of 69, comparable to other 233MHz MMX notebooks we've tested. Battery life tended to be between one and three hours.

The C1 is highly desirable but potential purchasers should think carefully about their portable requirements. The C1's display and keyboard are great but if you're only going to be using it for basic office applications on the move, you may be able to make do with something simpler, cheaper and with a far longer battery life, like a CE-based HP Jornada.

You should also know that there are more Windows 98 micro-notebooks out there than you may think, online dealers such as Japan Palmtop Direct <www.jpd.com> will have you trembling in anticipation! However, I suspect that most people will, like me, fall in love with the C1 on sight and bask in the sheer envy of lesser portables — brand loyalty has never felt so good.

GORDON LAING

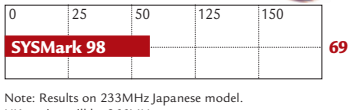
PCW DETAILS

RECOMMENDED Personal COMPUTER WORLD

★★★★★

Price *£1,399 (£1,190.64 ex VAT)*
Contact *Sony 0870 240 2408*
www.vaio.sony-europe.com
Good Points *Tiny, gorgeous, feature-packed.*
Bad Points *No CD-ROM drive as standard.*
Conclusion *Neither desktop replacement nor pocket-sized, but still the most desirable portable we've seen.*

PERFORMANCE RESULTS



Note: Results on 233MHz Japanese model. UK version will be 266MHz.

EXCLUSIVE

AMD K6-III 450MHz
Socket 7 PIII challenger

An exclusive review of this cheeky 450MHz chip, tested against the 500MHz PIII.

The release of Intel's Pentium III has not gone unnoticed, thanks largely to its blanket marketing campaign. AMD's more reserved approach to the K6-III has relied more on reputable reviews by those privileged enough to receive samples. AMD claims that in terms of raw data processing, even the slowest of its new K6-III chips, the 400MHz, will outperform a Pentium III running 100MHz faster. We got our hands on a 450MHz K6-III for an exclusive UK review of this new chip.

Loyal followers of the Socket 7 platform argue that it is a proven infrastructure delivering performance and features matching Slot 1. However, things have moved on dramatically since this argument first presented itself at the launch of K6-2 and the much-heralded 3DNow! instruction set.

For starters, Intel's belated response to 3DNow! was the launch of the Katmai New Instruction set with major plug-ins or patches released on the same day as the PIII. That said, AMD had almost a nine-month head start, giving software developers a chance to develop the code to take advantage of the performance-improving calls.

The K6-2's Achilles heel was that its restricted Level-2 cache was forced to run at the speed of the front side bus while the processor's clock speed was being increased. By employing a new 0.25micron manufacturing process this has now been addressed and AMD is able to squeeze a full 256Kb of on-board cache directly onto the processor die. The net result is that the cache now runs at a backside bus speed identical to that of the core. It may be only half its original size but it still delivers a dramatic performance boost.

By moving the cache in this way, motherboard cache comes back into play. Because the ceramic pin grid array (CPGA) package of the K6-2 contained a Level-2 cache off-die, any other Level-2 cache would be ignored. This dampened the spirits of many an enthusiast when 2Mb Level-2 cache motherboards started to appear.

AMD's new TriLevel Cache design re-enables motherboard cache usage up to a current maximum of 2Mb, offering potential performance increases of up to eight percent over a K6-III system with none. This combined cacheing capacity is currently up to two and a half times larger than typical competing designs.

So how does this translate into actual performance? It's important to note here that with such new chips, the benchmark used for performance testing has no optimisation for instruction sets. This is true for both the K6-III and the Pentium III. A fully optimised system, including its graphics drivers and applications, would in fact perform marginally better. As it stands, our benchmark will compare the physical architectural aspects of each processor, encompassing every factor of a blind, unoptimised system.

The test platform consisted of 128Mb PC100 SDRAM, an 18Gb EIDE Western Digital hard disk (model AC418000, 7200RPM, av. read seek 9.0ms) and a 16Mb VooDoo3 3000 AGP graphics card. The K6-III 450MHz was tested on an ASUS P5A motherboard with 512Kb on-board cache running at 100MHz while comparative tests were run with a Pentium III 500MHz on a motherboard utilising Intel's 440BX chipset. Although the normal core voltage of the K6-III 450MHz will be 2.4v this early sample was running at 2.5v while the Pentium III 500MHz was fully regulated to run at 1.8v.

The results were surprising when you consider that the Pentium III reputedly has a far superior floating-point unit, taking care of much of the geometry processing necessary for graphics rendering. As the graphs below show, AMD's claims have not quite been proven in our tests but at around two thirds the price of the Pentium III a similarly-clocked K6-III will still provide impressive performance. In a fully optimised system this chip could give Intel a serious run for its money.

IAN ROBSON

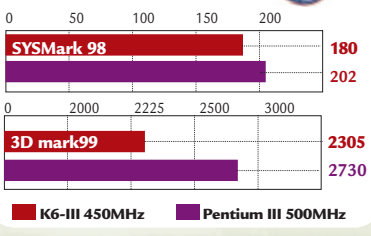
PCW DETAILS

RECOMMENDED PCW

★★★★★

Price *£347.39 (£295.65 ex VAT) per 1,000 units*
Contact *AMD UK 01276 803100*
www.amd.com
Good Points *Motherboard cache support. Allows for low-profile systems designs.*
Bad Points *Application support for instruction set required to bring out full potential.*
Conclusion *Performance may not be as striking as has been claimed, but for the price you won't be quibbling over the few points gained in performance by the Pentium III.*

PERFORMANCE RESULTS



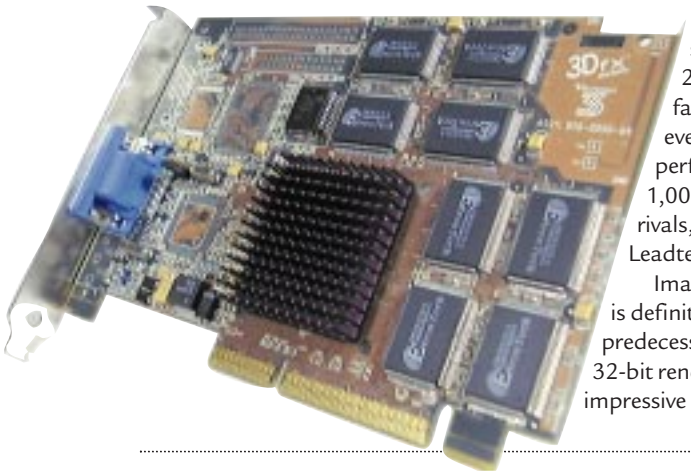
Voodoo3 3000

EXCLUSIVE

Catch it if you can — the fastest 3D graphics card in the universe.

The mother of all graphics cards has arrived, although not with a bang, like its predecessor. Never mind. The Voodoo3 3000 has 16Mb of RAM on board. Driver installation is hassle-free. As the feature-set in our test was incomplete, many of the regular customisation options were missing.

Despite the aura surrounding the Voodoo brand, a lot of advanced features like stencil buffer and 32-bit Z-buffer are missing. Unlike rival Savage 3D and Rage 128 chipsets, the Voodoo3 does not support motion compensation for DVD playback. At present, neither can it handle 32Mb textures nor OpenGL. The lack of these features might make it less attractive to the OEM market.



The Voodoo name has always been associated with high performance and the Voodoo3 turned in a stunning 3DMark 99 score of 2848 and it is certainly the fastest graphics card we have ever tested. In fact, its performance is almost a full 1,000 points ahead of its closest rivals, the ATI Rage Fury and Leadtek WinFast S320.

Image quality of the Voodoo3 is definitely better than that of its predecessor. However, the lack of 32-bit rendering makes the images less impressive than competing chipsets such as the Rage 128, G200 and Savage 3D. But if unbridled speed is all you care about, and you're after what is maybe the ultimate gamer's card, the Voodoo3 is definitely the way to go.

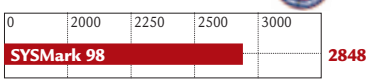
AJITH RAM

PCW DETAILS

★★★★

Price *£175 (£149 ex VAT)*
Contact *3Dfx Interactive 0171 544 6812*
www.3dfx.com
Good Points *Fastest 3D graphics card in the world. Good 2D performance.*
Bad Points *No 32-bit rendering, stencil buffer or AGP texturing.*
Conclusion *The first choice for the gamer for whom brute speed is everything.*

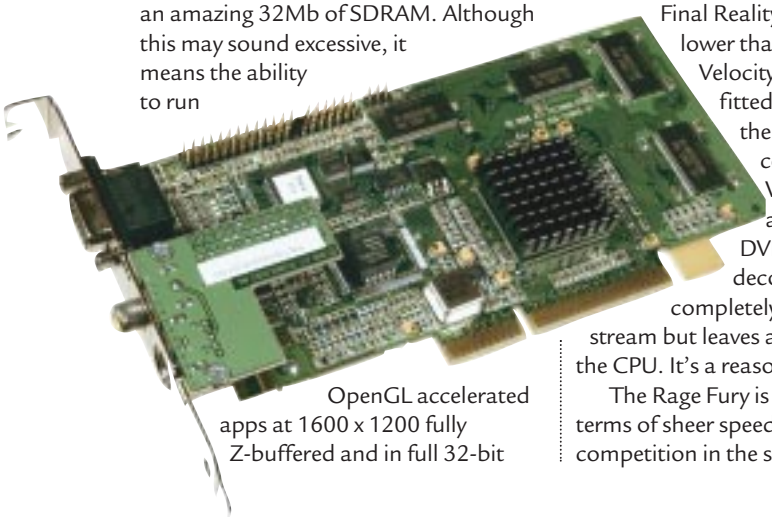
PERFORMANCE RESULTS



ATi Rage Fury

Catch this graphics card's great 3D abilities while you can.

The nVidia Riva TNT chipset has dominated the 2D/3D combo market, while Voodoo2 still rules the dedicated 3D card arena. But ATi's brand new Rage 128 2D/3D chipset has moved it to the head of the field. The Rage Fury is the highest-specification Rage 128-based card and it's fitted with an amazing 32Mb of SDRAM. Although this may sound excessive, it means the ability to run OpenGL accelerated apps at 1600 x 1200 fully Z-buffered and in full 32-bit colour. Its 2D image quality is high, and maximum 2D resolution is 1920 x 1200 at 76Hz vertical refresh rate. But it's 3D performance which really counts these days, and this is where the Rage Fury puts in a great performance although its success is not unqualified. It gains an extremely high 3DMark score but its Final Reality mark is slightly lower than STB's TNT-based Velocity 4400. The Fury is fitted with TV outputs in the form of both composite and S-Video connectors, and has integrated DVD hardware decoding which completely decodes the video stream but leaves audio processing to the CPU. It's a reasonable compromise.



The Rage Fury is an excellent card. In terms of sheer speed, it's got some stiff competition in the shape of the Voodoo3 [*above*], although with a 3DMark score of 1898 it's still going to be able to run games flawlessly at very high resolutions. For users after higher-quality images and DVD support, this is a premier choice.

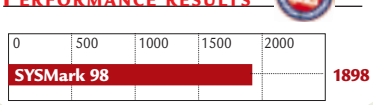
DAVID FEARON

PCW DETAILS

★★★★

Price *£149 (£126.80 ex VAT)*
Contact *ATi 01628 533115*
www.atitech.com/uk/uk_index.html
Good Points *Excellent 3D performance. Huge frame buffer. DVD decoding.*
Bad Points *Not massively faster than the competition.*
Conclusion *One of the best 2D/3D combo cards around.*

PERFORMANCE RESULTS

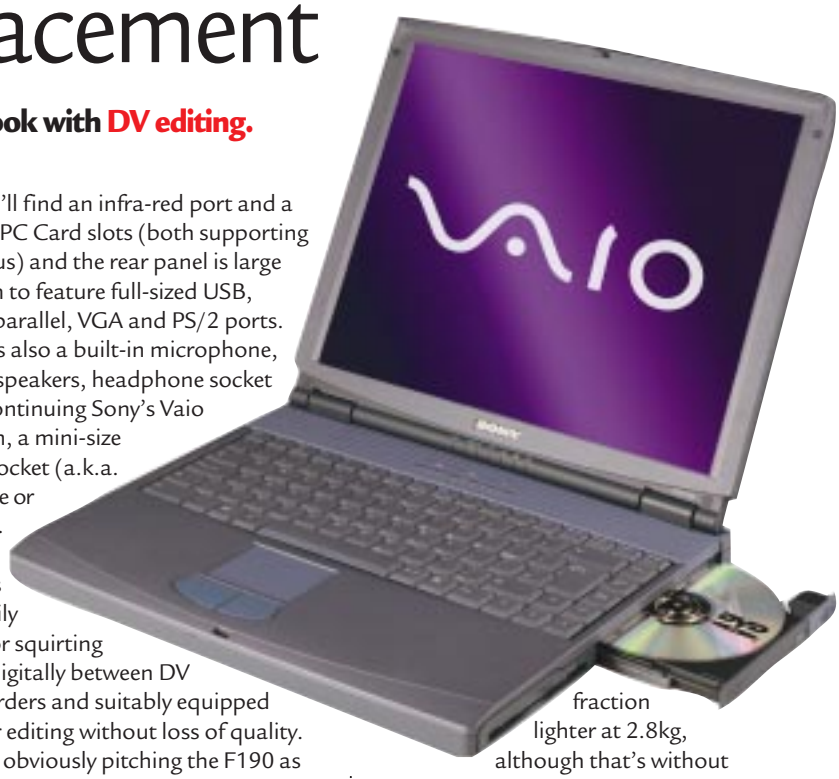


Sony Vaio PCG F190

EXCLUSIVE

Desktop replacement

An exclusive look at Sony's new notebook with DV editing.



Sony has only been in the UK PC portables market since last June, yet in less than a year models like the ultra-thin Vaio 505 have helped it achieve a 23 percent share of UK notebook retail sales and become the fifth largest notebook supplier in the UK [*Source: Romtek*]. Along with flying us a C1 from Japan for exclusive preview (see p77), Sony has additionally offered us an exclusive look at its new top of the range Vaio PCG-F190.

The F190 and the slightly lesser specified F160 are the first two models in Sony's new Vaio F100 series. Both feature 14.1in TFT displays operating at 1,024 x 768 in 24-bit colour and 64Mb RAM (expandable to 192Mb). Mobile Pentium IIs are standard, with the F160 running at 300MHz and the F190 at Intel's currently fastest 366MHz. Storage-wise, the F160 is fitted with a 4.3Gb disk and 24-speed CD-ROM drive, while the F190 boasts a 6.4Gb disk and 2.4 speed DVD-ROM drive. You're looking at £1,619 for the F160 or £2,559 for the F190 (ex VAT).

The power of a desktop PC in a portable package

After the recent raft of waif-like ultra-portables, it's interesting to see a deliberately large device designed to pack in the power and capabilities of a desktop PC in a portable package. The F190 measures 324 x 40 x 265mm and weighs 3.1Kg fully loaded with battery, floppy (but not HiFD) and DVD drive.

It looks big sat next to other notebooks and the screen is large enough for a small group to gather around during a presentation. The ample keyboard with its decent wrist-rest is an absolute joy to use. The F190 is certainly no burden to carry around. The DVD drive is a permanent fixture but the floppy drive can be removed to save weight, or replaced by an optional second battery to double the unit's 2.5 hour standard lifespan — excellent software utilities monitor battery performance.

You'll find an infra-red port and a pair of PC Card slots (both supporting CardBus) and the rear panel is large enough to feature full-sized USB, serial, parallel, VGA and PS/2 ports. There is also a built-in microphone, stereo speakers, headphone socket and, continuing Sony's Vaio mission, a mini-size 1394 socket (a.k.a. FireWire or i.Link). Today, 1394 is primarily used for squirting video digitally between DV camcorders and suitably equipped PCs for editing without loss of quality. Sony is obviously pitching the F190 as such an editor, supplying digital video capture utilities along with a light version of Adobe Premiere. There's MiniDisc editing software, too. A 56K PC Card modem is thrown in, upgradeable to support ethernet, ISDN and Sony GSM mobile phones. An optional port-replicator offers two PS/2 and a 10BaseT ethernet port.

The F190 is a superb Windows 98 notebook but faces some stiff competition. It doesn't have 3D accelerating hardware and employs software DVD playback which, while adequate, is let down by the unforgivable absence of a PAL/NTSC TV output. Last month, we tested Dell's Inspiron 7000 A366 LT with a similar spec but boasting a 15in display, 3D graphics, TV output, Microsoft Works 99 and a slightly lower price tag of £1,999 (ex VAT). The 3D graphics hardware gave Dell an edge in our benchmark test but it's almost 50 percent thicker and a kilo heavier. Dell's 14.1in version is slimmer and lighter than its 15in counterpart but still no match for the F190's vital statistics. Toshiba's top-of-the-range Tecra 8000 is comparable in size to the Sony, boasts a 14Gb disk, can support NT4 and is a fraction lighter at 2.8kg, although that's without floppy and it costs £3,595 (ex VAT) without Office software or 3D hardware.

Okay, Dell's screen is physically bigger but 14.1in certainly looks large enough. The lack of 3D graphics and composite video output will exclude the Sony for some users, but with its superb build quality and digital video facilities, the F190 is surprisingly competitive and will excel as a desktop replacement or power portable.

GORDON LAING

PCW DETAILS

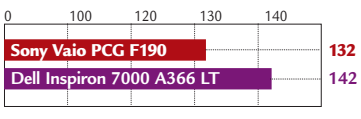
RECOMMENDED BY PCW COMPUTER WORLD

★★★★★

Price *£3,006.83 (£2,559 ex VAT)*
Contact *Sony 0990 424424*
www.vaio.sony-europe.com
Good Points *Well built. Unique DV editing facilities.*
Bad Points *No Office software, 3D graphics or TV output.*
Conclusion *Competitive desktop replacement notebook.*

PERFORMANCE RESULTS

SYSmark 98



Evesham Micros Scorcher DVD TNT

First of the 433MHz Celerons comes in at under £1,000.

When Intel launched the first CPU in its budget Celeron range last year, it faced criticism for its poor performance in business applications, due to a lack of L2 cache. Common business applications use the L1 and L2 cache to store frequently accessed data. Intel soon added cache with the introduction of the Celeron 300A processor. Since then, Celeron speeds have increased steadily and the 433MHz version is close to the more expensive Pentiums II and III in terms of clock speed.

The new 433MHz Celeron is available in both Slot 1 and Socket 370 configurations. However, both versions still run on motherboards with a front-side bus speed of 66MHz. This is slower than the 100MHz enjoyed by the Pentium II and III line of CPUs.

This 433MHz Celeron system from Evesham Micro uses the Socket 370 version of the CPU. The new socket looks almost identical to the Socket 7 used by the K6-2 CPUs from AMD. The heat sink and fan are fairly compact, much smaller than their Slot 1 counterparts, and are quite sufficient for cooling the processor.

The Celeron sits on a SuperMicro 370SBA motherboard which sports Intel's new ZX chipset. Unlike the 440BX chipset, the ZX is cheaper and supports a lower front-side bus speed of 66MHz.

This is an excellent choice for a home or office system

The AGP slot is occupied by the powerful 16Mb STB Velocity 4400 graphics card which uses the TNT chipset from nVidia. One of the few chipsets to support 32-bit colour, it has a high RAMDAC of 250Hz. Both OpenGL and DirectX APIs are supported.The Velocity 4400 is an outstanding performer in both 2D and 3D applications. Its score of 1703 in our 3D Mark 99 benchmark is one of the highest for any graphics card.

The Evesham system comes with a 5X DVD drive but no hardware MPEG-2 decoder. This means that decoding depends entirely on the abilities of the CPU and the Zoran SoftDVD player bundled with the graphics card.

The sound card is the modest SoundBlaster PCI 64 from Creative Labs and is paired with a set of Zyfi speakers. Immediately below the DVD sits the hard drive, a massive 10.2Gb DiamondMax from Maxtor. Being a UDMA drive it is fast, spinning at about 7,200rpm. Alongside the sound card is a Diamond Multimedia 56K modem. This leaves two PCI and three ISA slots free for upgrading. There is also one 3.5in and two 5.25in bays free for extra components.

The overall build quality of the Evesham system is excellent. There are two fans including the one for the CPU. The power supply unit with the exhaust fan is located slightly above the motherboard so there is easy access to the components. All the IDE cables are carefully folded and tucked well away and the ATX case is well ventilated.

The bundled Xeod XJ530 is one of the best 15in monitors around. It supports resolutions up to 1,280 x 1,024 but at this resolution, the refresh rate is only 60Hz. This increases to a flicker-free 75Hz at 1,024 x 768 and 85Hz at 800 x 600. The knob controls on the monitor are easy to use and contrast and brightness settings can be easily set using the helpful on-screen menus.

The Evesham system comes with a comprehensive set of manuals which include helpful tips on troubleshooting and upgrading your PC.

The 433MHz Celeron performs extremely well in comparison to its slower brethren and the faster Pentium II and III processors. The Evesham system scored 165 in our SYSMark 98 tests — only ten percent slower than the fastest Pentium II 450 PC we have seen. Even when compared to the latest Pentium III 450, the new Celeron's performance is impressive. Overall, the 433 processor is an excellent choice for a home or office system.

AJITH RAM

PCW DETAILS

RECOMMENDED PERSONAL COMPUTER WORLD

★★★★★

Price *£999 (£850.21 ex VAT)*
Contact *Evesham Micros 01386 769600*
www.evesham.com
Good Points *Good performance. High quality monitor. Very high graphics performance. Useful manuals.*
Bad Points *Motherboard will support neither Pentium II nor Pentium III CPUs.*
Conclusion *An excellent choice for a home or office system.*

PERFORMANCE RESULTS

CorelDraw Professional Publisher

Broaden your layout horizons with this mature, professional suite of applications.

Professional Publisher includes just about every graphics and DTP application Corel produces, so the one very large box contains all you're ever likely to need. The software itself occupies no more space than a couple of CDs on which you will find CorelDraw 8, Photo-Paint 8, Ventura 8 and WordPerfect 8. Additional software includes CorelDream 3D 8, Database Publisher, OCR-Trace, CorelScan, CorelCapture 8, CorelScript Editor and numerous writing tools such as a spell-checker and thesaurus.

Draw has always been a feature-rich application so, perhaps not surprisingly, with version 8 Corel concentrated on refining the interface for greater ease of use. Online help is available in abundance. You can configure virtually every aspect of the workspace, from toolbars and dialogue boxes to roll-ups, to suit your own way of working, and pretty much any style change can be achieved by dragging and dropping.

Drawing tools have become more intelligent, switching automatically to the shape tool when you are positioned over a node and making the editing of curves an easier task. And guidelines are now treated as objects. New interactive extrude, blend and envelope tools provide an easier route to existing effects, allowing you to manipulate objects in the workspace and choose options from the Property bar.

Two new interactive tools have been added. Interactive Drop shadow lets you add a transparent, soft-edged drop shadow to any object and the Interactive distortion tool lets you warp the shape of a path and its nodes in various ways.

Ventura has long been the choice for those producing lengthy, complicated publications. Its ability to handle style attributes, indexing and revisions across multiple documents is unmatched.

Central to Ventura's way of working is the concept of tags which define style attributes for everything from text paragraphs to master page layouts. In Ventura 8's redesigned tag window you can see at a glance all the format tags that define the look of your publication. The introduction of page tags in place of master pages makes the initial setup of documents more straightforward. Another new tag category, Rule tags, simplifies the application of rule styles to everything from frames to tables.

Ventura doesn't provide the ideal environment for the production of small, visually rich material like brochures, ads or posters but for managing lengthy, mainly text-based publications where consistency and accuracy are paramount, it's hard to beat.

Photo-Paint 8 represents more of a consolidation than a roll-out of new features. Dockers, an extension of Corel's original roll-up palettes, are tabbed palettes which, like Adobe's modeless floating versions, can be accessed at any time, grouped together and minimised to free-up editing space when not required.

There are dockers for objects, channels, scripts and on-screen help among other things. So versatile is the interface, you can set it up so that it's hardly recognisable as the same application. There is even a default setup which closely emulates Adobe Photoshop.

In common with the other packages in this suite, Paint offers features for web authors including HTML export of image maps and has good facilities for creating gif animations.

Over the past two years, Corel has concentrated hard on refining its applications interface. For its pains it has emerged with a suite of well-integrated graphics applications which, at least in the case of Draw and Paint, are respected by competitors and well liked by users. It is the layout package that is the lynchpin of these suites and everything else feeds into that. If you have the right layout package you can live with an unfamiliar vector illustration package or an image editor that wasn't your first choice.

So, if you are in the business of producing lengthy, complex documents and not committed to a competing vector illustration or photo editing application, this is for you. In other words, if you are thinking of buying Ventura, then Professional Publisher will most likely prove to be better value.

KEN MCMAHON

▲GRAPHICS AND TEXT COMBINE WITH EASE IN VENTURA PUBLISHER 8

PCW DETAILS

★★★

Price *£595 (£506.38 ex VAT). Upgrade £395 from Ventura, Draw, Paint, WordPerfect or PrintOffice, or from Illustrator, PhotoShop, PageMaker, XPress, FrameMaker or MS Publisher.*

Contact *Corel 0800 973189 www.corel.com*

Good Points *Well-integrated suite of mature, fully-featured applications. Good support.*

Bad Points *Specialised layout application won't suit many.*

Conclusion *Broadens the options for existing Corel customers.*

Alien Skin Xenofex

A superb collection of practical plug-in graphics filters.

Xenofex 1.0 is a collection of 16 plug-in filters for your chosen graphics package which mainly focus around natural phenomena effects while offering full customisation. Once the installation shell locates the 'plug-ins' folder of your choice, the filters will be in place in seconds. If you have no graphics package, don't worry — a complete edition of Jasc's Paint Shop Pro 4.14 is included with your purchase.

Whereas Eye Candy, a previous Alien Skin product, was mostly a bit of fun for applying special effects to, say, your tape covers, Xenofex attempts to provide some practical filters which just happen to be great fun. Products include Crumple, which is perfect for crinkled paper effects, Flag, for a bit of texture wrapping, and Constellation for just that little bit of obscurity. All effects are controlled via an accessible interface with drag bars and dials to alter level settings, including lighting, with the option to save your preferred settings. For the less creatively-inclined user, there are over 160 pre-sets.

Some of the more complex filters can take some time to apply so the interface offers you the chance to preview them in a fully resizable and zoomable window. Alien Skin is a master of design and provides not just a useful tool for professional designers but a seductive and simple interface. Trust the pre-sets if you don't have the time; they are pure inspiration and a joy to use.

IAN ROBSON

PCW DETAILS

★★★★★

Price *£104.57 (£89 ex VAT)*
Contact *Alien Skin Software 01756 704444*
www.alienskin.com
System Requirements *Host requirements: Adobe Photoshop 3.04 or later, Jasc Paint Shop Pro 4.12 or later, Corel PhotoPaint 8, Micrografx Picture Publisher 8. For others, visit web site.*
Good Points *Inspired. Time saving. Professional filters.*
Bad Points *A bit pricey if you're merely an enthusiast.*
Conclusion *Alien Skin continues to improve on its reputation for providing the best user interface for a plug-in. If you're just making tape covers, though, you could find cheaper alternatives to download from the web.*

MultiModem USB

Hassle-free setup and fax abilities — no power supply necessary.

Modems are not always the easiest devices to install: they have a nasty habit of failing to work and internal models eat up a free expansion slot. MultiTech systems, however, has a USB modem that should make things a whole lot easier.

Installation was everything it promised to be. We simply plugged it in while the computer was running — you don't even need power as this is drawn from the USB connection. The PC immediately asked for the provided driver disk. With this done all we needed to do was change the dial-up networking option to use this new modem and we were up and running. In fact, we were not expecting it to be as easy as it was.

The only trouble we experienced was the slow connection speed to our Internet Service Provider. But this was fixed by updating the drivers using the provided disk, which is supplied to meet the needs of users specifically experiencing slow transmission rates.

The modem itself is flat and slim. It will comfortably sit anywhere, and you get a phone connection at the back, too, so there's no need to unplug the phone from the wall each time you want to use the modem. It is good to see that all the necessary connectors for UK phones are provided as part of the package. Our test of its performance revealed that you won't be disappointed. With the ability to fax, and the hassle free setup, this a good modem to choose.

DAVID LUDLOW

PCW DETAILS

★★★★★

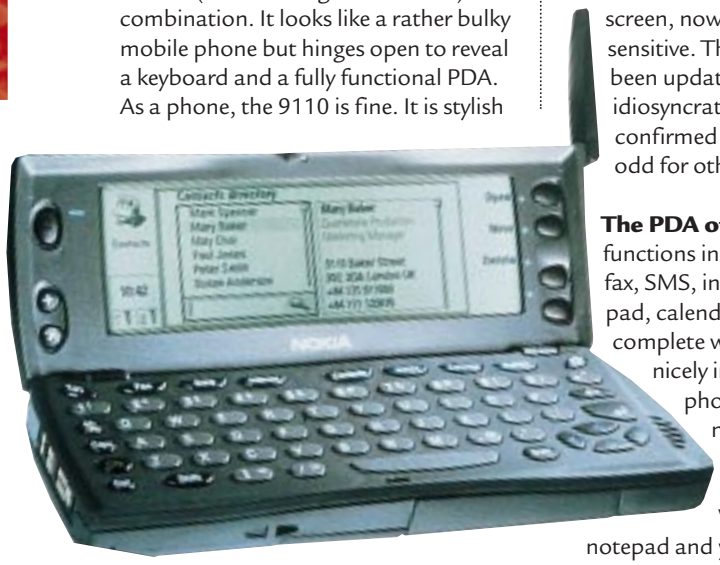
Price *£116.35 (£99.00 ex VAT)*
Contact *MultiTech Systems 01734 597774*
www.multitech.com
Good Points *An easy to install, good-performing modem. You don't need a power supply.*
Bad Points *A little more expensive than the standard equivalent.*
Conclusion *A very nice little modem. For those people who don't want to mess about installing a traditional modem, this is the answer.*

Nokia 9110

A well-integrated PDA/phone combination with a built-in camera connection, too.

The Nokia 9000 is well established as the leading phone/PDA (Personal Digital Assistant) combination. It looks like a rather bulky mobile phone but hinges open to reveal a keyboard and a fully functional PDA. As a phone, the 9110 is fine. It is stylish and easy to use. On the PDA side, the only possible criticism is that its controls remain a little clunky, both in hardware and software terms.

The small keyboard is not built for prolonged writing — although enthusiasts use it for such — and the screen, now backlit but not touch sensitive. The built-in software has been updated but remains a little idiosyncratic to drive: great for confirmed 9000 freaks, but a little odd for others.



The PDA offers a wide range of functions including contacts lists, fax, SMS, internet browser, note pad, calendar and a world clock complete with map. These are nicely integrated with the phone. Find a phone number in the contact list, press a button and you're in voice contact. Write a note in the notepad and you can send it as a fax, SMS or email to a hand-entered number or one chosen from the contacts list. This integration is where the Nokia wins hands down over any possible combination of PDA and mobile phone.

The really snazzy thing about the 9110 is its built-in camera connection facility. Take pictures with any IR-TranP compatible camera — in the UK, that means the Casio QV-7000SX or JVC GC-S1 — and transfer it by infra-red to the handset. This can then be saved as a JPEG, attached to an email and posted to friends, or uploaded to an FTP site. If you loved the 9000, you will be enraptured with the 9110.

MARK WHITEHORN

PCW DETAILS

★★★★★

Price *£350 with connection (Cellnet or Vodafone)*
Contact *Nokia 0990 003110*
www.nokia.com
Good Points *Smaller and neater than the previous model. Great integration between data in PDA and phone.*
Bad Points *Small, fiddly keyboard. Clunky software.*
Conclusion *A great way to combine PDA and phone.*

Desktop Theatre

Impressive surround sound for the PC or add it to your home theatre.

When Creative Labs introduced its SoundBlaster Live! last year, part of the upgrade kit was a set of four surround speakers. It was a good companion to the sound card and became popular. With the introduction of the long-rumoured Desktop Theatre, Creative has gone a few steps further. This kit is good enough to serve as your PC's speakers or as a capable addition to a home theatre.

The Desktop Theatre has support for Dolby Digital, Dolby Pro Logic and Creative's own CMSS standard. CMSS (Creative Multi-speaker Surround) is a technique which converts normal stereo into surround sound. Like mainstream home theatre equipment, the Desktop Theatre has four side speakers, a centre speaker and a sub woofer. There is also a decoder and amplifier.

Dolby Digital is the official standard for DVD movie soundtracks. To make use of this, the digital SPDIF output must be taken from the sound card and connected to the decoder's input. But if your sound card does not have an SPDIF output, the next best option would be to connect the normal output to the analogue input of the decoder. But this audio will not have the high fidelity of true Dolby Digital playback. We tested the Theatre by connecting it to the SoundBlaster Live!, a DVD player and a Denon CD audio player. Although overall quality was not as good as high-end decoders and speakers it was nevertheless impressive. The sub woofer reproduced a crisp bass with little distortion.

The Desktop Theatre provides great performance at an enticing price.

AJITH RAM

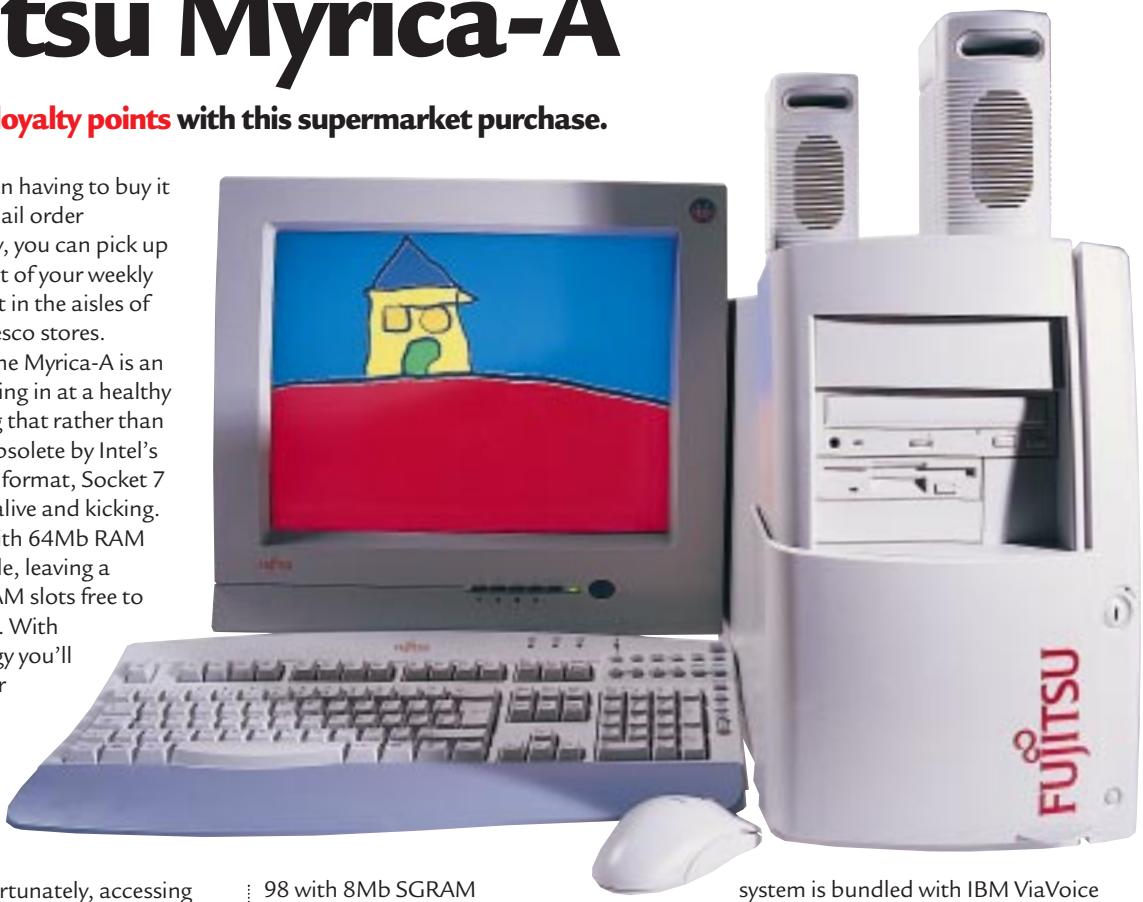
PCW DETAILS

★★★★★

Price *£179 (£152.34 ex VAT)*
Contact *Creative Labs 01189 344744*
www.creaf.com
Good Points *Good sound quality. Supports Dolby Digital and Pro Logic. Inexpensive.*
Bad Points *None.*
Conclusion *A high-quality kit at a fraction of the cost of many systems with similar specifications.*

Fujitsu Myrica-A

You deserve loyalty points with this supermarket purchase.



Rather than having to buy it from a mail order company, you can pick up this Fujitsu as part of your weekly shop. You'll find it in the aisles of one of 84 local Tesco stores.

The brain of the Myrica-A is an AMD K6-2, clocking in at a healthy 400MHz, proving that rather than being rendered obsolete by Intel's shift to the Slot 1 format, Socket 7 is still very much alive and kicking. This is coupled with 64Mb RAM on a single module, leaving a further two SDRAM slots free to increase this later. With current technology you'll be able to up your allocation to well over half a gigabyte without throwing away what you've already got. Unfortunately, accessing these slots is a little awkward as they sit behind the power supply, making small hands a useful asset, and one of the two free slots is obscured by a ribbon cable.

This PC's main problem is its looks. The squat case is far from attractive, which is a shame because being sold in a supermarket it is obviously destined for use in the home, where looks are an important consideration.

The case is difficult to remove. Even after all necessary screws had been taken out, it needed three people and a certain amount of prising with a screwdriver to remove it from the chassis.

The keyboard includes multimedia buttons for volume control, CD controls and application quick-launchers, although on our test machine these were not set to work by default upon arrival. In all, the keyboard feels unresponsive. The Fujitsu wheel mouse is excellent, though.

Expansion is catered for in the form of two vacant PCI and two ISA slots, and a free external drive bay of both 3.5in and 5.25in flavours.

Graphics are driven by an ATi Xpert 98 with 8Mb SGRAM onboard, using an AGP slot on the Socket 7 motherboard. The monitor is a 17in Fujitsu 772. On delivery, this needed minor tweaking to get the picture to entirely fill the screen and when running it at the 1,024 x 768 resolution, at which it was set, the image was fuzzy. Reducing this to 800 x 600 helped enormously.

The monitor performed poorly in our Display Mate tests. Although it demonstrated fairly regular screen uniformity there was slight geometric distortion in the lower left-hand corner. There was clear evidence of horizontal misconvergence and alignment errors and particularly bad screen regulation.

You can pick up this Fujitsu as part of your weekly shop

The on-screen display is comprehensive and incorporates three pre-set colour temperatures supplemented by a user-defined level. The monitor's 'coffee break' feature is a nice touch: choose an interval and it will remind you when to rest your eyes.

A 56K modem keeps users in touch with the outside world. Storage is handled by the 10.1Gb EIDE IBM Deskstar drive, offering a sustained data transfer rate of up to 12Mb/sec. The system is bundled with IBM ViaVoice Gold and an integrated headphone and mic set, as well as a disc for connection to TescoNet. The pack includes a voucher allowing users to select six free educational packages or six leisure titles from a list of 17 choices. Free home installation and a one-year on-site warranty are included.

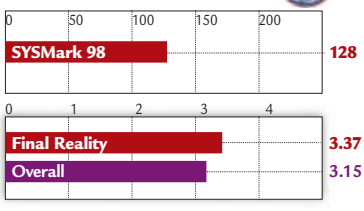
NIK RAWLINSON

PCW DETAILS

★★

Price *£899.99 (£765.95 ex VAT)*
Contact *Fujitsu 01344 475555*
www.fujitsu-computers.co.uk
Good Points *Easy to buy. Free home installation.*
Bad Points *Monitor. Case design.*
Conclusion *We had high hopes but were sadly disappointed.*

PERFORMANCE RESULTS



BAPCo SYSMark Windows 98 test scores

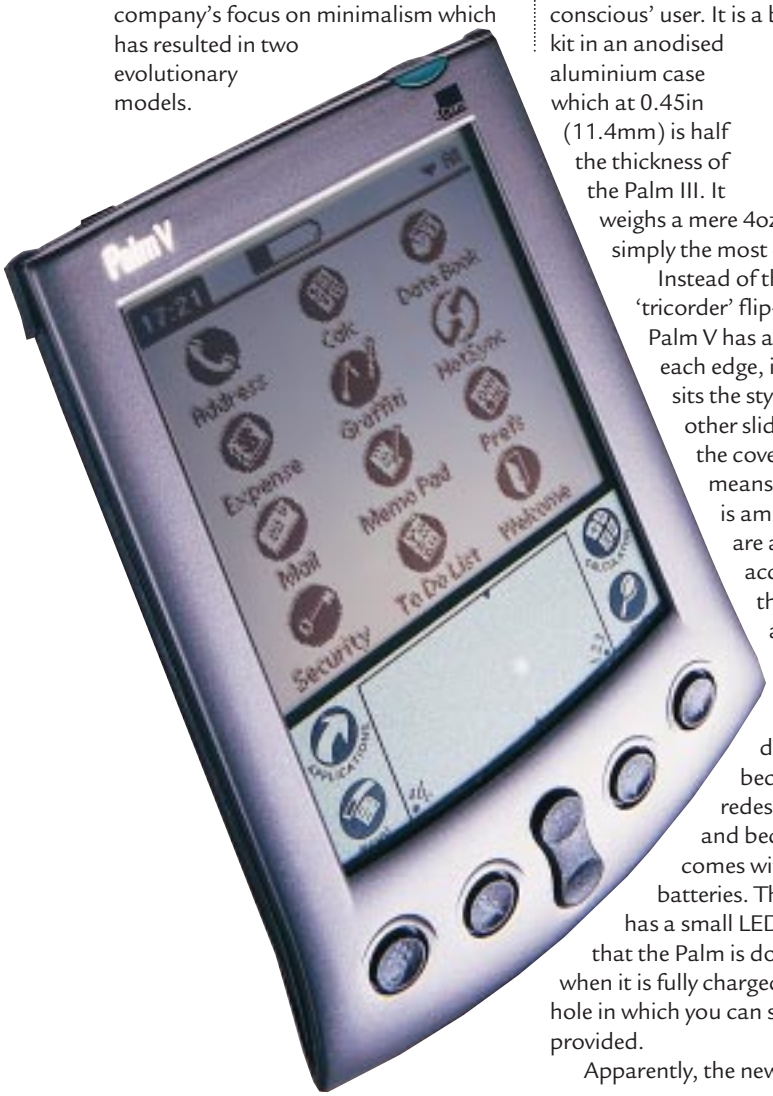
3Com Palm IIIx & Palm V

Two new versions of this great PDA will have you spoilt for choice.

3Com has launched two new versions of its market-leading palmtop PDA. Both are designed to appeal to different users. As revealed in last month's *PCW News*, the devices are called the Palm IIIx and the Palm V.

Both new models represent minor functional advances on existing ones, which will continue to sell alongside the two new Palms, but the Palm V in particular is a significant leap forward in design. Those expecting something along the lines of the US-only Palm VII with its built-in wireless capability will have to wait a bit longer.

When it shipped three years ago, the Pilot as it was then known was an instant success and 3Com now claims over 70 percent of the world market for PDAs. The secret of this success is the company's focus on minimalism which has resulted in two evolutionary models.



The Palm IIIx in particular is similar to the existing Palm III device. It has twice the memory (4Mb) of the III, a sharper display and a slightly more rugged casing. Internally, the OS ROM and the memory blocks have been taken off the removable board and placed on the main board, making future upgrades potentially cheaper.

3Com is aiming the Palm IIIx at the corporate user primarily on the basis of its extra memory. However, most Palm users will know that it's fairly easy to fill up the 2Mb in the normal course of events and that companies such as TRG already provide excellent upgrade boards for the Palm III — up to 8Mb, which really *is* plenty.

The Palm V is aimed at the 'style-conscious' user. It is a beautiful piece of kit in an anodised aluminium case which at 0.45in (11.4mm) is half the thickness of the Palm III. It weighs a mere 4oz (113g) and is simply the most elegant PDA, ever.

The Palm V is a significant leap forward in design

Instead of the flimsy 'tricorder' flip-up cover, the Palm V has a groove down each edge, in one of which sits the stylus while into the other slides the binding for the cover. What this means is that the Palm V is ambidextrous. There are a number of accessories around that will also take advantage of these slots.

The Palm V comes with a new docking station because it has a redesigned connector and because it now comes with rechargeable batteries. This docking station has a small LED which shows you that the Palm is docked, but not when it is fully charged. It also has a hole in which you can sit the spare stylus provided.

Apparently, the new batteries last for up to a month although a daily sync should be enough to keep them topped up. Unfortunately, our test unit turned itself on overnight and drained nearly all the power. What power remained was sucked away by the Palm turning itself on at regular intervals thereafter to say that its batteries were getting low. Thank you… very much…

Trapped on a mountain top without the cradle, I discovered that the batteries were not replaceable: if you don't have the power supply, the Palm will eventually drain and you're stuck.

Again, the OS is essentially the same as before. I had hoped that a solution to the awkward need to switch between the serial and IR ports (some seven keystrokes each time) would have been resolved but it hasn't. The new connector also means that upgraders will have to buy new accessories because the old Palm modem will no longer fit. And, worst of all, the Palm V has a bare 2Mb of memory with no possibility of upgrading. Yet the Palm V remains the most glorious of the palmtops. It may not be upgradeable, it may not be colour, it may not be a Microsoft product but it is the still finest palmtop, nay, PDA, in the land.

PAUL SMITH

PCW DETAILS

★★★★

Palm IIIx
Price *£279.99 (£238.29 ex VAT)*
Contact *3Com 0118 927 8200*
www.3com.co.uk
Good Points *A great PDA just got a little bit better…*
Bad Points *…but only a little bit.*
Conclusion *A solid choice from the Palm range.*

★★★★

Palm V
Price *£349.99 (£297.86 ex VAT)*
Contact *3Com 0118 927 8200*
www.3com.co.uk
Good Points *Simply the sexiest PDA ever.*
Bad Points *Not upgradeable. Not a great functional leap forward.*
Conclusion *Gorgeous but expensive.*

Armari NBX-500 SK

A big, beefy Pentium III workstation with a monitor that's a joy to view.

Armari is one of the few PC vendors around that has built its reputation more on high-end PCs than super value budget systems. And, given the kind of system you can buy for £1,000 these days, the NBX-500 at twice that price certainly represents the upper third of the market, but it's not silly money.

The heart of the NBX-500 is, as the name suggests, a 500MHz Pentium III processor. At the time of writing, there's no tangible benefit from the new instruction support with which this processor is blessed since Intel has once again fluffed its co-ordinated rollout arrangements with software vendors. It's an identical situation to that of the MMX Pentium's release in 1997 but the hike in clock speed and slight architectural tweaks lead to a small but significant performance increase and make it worth getting one now, and KNI (Katmai New Instructions) support will certainly be appearing before long.

Aside from the Pentium III, the rest of the NBX-500 is well specified. There's 128Mb of SDRAM in a single DIMM, leaving two free sockets on the SuperMicro P6SBA motherboard. Avoiding the expense of SCSI, mass storage takes the form of a 7,200rpm IBM DeskStar 14GXP. This is an UltraATA/33 drive and gives you 14.4Gb with which to play. Armari has configured the drive as two 7Gb partitions.

The final core component in the machine we were sent was an ATI Xpert 128 with the brand new Rage 128 chipset. The Xpert 128 has 16Mb of video RAM but the final unit will ship with the Rage Fury 128, which sports 32Mb. The core chipset is the same, however, and it's exceedingly impressive, trouncing the former 2D/3D king, nVidia's Riva TNT.

The Armari's price represents reasonable value for money

A Panasonic DVD-103S DVD-ROM drive occupies one of the front panel expansion bays. This will read DVDs at six-speed and CD-ROMs at 32-speed. It lacks a CD tray, sucking discs inwards in the manner of a car CD player, but we can't really see the point.

The system's supporting peripherals take the form of a Diamond Monster Sound MX300, which is Diamond's answer to Creative's SoundBlaster Live, coupled with the increasingly familiar Cambridge SoundWorks FourPoint surround speakers. The combination provides excellent sound. Diamond also supplies the 56K SupraExpress Pro internal V.90 modem.

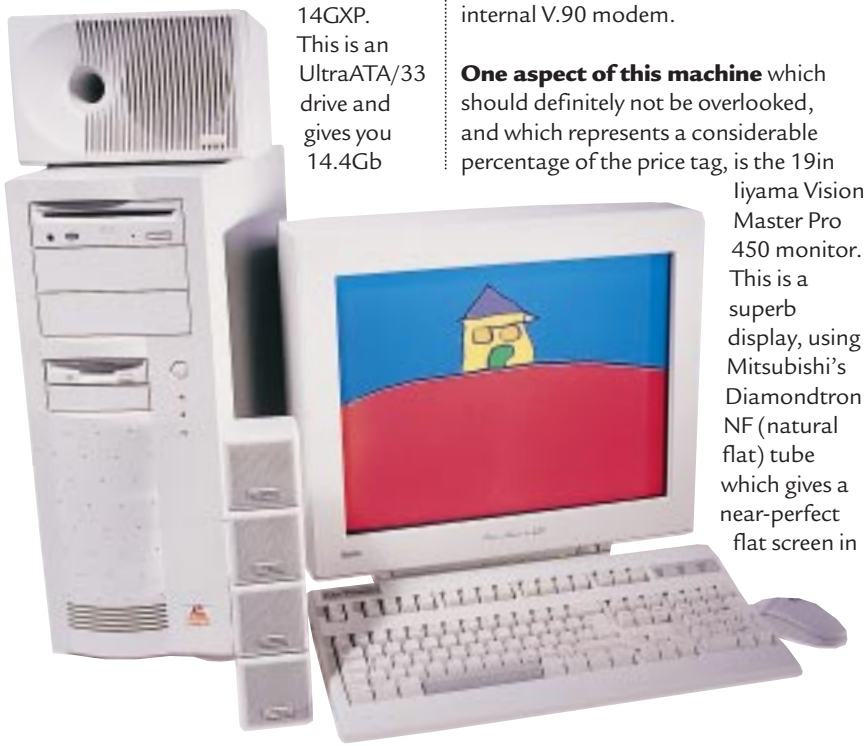
One aspect of this machine which should definitely not be overlooked, and which represents a considerable percentage of the price tag, is the 19in Iiyama Vision Master Pro 450 monitor. This is a superb display, using Mitsubishi's Diamondtron NF (natural flat) tube which gives a near-perfect flat screen in vertical and horizontal directions. Coupled with the Xpert 128 card, the unit defaults to a 100Hz refresh rate at 1,280 x 1,024 resolution in 32-bit colour. Impressive though this is, there's not much point to it and reducing the vertical refresh to 75Hz affords noticeably better image quality since the frequency of the video signal is reduced, giving the display circuitry more headroom.

A good-quality Key Tronic keyboard and similarly high quality three-button Logitech mouse handle user input. We would have liked to have seen a mouse with a middle wheel, though, on a system costing this much.

Inside the tower case the system is tidily built. We were disappointed to note that the hard drive had been mounted in the only expansion bay with an accompanying free 3.5in front panel cut-out despite the fact that two internal 3.5in bays were free.

Aside from Windows 98, the system was not supplied with software. But even so, the Armari's price represents reasonable value for money when taking into account the hardware specification.

David Fearon

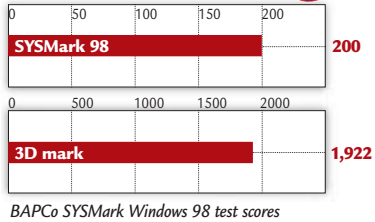


PCW DETAILS

★★★★

Price *£2,349 (£1,999 ex VAT)*
Contact *Armari 0181 810 7441*
www.armari.com
Good Points *Pentium III. Excellent graphics card. Superb monitor.*
Bad Points *A high-end user might prefer SCSI. The hard drive blocks a 3.5in front panel bay.*
Conclusion *If you're looking for something more than the usual £1,000 system, the NBX-500 represents a good step up.*

Performance results



BAPCo SYSMark Windows 98 test scores

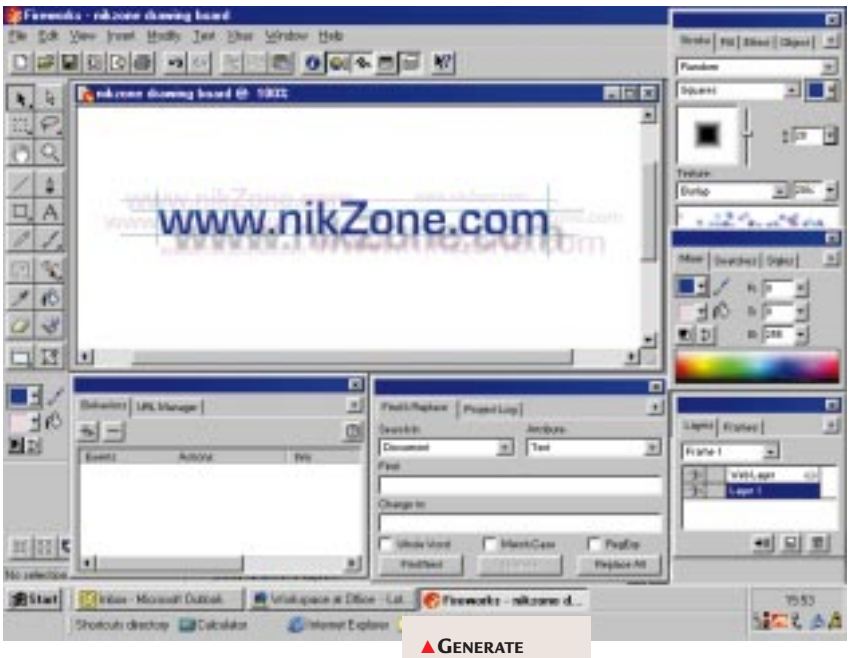
EXCLUSIVE

Macromedia Fireworks 2 BETA

This will add extra sparkle to professional web pages.

Fireworks 2 and Dreamweaver 2 (see *PCW*, April) share a common interface so users of either package will have no problems switching between the two. Indeed, they are so well integrated that an option to 'Optimise Image in Fireworks' will be added to your Dreamweaver Commands menu.

This product is aimed primarily at the professional web designer although the price should leave it well within the reach of the serious home user. New additions are here in abundance. The export dialogue box now allows users to view four versions of their image on screen at once. Differing compression ratios can be applied to each on an individual basis and it is easy for the user to select the best output. Also new is the ability to compress files to size. Give Fireworks an upper file size limit and it will tailor your image to fit.



▲ GENERATE SPECTACULAR EFFECTS IN SECONDS, EVEN AS A BEGINNER

Restricting your image to a web-safe palette when saving will ensure that it can be displayed without problem in common browsers. It may mess with specific tones, though, such as those required for corporate logos. Fireworks overcomes this by allowing users to lock non-web-safe colours before switching to the safe palette. These locked colours will then be appended to the palette so that while the majority of the image is web safe, the important sections retain their original shading. This same area of the package can be used to specify the colours to be discarded in generating a transparent GIF.

It has the ability to apply multiple effects to a single object

Hotspots can be drawn in the conventional way but Fireworks can also identify the boundaries of image objects and use these to generate irregular polygon hotspots, exactly tracing the object boundary and making it easy for the user to create incredibly intricate hotspots which might previously have taken hours to map.

Fireworks employs a number of time saving options for saving your settings. For example, save your compression ratios from the Export dialogue to use on future files without having to create them from scratch. Save the effects you have applied to an image object to ensure that they can be applied exactly to other objects for a uniform look and feel. It even lets you save batch processes.

Batch processing is a way of instructing the package to execute the same command across a number of image files. This could be replacing certain words, globally swapping one particular colour for another, or altering multiple references to a URL that may have been relocated. It can be set to process all your open files or, to save the time of having to open the files manually in advance, you could point it in the direction of a number of files even if these span disks or servers on a network. Each will be processed without further user intervention.

The most important innovation in this new Fireworks is, perhaps, the ability to apply multiple effects to a single object. In the original release it was possible to apply only a single effect. Each effect can be further customised to generate an almost infinite range of styles which once set can be saved as a custom style to be applied to further objects, saving time and ensuring a consistent look to all graphics on a site. Images can be sliced so that different compression ratios can be applied to individual sections and the various parts can even be saved as different file formats. The HTML code needed to stitch them back together in a browser can be saved alongside and tailored to match the way you work, so that it can be seamlessly integrated into your pages.

Users of the original Fireworks may wonder why an upgrade for this already extensive package is necessary, but after a few hours playing with the extended features of release 2, all will become clear. A worthy purchase both for first timers and those upgrading.

NIK RAWLINSON

PCW DETAILS BETA

★★★★★

Price *£139 (£118.29 ex VAT)*
Contact *Computers Unlimited 0181 358 5857, www.macromedia.com*
Good Points *Plenty of new features. Still as easy to use as ever.*
Bad Points *Although effects can be tailored it would be nice to have more than five basic effects starting points.*
Conclusion *Enough to justify a purchase or an upgrade.*

Dan Dantum 500/D

This superfast PIII machine has a hard drive the size of Desperate Dan.

The major vendors have been quick off the mark getting us systems based around the Pentium III, and Dan is no exception. One of the most noteworthy features of the Dantum from a performance point of view, aside from the 500MHz Pentium III, is the inclusion of a Western Digital (WD) hard drive.

Although WD has always had a reputation for reliability, the performance of its drives has slipped behind the competition during the past year or two. But with the new models it looks as if this trend may be reversing: the AC418000 drive included with the Dantum not only spins at 7,200rpm, but also supports Ultra ATA/66 allowing maximum burst transfer rates of 66Mb/sec, rivalling the fastest SCSI standards. Frustratingly, the system's SuperMicro P6SBA motherboard doesn't support the feature, but you're at least safe in the knowledge that future upgrades will allow the drive to reach its full potential.

Not only does the drive support the latest technology, it's also huge at 18Gb which is easily enough space to enable realistic levels of video editing, or to have a dual-boot system consisting of Windows 98 and NT, with as many applications as you like installed on both operating systems.

Like Armari's PIII machine *(reviewed on p97)*, the Dan sports a graphics card based around ATI's new, impressive Rage 128 chipset. But fitted to the Dantum is a Rage Magnum rather than a Rage Fury. Like the Fury, it's fitted with 32Mb of video memory. Dan has built in a 5X Creative DVD-ROM drive and the full Creative Encore Dxr2 DVD package which includes a separate MPEG2 hardware decoder board with TV output as well as the drive itself.

Even better for the PC-based DVD movie enthusiast is the TEAC PowerMax 1000 speaker setup. This consists of five satellite speakers and a subwoofer.

Future upgrades will allow the drive to reach its full potential

There's even a remote control for correct setup of sound levels from the listening position. The system will decode signals from a Dolby Pro-Logic soundtrack, but unfortunately cannot take advantage of the Dxr2 card's digital S/PDIF output for Dolby Digital AC3 films. The system's second source of audio is Creative's SoundBlaster Live Value PCI soundcard. A generic 56K internal ISA modem completes the peripheral picture.

The system includes 128Mb RAM on a single DIMM module, leaving two sockets free for future upgrades. Sharing the front panel bay with the DVD-ROM drive is an LS120 SuperDisk drive which accepts 120Mb disks as well as standard 1.44Mb floppies. The internals of the machine are laid out neatly enough, and the EIDE and drive power cable are neatly routed around the casing to keep them out of the way.

The monitor is the most important part of any PC and the 19in CTX unit shows impressive focus and resolution, making it feasible to run your Windows desktop at a resolution of 1280 x 1024 without giving yourself a headache. The only problem was some streaking effects at the edges of high contrast areas.

There is a reasonable set of software, primarily Microsoft's Works Suite 99. As well as the Works 4.5 package, which includes a capable spreadsheet and word processor, Works Suite has Word 97 and Money 99, too.

There's a good games bundle, too, including G-Police, Jazz JackRabbit 2 and Red Line Racer, which will keep the casual gamer occupied for a fair while.

Although it doesn't have the superb Iiyama monitor of the Armari system, those DVD extras, the larger hard drive, software bundle and slightly lower price certainly make it one to consider, particularly for the first-time user with a reasonable budget.

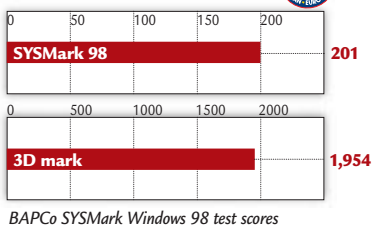
DAVID FEARON

PCW DETAILS

★★★★

Price *£2,143 (£1,824 ex VAT)*
Contact *Dan Technology 0181 830 1100*
www.dan.co.uk
Good Points *Great setup for DVD movie fans. Superfast processor and graphics card. Huge hard drive.*
Bad Points *Hard drive's abilities hindered by the motherboard.*
Conclusion *It's not exactly cheap, but if you're a new user blessed with deep pockets, the Dantum fits the bill nicely.*

PERFORMANCE RESULTS



BAPCo SYSMark Windows 98 test scores

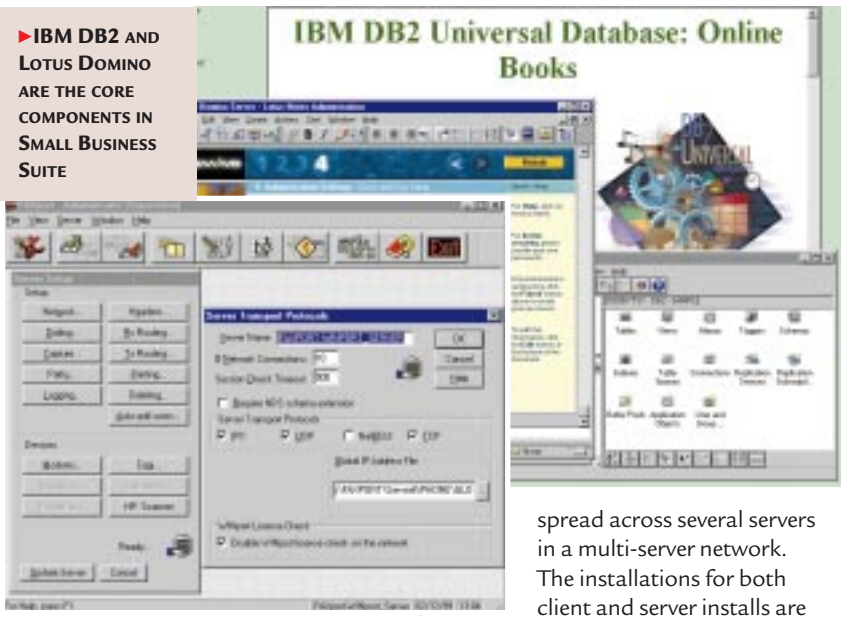
IBM Small Business Suite for Windows NT 1.0

A solid, flexible network solution forming a good base for future expansion.

IBM Small Business Suite for Windows NT is now shipping. It is very like the small business server products from Microsoft and Novell, but without the server. Although you have to buy Windows NT Server 4.0 separately, the IBM version is good value for money considering the quality of the products in the package. Small Business Suite has all the functionality of its competitors, with email, groupware, database, fax and modem communications services all integrated into a package that is easy to install and use.

The core components in Small Business Suite are Lotus Domino Release 4.6.2 and IBM DB2 Universal Database 5.2. The fax- and modem-sharing software comes courtesy of LANSource Winport and LANSource FAXport servers. The Netscape Navigator 4.05 web browser is included. Lotus SmartSuite Millennium Edition is provided as an optional extra in case an office application suite is required. IBM adds a set of five application templates, too, which can be put to use as is, or with minimal customisation. The templates are Domino applications which integrate Domino and DB2 to provide a discussion database, a document library and customer contact tracking. Software licences for up to 100 concurrent users are included.

The main difference between the Microsoft/Novell small business server approach and IBM Small Business Suite is not so much the absence of a server operating system in the package, as the target audience. While a small business can easily install Small Business Suite and be up and running with an office network solution, it is more obviously targeted at resellers, consultants, and systems integrators. The idea is to give them the basic set of applications and services which they can install quickly, while allowing for customisation and special applications. To this end the suite comes with a tool called the Integrated Installation Pack with which standard and customised installation packages



▶IBM DB2 and Lotus Domino are the core components in Small Business Suite

can be built. A customised installation package would comprise a subset of the Suite components, either by itself or with added third-party applications. When you use IIP to create a package, it runs through a sequence requiring you to identify the target systems, the package contents, whether additional applications will be included and whether the install will be attended or not.

The standard install of Small Business Suite is an IIP package which initiates the installation process with a minimum of questions and then runs through the five distribution CDs, installing the complete set or the subset you requested. A complete install requires about 600Mb of disk space. This works very well and takes under an hour to complete if you fed in the CDs by hand, as I did. You can also copy them to a file server and install from there. The whole server, including communications, was virtually completely set up and ready to go, so much so that it took me a while to realise that the FAX server was answering my incoming calls!

To use IIP you need 2Gb disk space where IIP can create installation images. These are installed over the network to clients or other servers. When the server components of Small Business Suite for NT are being installed, they can be spread across several servers in a multi-server network. The installations for both client and server installs are triggered with an installation diskette which IIP creates as part of the process of building an installation image.

Small Business Suite is the junior partner to the IBM Suite for Windows NT and the Enterprise Suite for Windows NT. This combination of IBM and NT is not as strange as it might seem to those who remember the war between OS/2 and NT. IBM is one of the few Microsoft associates authorised to self-certify the integration of NT products.

TERENCE GREEN

PCW DETAILS

★★★★

Price *Server licence £371.30 (£316.00 ex VAT), Client licence £74.00 (£63.00 ex VAT)*

Contact *IBM 01329 242728*
www.software.ibm.com/is/mp/nt/suites.html

System Specification *Pentium-class CPU (200MHz recommended), NT 4.0 Service Pack 3 or later, 64Mb RAM (128Mb recommended), CD-ROM drive or LAN connection for installation.*

Good Points *Good solid applications; a sound base for expansion.*

Bad Points *Aimed at a more technical user than Microsoft Small Business Server.*

Conclusion *The suite makes a lot of sense for resellers and consultants looking for a solid applications platform. Technically savvy end-users will also appreciate it.*

NetObjects Fusion 4
Web authoring

Great for e-commerce entrepreneurs to make a web presence.

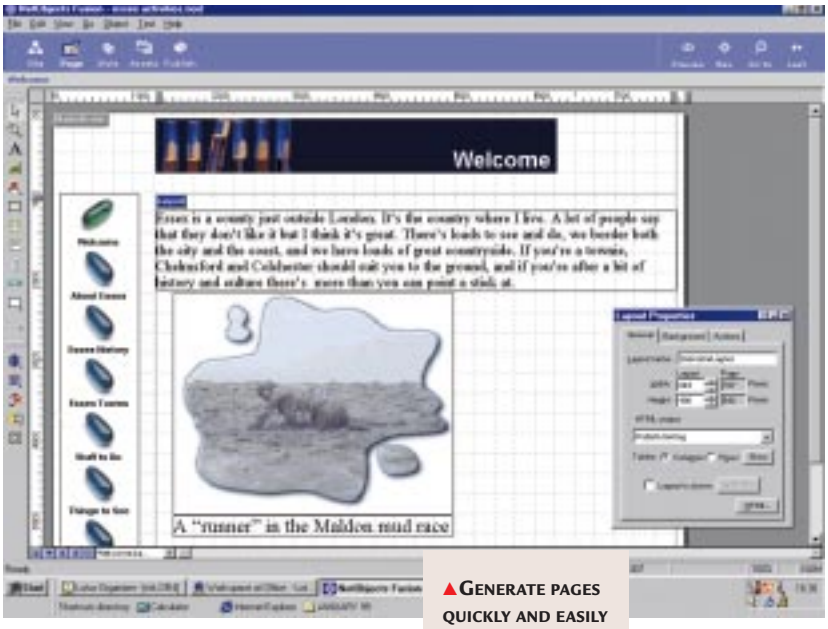
If you're looking for a single reason to buy this product, then it should perhaps be its handling of e-commerce sites: components can be dragged and dropped onto your pages from a dedicated toolbar. NetObjects has worked hard to ensure that users wanting to set up their own online shops in this way can easily incorporate the services of iCat, based in Seattle, USA, that will handle the necessary credit card transactions, passing the proceeds on to the site owner's card.

If this sounds a little expensive, don't worry: smaller sites with ten or fewer items for sale will not be charged a setup fee, and will be hosted free. It also allows users to incorporate IBM HotMedia components to make the site more interactive, with zoomable images and 3D objects. All add-on components can be installed as needed, to save cluttering the PC with unused objects during the first install.

Site styles have always been one of Fusion's strengths, and in this latest version the range has been expanded to include many new, more businesslike examples. Most are very suitable, although when using stock elements like this, there's always the risk that your site will look exactly like several others elsewhere on the net.

Each style can be customised and individual elements can be swapped for alternative graphics. As ever, Fusion tailors these on-the-fly to incorporate headings and graphical links to meet the specific requirements of your own site in a matter of seconds. For example, add a new page to your site, and all pages will have a graphical link added to point back to the new page. Many of the unmodified styles include rollover buttons, giving any site a professional look without the hassle of JavaScript programming.

Fusion 4, like its predecessor, works on a 'whole site' basis. Instead of constructing individual, standalone pages, each new page is immediately considered a part of the site. In this way, users can navigate their partially finished site to check the overall look and feel. Sites are saved in their entirety to ensure a logical structure and save users from losing individual parts.



▲ GENERATE PAGES QUICKLY AND EASILY USING FUSION'S STYLISH STYLES

Users of Fusion 3 will find the version 4 interface familiar and easy to use, as it employs the same toolbars and layout properties dialogue box. Similarly, it makes use of the same easy-to-understand methods for generating imagemaps. Once an area has been defined, a list of all pages belonging to the site will appear, from which the user may select the relevant destination or enter the location of an off-site address.

Version 4 retains Fusion 3's image handling conventions. The usual option of stretching or contracting an image when manipulating the picture borders is supplemented by a 'crop' feature which will slice the picture to fit within a defined frame, discarding anything falling outside of that area.

A range of predefined sites allows users to load a template site to suit a particular need, such as a corporate presence. All commonly needed pages will be generated and linked. The user then need do nothing more than replace the sample text and images with their own content.

Tables are handled well. Cells can easily be resized, just as if you were resizing a table in Word. Merging and splitting cells is similarly easy. Once a number of adjacent cells have been selected, the user need only right-click within them for the manipulation menu.

We were impressed with Fusion 4. It's a valuable addition to the range of web authoring packages on the market today. We were unconvinced that users of Fusion 3 should be rushing out to upgrade, though, unless dedicated to generating online e-commerce solutions.

NIK RAWLINSON

PCW DETAILS

★★★★

Price *£233.83 (£199 ex VAT); upgrade £81.08 (£69 ex VAT)*
Contact *NetObjects 01189 823822*
www.netobjects.com
Good Points *E-commerce integration. Businesslike styles.*
Bad Points *None to speak of.*
Conclusion *Great for the business user, but home users may be happier with competitors' products.*

Canon BJC-2000

This little Canon's a real cracker.

This printer is tiny and should find a home on any desk, and the quality of its output will ensure that home is well deserved. Considering the price, we were very impressed. On photocopy paper, standard quality text was excellent with clean, crisp edges and smooth curves on larger characters. Text as small as 4pt size was legible. Five pages at this quality setting arrived after just 1min 52sec. Upping the quality to the best possible increased the time to 7min 43sec, although it made very little difference to the standard of the output. We would be more than happy to stick with the standard setting.

Photo reproduction was handled well. Using the bundled colour cartridge rather than the optional extra photo cartridge, super quality on glossy photo paper produced the sort of results normally achieved by far more expensive printers. Skin tones were realistic and colours were vivid, with smooth transitions between light and dark areas. There was no discernible evidence of bleeding where darker and lighter colours shared a common border. Neither was there evidence of visible banding. Surprisingly, at 10min 1sec, this SuperPhoto quality image arrived 24 seconds faster than the lower quality Photo image.

The printer is bundled with a 50-sheet page feeder and a holder for spare cartridges. It holds two ink-wells (CMY and black) simultaneously in a single head which can be swapped for an optional scanning module capable of scanning at a maximum optical resolution of 360dpi. In all, a very impressive piece of kit.

NIK RAWLINSON

PCW DETAILS

★★★★★

Price *£139.83 (£119 ex VAT)*
Contact *Canon 0121 666 6262*
www.canon.co.uk
Good Points *Small. Cheap. Great quality.*
Bad Points *None.*
Conclusion *We loved it.*

HP Capshare 910

This hand scanner's a bit quirky but it's very easy to use.

Hewlett-Packard (HP) describes its CapShare 910 as an 'Information Appliance' — a horrendous phrase. It's a rather clever device though, so we'll forgive the marketing team.

The 910 is a cordless and significantly more cunning version of the long-retired hand scanner, a device which overcame its narrow capture window by stitching together strips of a bigger image. Sadly, the stitching software was often far from foolproof and the concentration needed to drag the unit in parallel strips was comparable to that of a world chess final.

The 910's 5in scanning window may still be narrow, but two optoelectric sensors monitor the 910's every move and allow the user to capture entire A4 documents in a single U-shaped swoop — the device is remarkably tolerant of casual changes in speed and direction during scanning. Six seconds later, the built-in software has seamlessly rebuilt the page, compressed it and stored it at a sufficient resolution to read, print or OCR. Up to 50 pages can be stored in the 4Mb memory, examined closely on the 45 x 45mm display and rotated or deleted as desired.

Now you've captured, you'll want to share. The IrDA compliant infra-red port can beam documents straight to infra-red printers or notebook computers. A serial cable is provided for blind PCs. The supplied PC software won't perform OCR but it does store the received mono bitmapped pages in Adobe Acrobat format.

It may eat its rechargeable AA batteries at a rate of knots, cost £500 and capture in mono only, but the 910 is dead easy to use and a unique product that will be welcome in the briefcases of mobile professionals.

GORDON LAING

PCW DETAILS

★★★★

Price *£499 (£424.68 ex VAT)*
Contact *HP 0990 474747*
www.capshare.hp.com
Good Points *Remarkably tolerant when scanning.*
Bad Points *Battery hungry. Mono. No OCR software.*
Conclusion *Unique product for mobile professionals.*

Kai's Photo Soap 2
Image manipulation

The simple way to slip into photo editing and picture file management.

Images can be loaded into Soap from disc or any TWAIN-compliant device, but the Input menu also contains a direct link to the PhotoDisc web site. A great feature is its ability to open a whole folder rather than an individual file. This imports every image in the folder onto the Soap desktop ready for editing. Here, thumbnail images can be organised into piles, moved around the screen and resized to make managing your work easy. The useful transport area at the foot of the screen is used to store images while they are moved from one area of the program to another.

Adjusting images is simply a matter of dragging them from the transport area into the 'Clean' room. Here, a wide range of tools can be implemented simply by clicking an icon. The more you click, the more the icon changes the relevant attribute — hue, saturation, sharpness etc. To change just part of the image rather than the whole thing, the bucket tool can be used to select an area. This is similar to the eyedropper in other graphics packages but has a variable tolerance based on colour and contrast, allowing users to select more or less of the image using a slider, without having to click on multiple areas.

...quick access to users' most commonly used files

All alterations are made on a separate layer so they can be removed quickly and easily. Photos can be laid out in an album just like their paper-based equivalents. A range of 24 standard albums can be customised with captions for each photo and, once complete, can be printed or output for use on the net. Likewise, the photo desktop, the area into which images are initially imported, can also be exported in its entirety. This is saved as a neat JavaScript application which, when run in a compliant browser, allows users to interact as though they themselves were using Soap. Although they cannot alter your images, they can select them, move them around the desktop and open them for closer inspection. Net-based users of exported albums are able to turn pages as though using the Soap-based equivalent.

▲ THE UNUSUAL KAI INTERFACE GIVES THIS PACKAGE A FRESH, UNCLUTTERED FEEL

When exported for use on the net, images are optimised according to user specifications, the desktop can be fixed at preset screen sizes, and attributes such as email addresses, links and page titles can be set for display within the page. The JavaScript it creates is clearly laid out, well implemented and works well with up-to-date browsers.

Photo Soap 2 can act as host to all Kai's Power Tools plug-ins up to and including the most recent version 5. It can also utilise all Adobe PhotoShop compliant plug-ins, such as those from Alien Skin, making this a cheaper, although less versatile, alternative to the Adobe option. Printing capabilities have been improved, too. Users can now print from any part of the package and output to a far wider variety of paper sizes than was previously possible.

Image information can be appended to all files and used to sort pictures into logical order. Users may also add a 'beauty scale' rating, ranging from zero to ten so that favourite pictures can be set to appear before less popular examples, giving users quick access to their most commonly used files.

The Soap Talk feature connects users around the world so they can discuss the package and solve each others' problems, although MetaCreations insists that it will maintain its levels of conventional technical support. Help files are well presented and easy to follow, although the package is so intuitive that many users will never need to refer to them.

NIK RAWLINSON

PCW DETAILS

★★★★★

Price *£39.99 (£34.03 ex VAT)*
Contact *Computers Unlimited 0181 358 5857 www.metacreations.com*
System Specification *Pentium processor, Windows 95/98/NT4 (SP 3+), 32Mb RAM (64Mb for NT), 100Mb hard-disk space, 16-bit colour display, 800 x 600 resolution, CD-ROM drive.*
Good Points *Easy to use. Support for PhotoShop plug-ins. Inexpensive.*
Bad Points *None to speak of.*
Conclusion *Looks great, works well. Ideal for the home digital photographer.*

MAG LT 541F

More picture on the panel — just spin it the other way.

A TFT display with a 15in viewable area, the LT1541F has a 0.297mm dot pitch. Its optimal resolution is 1024 x 768 at a colour depth of 16 bits. The panel has a distortion-free viewing angle of 40°.

Moreover, the display can be rotated a full 90°, which means you can view the screen in landscape or portrait format. In portrait mode, this 15in panel is capable of displaying an entire letter-sized page while still being barely taller than a standard 21in monitor. Conventional 15in monitors are able to display only around 60 percent of a page that size.

Setting up the Mag TFT panel is an easy process. It comes with a DC adaptor and two floppies hosting a display auto alignment utility. Although this software is not absolutely necessary, using it will produce an appreciable difference. There is also a copy of Mag Portrait software in the box.

The pushbutton controls located at the top of the screen are easy to operate in conjunction with the clear on-screen display. All the basic settings such as brightness, contrast and clock frequency can be easily adjusted. Moreover, the three basic colours (RGB) can be manipulated individually.

The overall quality of the Mag flat panel is excellent. In our tests, the image remained sharp throughout the whole length of the screen. The display handled graduated tones of colour equally well.

With these qualities in mind, if you are in the market for a decent flat panel display, the Mag LT541F is well worth consideration.

AJITH RAM

PCW DETAILS

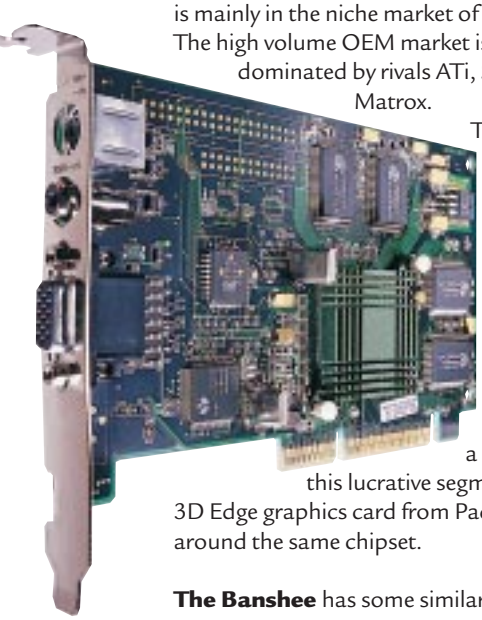
★★★★

Price *£820.15 (£698 ex VAT)*
Contact *Mag InnoVision UK 0118 9752445 www.magin.co.uk*
Good Points *Excellent quality. USB connector. Wide viewing angle.*
Bad Points *None to speak of.*
Conclusion *A 15in flat panel that could easily be the best in its class.*

Pace 3D Edge

For PC life on the edge, this graphics card may not look sharp enough.

Perhaps one of the best-known brands in the graphics-card market is 3Dfx, but its reputation is mainly in the niche market of gaming. The high volume OEM market is dominated by rivals ATi, S3 and Matrox.



The Banshee chipset from 3Dfx is the com pany's first attempt to carve a slice of this lucrative segment. The 3D Edge graphics card from Pace is built around the same chipset.

The Banshee has some similarities to the more famous 3D-only Voodoo2 card from 3Dfx. It has essentially the same rendering engine as the Voodoo2 but one of the two texturing engines is absent. This means that the Banshee cannot handle single-pass multitexturing. So, in games like Unreal and Quake 2 which use multitexturing, there will be a significant performance hit. Also, unlike the G200 from Matrox and the TNT from nVidia, the Banshee supports only AGP 1X.
It also lacks a full OpenGL ICD.
Despite these obvious limitations, this Pace card is worth a look due to some extra features. In addition to 16Mb of SGRAM, it has
a video-out port, which will be of interest to gamers. A copy of Wargasm is included.

The 3D Edge, despite its name, did not produce cutting edge performance. With a 3DMark99 benchmark test score of 1124, it's faster than the Matrox Millennium G200 but much slower than graphics cards based on the TNT chipset. And as the Banshee does not support 32-bit colour, picture quality is not quite top notch.

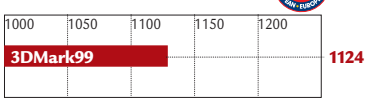
AJITH RAM

PCW DETAILS

★★★

Price *£99 (£84.26 ex VAT)*
Contact *Pace 0990 561001 www.pace.co.uk*
Good Points *Decent performance. TV-out.*
Bad Points *No OpenGL ICD. Lacks 32-bit rendering. Does not support AGP 2X.*
Conclusion *A graphics card that's let down by a chipset which lacks some crucial features.*

PERFORMANCE RESULTS



Wired up *or* wire-less? Mobile computing choice

If you travel out of the office a lot with a mobile computer, you probably spend too much time fiddling with cables and Windows setup issues. Back in the sixties we called this 'getting wired'. It meant that you were uptight, man.

The wired person is usually to be found with one end of a cable in hand casting around for a data port. It isn't cool, and it doesn't get any better when you find the right port and start plugging in all those network, modem and power cables. Suddenly your desk looks like the cable guy's workbench. It's about as hip today as an Afghan coat. The solution is to get *unwired* — to lose the cables and go wireless. Not only that. Lose the laptop, too. Replace it with a Windows CE Handheld computer hooked up to a Citrix MetaFrame server over a wireless network. We chose Proxim because it's fast, and the latest round of Windows CE Handheld Pro devices come with Proxim and Citrix support built in.

Suddenly, your desk looks like the cable guy's workbench

▼THE PROXIM ACCESS POINT WIRELESS NETWORK RECEIVER

On the face of it, a Windows CE box is never going to impress your average laptop power user, but there's very little that you can do with a laptop that you can't do with the aforementioned setup. You're still running the same applications but now you're running them on the server, so they only need to be installed once for everyone to access them. There's only one system, the MetaFrame server, to configure.

▲METAFRAME SUPPORTS LOW-BANDWIDTH CONNECTIONS DOWN TO 14.4KBPS

The Windows CE Handheld is instantly ready when you switch it on. There's no waiting for it to boot up or to come out of hibernation. And you get battery life that laptop owners can only dream about. There are some drawbacks, though: you might need to review your addiction to RealPlayer streaming audio and video clips of product announcements.

When you get right down to it, wireless networking is the only way to go with a handheld device. They're meant to be carried around, not just out of the office, but everywhere: into meetings, to the boss's office, out to the car park. Doing the laptop thing where you unpack a bag full of cables and wire it up like an intensive care patient just doesn't mesh with the handheld style.

When you add Citrix MetaFrame to this combination, you free the Windows CE device from its dependence on Pocket versions of real applications, and allow it to access and run real Windows applications: Microsoft Office, Lotus SmartSuite. The Citrix client enables you to connect to the MetaFrame server over virtually any network medium, from dial-up to wireless.

Since MetaFrame is designed to support low bandwidth connections down to 14.4Kbps, you can access the same applications with better than acceptable performance via modem when you're away from the office. OK, so your cellular data modem might be on the cusp of acceptability, but that still only leaves you with a single cable to tote. And let's face it, if a cable-heavy laptop on the desktop is a fashion disaster, it's even worse with one of those cute little handheld systems.

When you're in the office, the ideal wireless solution for Windows CE Handheld Pro devices is the one that's been integrated into almost all of the

Wired *vs* wireless working — the pros and cons

WIRED:

For
- ✓ Fully standardised.
- ✓ High bandwidth:10Mbps and upwards.
- ✓ Relatively easy to expand bandwidth.

Against
- ✗ Configuration includes laying wiring.
- ✗ Most homes and small businesses not easily wired.
- ✗ Fixed access points.

WIRELESS:

For
- ✓ Easy integration with wired Ethernet networks.
- ✓ Inherently supports roaming.
- ✓ Can be shipped preconfigured to work 'out of the box'.

Against
- ✗ Slower than wired: 1Mbps and 2Mbps at present.
- ✗ Growth in performance limited by radio spectrum.
- ✗ Possibility of signal degradation due to absorption, especially outdoors with rain, etc.

latest Windows CE Handheld Pro systems, Proxim RangeLAN2. It's a fast, low-power wireless medium designed for mobile users.

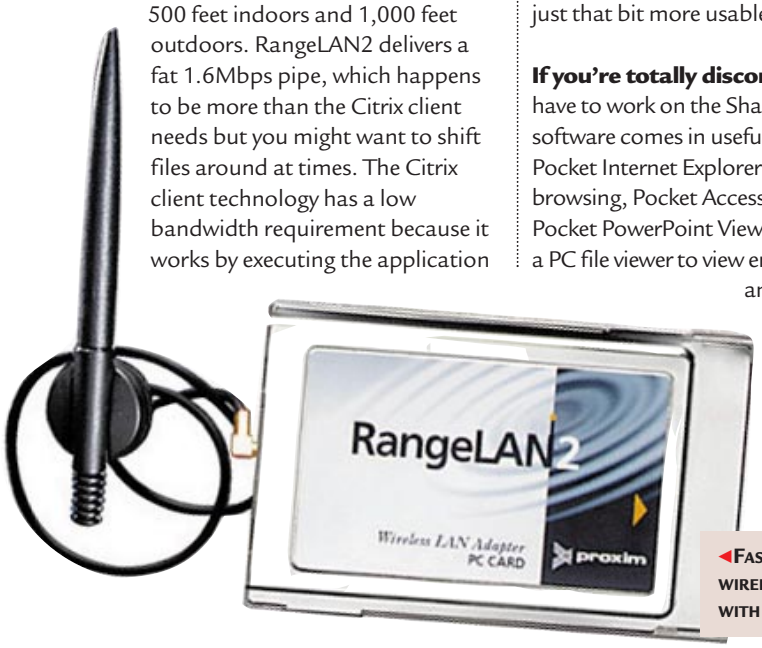
When I inserted the RangeLAN2 PC Card into the Sharp PV-5000 used for testing, it was automatically recognised and configured. As the Proxim Access Point was already connected to my Ethernet hub, the Sharp was on the LAN via a wireless link moments after I installed the RangeLAN2 card. Having installed the Citrix client provided by Sharp, I could log in to the MetaFrame server and run standard 32-bit Windows applications.

Proxim RangeLAN2 operates in the unlicensed 2.4GHz waveband allocated to wireless LANs of up to 100milliwatts worldwide. It has a maximum range of 500 feet indoors and 1,000 feet outdoors. RangeLAN2 delivers a fat 1.6Mbps pipe, which happens to be more than the Citrix client needs but you might want to shift files around at times. The Citrix client technology has a low bandwidth requirement because it works by executing the application on the server. Only the display interface is sent over the network to the Citrix client on the Sharp, and then only as a series of screen drawing commands rather than bitmaps.

Likewise, the only data flowing back to the server from the client are the keyboard and mouse inputs. Since the Sharp PV-5000 is a Handheld Pro system, it has a full 640 x 480 colour VGA screen, so you're not cramped for style. It's an 8.2in backlit LCD touch-screen, too; viewable without squinting. There are Citrix clients for the smaller half-screen handhelds, but it has to be said that if you're looking for a full-function replacement for a laptop, the keyboards on the larger Handheld Pro systems are just that bit more usable.

Wireless LANs have yet to become a volume market

If you're totally disconnected and have to work on the Sharp, the bundled software comes in useful. It had Microsoft Pocket Internet Explorer for web browsing, Pocket Access for data, and the Pocket PowerPoint Viewer. Sharp provides a PC file viewer to view email attachments, and an image editor with MPEG support. It also offers a Colour Digital Camera attachment as an optional extra.



FAST, LOW-POWER WIRELESS WORKING WITH RANGELAN2

At 1.22kg (2.7lbs) the Sharp PV-5000 I used is a lot easier to carry around than any laptop, even the new lightweight systems. In truth I'd prefer something lighter still, but that's going to have to wait for better battery technology or solar panels or something, because the bulkiest item must be the rechargeable Lithium-Ion battery which is good for a full day's work. The rest of the spec is fairly standard. Connectivity options are covered by a serial port, IrDA port and PC Card Type II slot. There's a choice of 16Mb or 32Mb RAM, but sadly no internal fax/modem in the model we had — that's limited to North America for now.

Although I liked the Sharp PV-5000 a lot, it's not an essential part of the mix. The Proxim wireless LAN software and Citrix MetaFrame certainly are. Without these two technologies, the handheld is a far less functional item. One important point to note: this is not yet a small business proposition. Cost is still an issue because wireless LANs have yet to become a volume market. As a result, the initial outlay means it will appeal mostly to companies with several mobile computer users. Although at first glance the initial outlay seems to suggest that it's an expensive alternative to regular laptops, when you do the sums and factor out the time you won't be spending maintaining Windows 98 laptops, it's a winner.

TERENCE GREEN

Wireless networking technology

Wireless LANs have been around for a long time but they've largely been consigned to niches: vertical applications such as stock-picking in warehouses, or in sites where wiring either isn't allowed (an historic building, say) or is uneconomic. Now everything is changing. Computing devices are becoming more varied and more consumer-orientated.

Mobile phones, handheld organisers, set-top boxes and digital cameras are only the first wave of application-specific devices with built-in computing and communications intelligence. Inevitably they will be followed by an increasing number of function-specific 'appliances' aimed at volume markets both in the home and in business. Wired connections just aren't going to cut it.

Most existing homes and small businesses cannot easily be wired for networking, but the more compelling reason for a wireless solution is that it's a better fit for the usage pattern of computing appliances. You want to be free to roam from room to room, from home to the office and back without the hassle of being tethered by cable to fixed access points.

Everything is changing ... computer devices are becoming more varied and more consumer orientated

As a niche product, wireless networking vendors got by without worrying too much about products from different vendors working together but that time passed a while back and there has been a flurry of activity over the past few years with much of it happening in 1998.

A representative selection of working groups and standards committees is shown below.

Proxim

Proxim appears on most of them. Its technology is the favoured solution of the Wireless LAN Interoperability Forum and the basis of HomeRF. Proxim's position becomes more understandable when you discover that Proxim is the world's leading wireless LAN vendor, according to International Data Corporation.

IEEE 802.11

This is the only IEEE-ratified wireless networking standard. Ratified in 1997, it covers diffuse infra-red and spread spectrum radio. Infra-red is limited in range, by fixed objects such as walls and by low data rates. Spread spectrum radio spreads the signal across a band of frequencies, making it difficult to intercept, jam, or decode.

There are two types of spread spectrum radio: direct sequence (DSSS) and frequency hopped (FHSS). Both operate in the unlicensed 2.4GHz industrial, scientific, and medical band which is available worldwide with some restrictions in France and Spain. Currently, the technology supports 1Mbps and 2Mbps data rates. Work is under way on higher speeds in the 2.4GHz and 5GHz bands.

The Wireless LAN Interoperability Forum

Although IEEE 802.11 is a ratified standard for multivendor wireless LAN interoperability, the standard lacks a precise definition of how roaming users move from one vendor's access point to another. The OpenAir standard is the work of the WLI Forum which was set up to address interoperability of FHSS radio products. OpenAir is based on Proxim's FHSS technology largely because Proxim is the single largest vendor of wireless LAN equipment to OEMS and end-users.

The HomeRF Working Group

The HomeRF Working Group spans the gamut of interests from the PC industry to consumer electronics and wireless communications. Companies include Compaq, HP, IBM, Intel, Microsoft, Ericsson, Motorola, Philips and Proxim. All are involved in defining the Shared Wireless Access Protocol (SWAP) which aims to provide seamless multivendor wireless networking for home users.

SWAP draws together both DECT (Digital Enhanced Cordless Telephones) and the IEEE 802.11 wireless standard in order to define a common wireless interface for voice and data networking. SWAP 1.0 was released last January and products are expected by the end of this year. SWAP uses frequency hopping spread spectrum radio in the 2.4GHz band, and promises rates of 1Mbps and 2Mbps.

Although the title of the working group says 'Home', it seems inevitable that the technology will spill over to small-office users, too. Home users and small offices share the aims of the HomeRF working group: to enable shared access to the internet from any capable device, to share files and peripherals, to control electrical systems such as security alarms, and to manage phones and faxes.

Bluetooth

Bluetooth is short range radio technology from Intel, IBM, Ericsson, Toshiba and Nokia. It has since been adopted by Psion. It is largely designed to replace cables between mobile phones, PCs, handheld devices and peripherals. Bluetooth uses FHSS radio with a combined rate of 1Mbps, either 0.7Mbps one way with a slow back channel or under 0.5Mbps duplex.

With a target range of 10cm to 10m, Bluetooth is aimed primarily at applications which link mobile phones and PCs or mobile computers — for example, remote networking via mobile phones. As with HomeRF, Bluetooth will bridge to existing networks and enable *ad hoc* private networks such as multiplayer games with Bluetooth games consoles.

Store plan

SYNCHRONISING YOUR CONTACT DATA MEANS THE RIGHT NUMBER WILL ALWAYS BE AT YOUR FINGERTIPS. TONY DENNIS EXPLAINS.

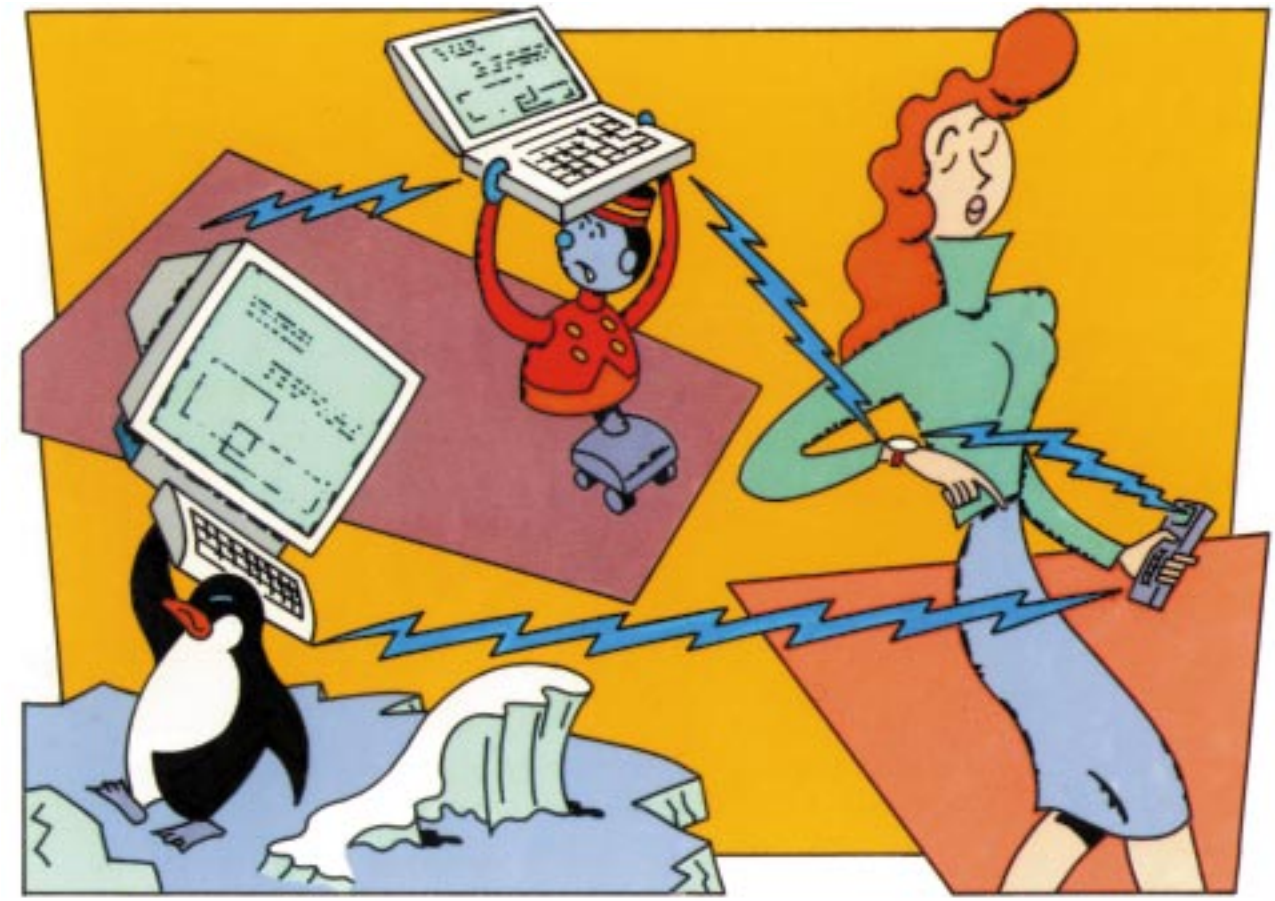


Illustration by Colin Mier

Have you ever searched desperately for that important telephone number but simply couldn't remember where you'd stored it? Was it on your desktop PC? In your PDA? In your mobile phone? Or in your wristwatch? Don't panic. With a little effort you can synchronise the data in all four devices so the right number is always at your fingertips.

What you really want is 'synchronicity', a facility which removes the problems associated with storing multiple versions of the same information in separate places. The trick is in not only possessing the right software tools, but also finding an easy way to link different devices together. Currently there is a movement towards creating a *de facto* industry standard format for holding information about personal contacts, plus a standard for swapping diary data. Other standards, such as Bluetooth which covers wireless data exchange, are seeking to establish a common means for establishing a data connection.

What is required is a central repository for all your name and address information which you carefully maintain so it only holds current data. The closest we've come to achieving this objective is vCard, a standard means of storing a business card in an electronic format [*p119*]. vCard is fine if all you want to do is zap your business card to somebody else, or attach your card to an email message so the recipient can easily import it into his/her addressbook. Unfortunately, you still need some means of 'managing' your addressbook and electronic diary.

Consequently you'll find yourself forced to standardise on one particular information manager (PIM), be that Symantec's ACT!, AVG's Goldmine, Lotus Organizer or Microsoft's Outlook. Why? Let's assume, for example, that you possess a 3Com PalmPilot as well as a desktop Windows 98 machine. They both hold email and telephone number address information. If your only software tool is a file conversion utility, then every week or so you need to laboriously convert one format into the other in order to synchronise the two machines.

By contrast, if you can, use a utility such as IntelliSync for Pilot from Puma Technologies to keep the two machines in sync. This kind of synchronisation software compares data held by the PDA with data held by the PC. It allows the user not only to link two similar applications together (email package with email package, for example) but also to decide which machine takes precedence. You might decide that records from the Pilot overwrite data held on your desktop.

The snag is, you still have to standardise on one particular application since packages like IntelliSync can only support a range of rival products such as Lotus Organizer, Starfish's Sidekick, and Now's Up-to-Date. Furthermore, Puma has some serious rivals. Smart Ideas Software has decided to specialise with its Data Anywhere offering, in providing synchronicity between Windows CE based machines and desktop database programs like dBase and Microsoft Access. Starfish offers TrueSync, a web-aware technology aimed at providing synchronicity between a host of different devices [*p120*]. Significantly, Motorola thought this technology was so good, it bought the company for an undisclosed sum in July 1998. Until now, the most visible application for TrueSync has been the Rex PC Companion from Franklin Electronic Publishers, akin to a PDA in PC Card format which can slip into a suitable PCMCIA slot. But the latest incarnation of this product is the Rex Pro, jointly developed by watchmaker Citizen and Motorola (but marketed by Franklin). With 512Kb of memory it can store 6,000 records compared to only 3,000 in the original.

Pictured, this page An alternative to the D127 modem is the SH888 Ericsson handset which has an infra-red port and modem built-in

How is synchronicity achieved? In the case of GSM phones, the data is stored on a smart card known as a SIM (Subscriber Identity Module). Most leading handset manufacturers can supply a small utility to edit the numbers held by the SIM, but there's no interchange with leading PIMs. Enter Paragon Software, with FoneSync. Essentially FoneSync allows you to create a GSM phone number address book from scratch or by dragging and dropping names from popular Windows-based PIMs. The point here is that the links between contact information held in your favourite PIM can be made permanent, so changes made in, for example, Goldmine will be reflected in your FoneSync directory. Next time you download the directory to the phone, any changes will be included.

An alternative is the Timex Datalink, a wristwatch that can read bar codes displayed on a PC's screen and thereby store the latest names and appointments you've keyed in via your PIM.

vCard and vCalendar systems

There are two 'open' standards, vCard and vCalendar. Both define the formats for exchanging personal data found on business cards and data found in calendar/scheduling applications. These technologies were originally developed by the Versit consortium (founded by Apple, AT&T (Lucent Technologies), IBM, and Siemens) but in December 1996 the rights to Versit's Personal Data Interchange (PDI) technology, which includes the specifications and reference software for both vCards and vCalendars, were transferred to the Internet Mail Consortium (IMC). The IMC works closely with standards organisations such as the IETF (Internet Engineering Task Force) so the vCard and vCalendar specifications, as well as the reference software, are distributed freely. Therefore, vCard and vCalendar are the closest thing we have to standards that actively promote synchronicity. The idea is, for example, that owners of different types of PDA and portable computers can quickly exchange business card data via the vCard format. These standards have been supported by the likes of Lotus and Microsoft, who supply vCard readers for Organizer and Outlook, respectively. The only real major omission appears to be support from Psion.

TrueSync: anatomy of a typical synchronicity engine

As an example of a typical synchronicity engine, let's look at the five key components of Starfish's TrueSync. Why the technology proved so attractive to Motorola then becomes more clear.

- **Micro-Applications**: include a calendar, address book, to-do list, memo, world clock and preferences toolkit. These are the utilities which would sit inside the mobile phone, PDA, watch, etc.
- **Micro-Framework**: allows the development of applications suitable for wearable devices. Significantly it enables the porting of TrueSync applications to real-time operating systems including (potentially) Symbian.
- **Desktop**: the PIM application designed as a desktop companion to TrueSync devices. It directly synchronises data between the desktop and TrueSync devices, and allows information to be imported from popular desktop organisers. It could be Starfish's own offering or something like Outlook 98.
- **Synchronisation Engine**: the core TrueSync technology that provides synchronisation of calendar, address book, to-do list, memo and other information between multiple sources. Additionally, using a multi-point synchronisation methodology allows users to directly synchronise information among more than one device, including servers, simultaneously. This provides TrueSync's true advantage over rival offerings.
- **Server**: provides multi-point synchronisation services between wireless devices, desktop PCs and other servers including web-based or telecomms (i.e. GSM) systems.

Timex developed this technology in conjunction with Microsoft, so it suits those who follow a Schedule Plus or Outlook Express/97/98 route.

Aware that the standard Datalink 150 watch looks a tad nerdy, Timex has just introduced the Ironman, a watch aimed at the more sporty types. The major difference between the two is the Ironman boasts a host of stopwatch functions. The company has even developed a notebook adapter which uses infra-red to communicate with the watch, since LED screens can't support the bar code approach. The only disappointment is the Ironman holds only 10 appointments and links only to Outlook 98 at present.

The last great obstacle to overcome is selecting a suitable way to transfer the data. The most obvious candidate here is the Bluetooth standard supported by the likes of Intel, Toshiba, IBM, Nokia, Ericsson and Motorola. Bluetooth provides for wireless radio (RF) data transfer between compatible devices, and support for synchronicity between devices is a salient feature.

According to TDK Systems business development manager, Nick Hunn, the first version of the Bluetooth standard will probably miss its CeBit target date — although the likes of Ericsson will show a 'Bluetooth'-compatible headset — chiefly because many RF issues have still to be resolved. There's security, for eample: if somebody's using a Bluetooth to listen to their portable CD player, you don't want them to suddenly be able to hear the conversation on your Bluetooth-enabled GSM phone.

This breathing space has given extra impetus to IrDA (the infra-red standards body). There are IrDA standards in place enabling infra-red communications to operate at 4Mbit/s rather than the original 115Kbit/s. Hence one supplier, Clarinet Systems, has developed EthIR LAN, which will enable notebooks and PDAs to participate on a standard Ethernet LAN without the need for additional hardware. Plus there's infra-red already built in to GSM phones such as the Nokia 9000I Communicator and the D127 modem from Ericsson, which slots underneath a range of its existing handsets.

▲ THE TIMEX IRONMAN WATCH BOASTS A SPORTY IMAGE BUT CAN STILL HOLD PHONE NUMBERS AND 10 APPOINTMENTS FOR YOU

Other alternatives to both technologies include CompactFlash cards from SanDisk (available through Portable Add-Ons). These memory cards are small enough to go inside cameras and mobile phones, yet can fit into a standard PCMCIA port via an adapter. For owners of the original PalmPilots (which don't have an infra-red port), Option has come up with a similar solution to the D127 — the Snap-On, which clips underneath the Pilot but uses a cable to link to a variety of GSM phones.

Synchronicity very definitely does have its benefits. Not only can your favourite telephone numbers be available from your watch, PDA, GSM phone or portable computer, but they can be sitting inside your desktop PC too. Link your standard BT or ISDN line to something like a Pace modem which supports UK CLI, and you can see who's calling you. Better still, if you download your diary of engagements from your desktop to your Datalink watch, you can be in the sauna and still be reminded in time not to miss that important meeting! ❐

PCW CONTACTS

For further information, contact the following web sites:

www.starfish.com
www.imc.org/pdi
www.argosoft.com/vcard.html.

BACKING UP YOUR PRECIOUS DATA AS A MATTER OF ROUTINE WILL PROTECT YOU FROM THE AWFUL REALISATION THAT, IN THE EVENT OF A DISASTER, YOU REALLY HAVE LOST EVERYTHING. DAVE MITCHELL HAS A PLAN OF ACTION.

Data protection act

Illustration by Paul Shorrock

Data is just as valuable as cash to business, yet an alarming number of companies fail to take appropriate measures to protect it. It's easy to view funds, property and staff as assets, but data rarely comes into this equation. Information held on customer accounts, sales and stock is just as important to business operations and, realistically, is one asset that is not expendable. Once data is gone, it's gone for good. How long would your company survive if all customer records and details on debtors were lost? The lucky ones might get through, but many will fall by the wayside. There's been plenty of research in this area and the general finding is that over half of companies that lose their data will go out of business.

It's essential to survival that data is protected,

BACKUP SOFTWARE AND HARDWARE OPTIONS

Software

☛ **Seagate Backup Exec** NT and Novell NetWare versions. Excellent features for network backup. Fewer management tools than ARCserve but still excellent.

☛ **Computer Associates ARCserve** Another top choice for network backup run from Windows NT or Novell NetWare servers. Supports multiple tape drives and can manage backup rotation strategy.

☛ **Yosemite Technologies TapeWare** Fast becoming a main contender. Good management features, plenty of backup options and a pile of predefined backup systems are included.

Hardware

☛ **Hewlett-Packard DAT8** Digital audio tape based drive that uses cheap DAT DDS-2 format 4Gb capacity tapes. Approximate drive cost, £500.

☛ **Tandberg Data SLR6** A SCSI-based drive offering a whopping 12Gb of native storage on a single cartridge for less than £600. Fast, with transfer rates of around 110Mb/min.

☛ **Sony SDT-9000** DAT DDS -3 format SCSI drive with 12Gb native capacity, 70Mb/minute transfer rates and all for around £800.

• *Contacts*

Seagate Software
01628 771299
www.seagatesoftware.com
Computer Associates
01737 775500
www.cai.com
Kingswall Computers (Tapeware)
01604 767636
www.kingswall.co.uk
Hewlett-Packard
0990 474747
www.hp.com
Tandberg Data
01582 769071
www.tandberg.com
Sony 0990 424242
www.sony.co.uk

and backup plays a key role in this. But, this must be seen as part of an overall plan that ensures a company can survive a disaster and get back on its feet as quickly as possible. While a lost file may be easy to restore, total data loss is not so easy to recover from. Your plan should include full disaster recovery procedures, secure off-site storage and even a contingency site to be used if access to your premises is denied.

Risk assessment

The first course of action is to assess the risk areas — identify all threats to your systems and data and take appropriate measures to protect against them. These should include human error and physical damage to equipment whether accidental or malicious. Viruses come into this grim picture as well. Even though the most common viruses can be removed safely by good anti-virus software, there is a potential for data corruption. Boot sector and macro viruses can be cleaned easily, but file viruses actually play around with program coding and often damage files beyond repair. In many cases, anti-virus utilities won't even attempt to repair the infected files and will recommend that they are restored from the last clean backup.

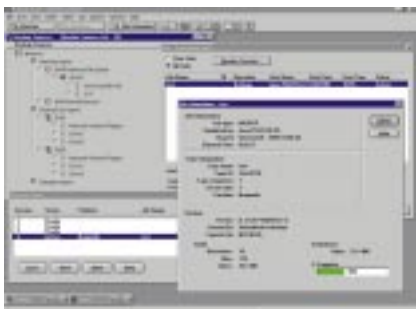
These are more common problems, but the potential disaster needs to be considered. Fire, flood and theft spring to mind, and it's here that off-site storage for your latest backup tapes becomes imperative. Hardware can be replaced easily but is of little value if all your data was destroyed as well.

Implementing a backup strategy may look expensive to small businesses on a tight budget, so perhaps they should apply some reverse logic and first consider what a disaster would cost them. How much business would be lost for every twenty four hours out of action? There's also the knock-on effects, such as potential new customers going elsewhere because essential services can't be provided. Surely it makes sense to invest a proportion of this amount to ensure it doesn't happen.

In the February issue of *PCW* we looked at networking for small businesses and how costs can be reduced by sharing devices such as printers and modems over the network. The same applies to backup: why go to the expense of having a tape drive on every desk when you could place a single drive on the server? All attached workstations can be backed up to a single location, making it far easier to manage.

Good backup software comes into play as well. Network versions of popular products allow you to view the resources on each workstation, select the files you want backed up and send them across the network to a tape drive attached to a server. Users don't have to be involved, as backup can be run out of hours and the whole strategy can be managed by the software itself.

The type of hardware will be determined by the amount of data that must be backed up and the time available. Tape is the only sensible choice as it combines high performance and low storage costs. Devices such as Jaz drives may seem



▲ SEAGATE'S BACKUP EXEC USES AGENT SOFTWARE LOADED ON EACH WORKSTATION SO HARD DISKS CAN BE REMOTELY BACKED UP TO A TAPE DRIVE ON THE SERVER

GOOD BACKUP PRACTICES

☛ **Schedule** backups for a specific time each day. If you back up when time permits, it may not get run at all.
☛ **Appoint** one member or a team of staff with full responsibility for the entire backup and recovery strategy.
☛ **Don't rely** on one copy of vital data. Run the backup job a second time to create a copy instead of copying one tape to another, as this may transfer errors.
☛ **Check** your data by including verification as part of your backup.
☛ **Retire** old tapes from the system. Ensure tapes stored for long periods are regularly re-tensioned if specified by the manufacturer.
☛ **Make** off-site storage an essential part of your backup strategy and use it.
☛ **Tapes** to be retained on-site should be labelled and stored in a fireproof safe.
☛ **Recovery** plans should be regularly tested to ensure they'll run smoothly if disaster strikes.
☛ **If continued business operations** are critical to survival, consider using a contingency site where essential operations can be restored during a crisis.

a good idea, but the high cost per megabyte of storage far outweighs its superior performance. Choose a tape drive that can store all the day's backup data on a single tape.

One of the reasons data doesn't get secured is because backup is about as exciting as watching paint dry. If you have to sit around waiting to change tapes as they fill up, the chances are you won't bother in the first place.

It's far easier to start a backup at the end of the day and walk away knowing it will be finished when you next come in. Be wary of manufacturers' claims, as they invariably quote the performance and capacity of their products with a 2:1 compression ratio applied. Most modern tape drives can pack more data on the tape by compressing it as it is being read. However, the type and variety of data on today's networks makes this almost impossible to achieve, so it's far safer to use the uncompressed, or native, figures quoted for a tape drive. If possible go for a SCSI-based drive. Parallel port and IDE drives might be much cheaper, but they are too slow and have insufficient backup capacity to be of use for network backup.

When it comes to choosing the best backup strategy you'll be faced with three main options — full, incremental and differential. A full backup is obvious; but what do the others mean? They are both types of partial backup and their differences come down to a file property called the archive bit, a feature that is fundamental to correct backup software operation. You can see this by choosing a file from Windows Explorer and viewing its properties. Below the dates for creation and modification is a section called Attributes. Here you can see whether it is a system file, marked as read only, hidden, and the status of its archive bit. Whenever a file is created or modified, the archive bit is switched on automatically to show that it is either a new file or its contents have changed. When your software runs a full backup, each file copied has the archive bit switched off to indicate that it has been secured to tape. If any file is subsequently modified, the archive bit is automatically switched back on again, indicating that its contents have changed since the last backup.

When an incremental backup is run, it checks the status of each selected file's archive bit and only copies those that have had it switched back on — hence the term 'partial backup'. Once the backup candidates have been secured, the archive bit is switched off again. The next day's incremental backup will also check the archive bit of the same group of files and copy any that have been changed. Consequently, the tapes produced by each incremental backup will only contain those files that were modified in the twenty four hours prior to them being run.

Differential backups, on the other hand, don't change the archive bit after copying a file. Any file that was created or modified after the last full backup will be copied to each day's tape until the next full backup is run. As you go through the week, each day's differential backup will be larger than the previous one as the number of files modified or created increases.

▼ THE ARCHIVE ATTRIBUTE IS VITAL TO BACKUP SOFTWARE AS IT SHOWS WHETHER A FILE HAS BEEN CREATED OR UPDATED SINCE THE LAST BACKUP

Backup or recovery?

Which type of partial backup will suit you best will be determined by one of two factors: whether you want fast backup or fast recovery. As incremental backups are only copying data that has changed during a comparatively short space of time, they'll be a lot quicker. Many companies whose operations extend beyond the standard 9-to-5 day frequently opt for the incremental purely because the network administrator has less time available to run backup. The downside will be revealed when the time comes to restore data.

Recreating an entire system will require the most up-to-date full backup to be copied back first, followed by all subsequent incrementals.

Backing up your data

Say you're running a full backup every Friday and a disaster occurred on the following Thursday: you'd need to restore five different tapes and each incremental must be applied in the order they were created.

The differential backup wins out here, as full system restoration would take far less time and will be easier to manage, as only the latest full backup plus the last differential will be needed. However, each day's backup will take longer as the week progresses. In situations where large amounts of data are changing frequently, it is not unknown for the week's final differential to be almost as large as the full backup.

Getting it taped

Now that we know what types of backup are possible, a suitable tape rotation system needs to be implemented. This will reduce the amount of media to a manageable level and the type will depend on the choice of backup horizon. If you only want to keep a copy of your data for one week, then do a full backup run on Friday, along with incrementals or differentials for Monday through to Thursday. The tapes are then all re-used the following week. Although tape life is reduced due to the frequent usage, it's a simple system that's easy to manage and can be modified to suit. Say you want a backup horizon that extends back two weeks. Instead of recycling the end-of-week full backup, remove it from the system over to secure storage and use a new tape. The following Friday sees the tape held in storage swapped over and returned to the system.

▲ TapeWare looks complex but it has a wide range of pre-defined strategies included to help with network backup

This method of regularly removing tapes from the system and replacing them with fresh media gives a wide range of options. Most companies will need to retain copies of their data for at least a year so month-end backups can be introduced into the system. The tapes used for mid-week partial backups are still recycled, but each weekly full backup is removed to secure storage. The first three tapes are returned to the system the following month, but the fourth is removed permanently and a new tape used in its place. When you reach year-end, you'll have twelve tapes containing data for the entire period.

This one year system is often referred to as a Grandfather/Father/Son (GFS) rotation where the daily backups are the Sons, the weekly backups the Fathers and the monthly backups the Grandfathers. It is one of the most commonly used backup strategies because it is relatively easy to administer and provides good, long-term data protection. There are, however, potential pitfalls that need to be avoided. Say you decide to carry out some housekeeping on a server or workstation because disk space is running out. If you run this in the middle of the month, the deleted files will not be on the month-end copy. They will be on the weekly copies but these will be recycled the following month.

If possible, leave all housekeeping tasks until after the month-end backup has been taken, or take a separate copy and store it permanently. The difference between a backup and a copy is that the latter leaves the archive bit alone, otherwise it would interfere with the tape rotation system. Also, for your backup strategy to work properly, the tapes being rotated out of the system must be stored off-site and must remain there until they are required. If your business premises gets burnt down, flooded or all your computer equipment is stolen, you will still have access to your data. Servers and PCs are replaceable but data is not; once it's gone, you've lost it for good.

Contingency plan

As backup is an integral part of a data protection policy, so is disaster recovery. If your computer equipment is stolen then you need a decent insurance policy so it can be replaced as quickly as possible. However, that won't help in the event of a fire or flood or even a gas leak. You also have to consider the possibility of being denied access to your premises by the emergency services.

In these situations a business continuity plan using a contingency site is the answer. You move the necessary personnel to a pre-prepared remote location, recreate critical systems using your off-site data, and maintain reduced business operations until you can re-enter the main premises. A contingency site is probably the most difficult part of the strategy to create as it can be expensive. However, it is not unknown for non-competing companies in the same geographical area to cooperate with each other and provide assistance if disaster strikes. If this is not feasible, then consider a third-party specialist.

Companies that already have a data protection plan in place are thinking ahead. They'll have it fully documented and will regularly test the procedures to ensure there are no foul-ups if it has to be run for real. Unfortunately, many firms still have their heads in the sand and will consider it a waste of money: why pay out large sums of money for something you hope never to use? They are living on borrowed time: Murphy's Law states that whatever can go wrong, will go wrong, and when least expected. Are you prepared to risk your company's future that he's wrong? It's called false economy. ❐

TAKE PART IN OUR

Service and Reliability Survey 1999

It's time for *PCW*'s second Service and Reliability Survey. With your help, our comprehensive, independent readership survey will provide the ultimate guide to the best brands for technical support, service efficiency and product reliability.

We had an incredible response from our readers last year, so once more we have employed the services of Maritz Research, one of the world's largest research groups and a leader in the field of customer satisfaction and loyalty research, to compile and deliver the ultimate performance guide to computer equipment.

Please fill in the questionnaire you will find when you log on to www.pcwsurvey.co.uk, and return by 31st May 1999. All information supplied will be treated in confidence. The results will appear in our November 1999 issue.

To make it a bit more fun, we are carrying out a prize draw. All entries will be entered as long as your full name and address details are completed at the end of the questionnaire. The prizes up for grabs are three Olympus C-830L cameras, 20 copies of Microsoft's Office 2000 and 50 copies of *PCW* on CD-ROM. (This includes the last 24 issues of *PCW* with full search and browser facilities.)

Many thanks for your participation.

WIN 3 Olympus CAMEDIA C-830L digital cameras

You could be one of three lucky winners to get your hands on a **CAMEDIA C-830L digital camera from Olympus** in our prize draw. Worth £549.99 each (inc VAT), the C-830L is an ideal starting point for digital-photography enthusiasts.

This compact, lightweight (it weighs in at 235g without batteries and cards), easy-to-handle camera features a 1/2.7in high-performance CCD, with no less than 1.31million square pixels. It has enhanced internal software, and features a new sliding-lens barrier that doubles as a powerswitch. Once opened, it's ready to take pictures in one second.

To ensure a balance of top image quality and storage, the C-830L offers a non-compression SHQ mode. This means that digital photos can be stored virtually without loss of information, so that each high-resolution picture file has a size of nearly 4Mb.

Images are displayed on an improved LCD monitor with a highly accurate 1.8in TFT colour display with approximately 72,000 pixels. It also has the added function of enlarging images shown on the LC-Display. So if you select one part of a picture, which is divided into nine sections, details can easily be viewed as 3X close-ups. This 'zoomed' image can be printed and even shown on a TV monitor via the camera's video-output.

Digital photography fans will be pleased to know that there are the additional features of manual exposure compensation and a 2X digital tele and macro mode. Ideally suited for leisure, travel and business, the C-830L comes with a SmartMedia card with panorama function and CAMEDIA utility software. And its efficient power consumption means it can offer a longer operation time. What a star!

www.pcwsurvey.co.uk

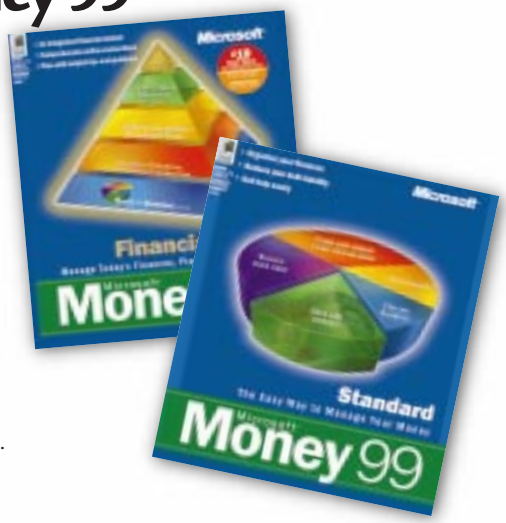
SURVEY AND WIN!

WIN 20 copies of Microsoft **Money 99**

Money 99 is the perfect way to keep your finances up to date. All the components in this software are integrated, so any changes are automatically updated throughout the product.

It also works as your own private financial expert: once you input information, such as account details or longterm saving plans, Money 99 keeps a 24-hour watch on it and notifies you of any event that could affect your financial situation. It offers connection to any financial institution with online services, so you can download statements, pay bills, and transfer funds online. And there's the added bonus of the following features:

- **a budget planner**, which helps you budget monthly or for certain occasions;
- **a Loan Wizard**, which estimates the costs of various loans and compares the results; and
- **a Mortgage Wizard**, which stores up to six different mortgage schemes and compares a mortgage cost at different interest rates. There's even a function that tracks employee stock options. You can't go wrong!



WIN 20 copies of Microsoft **Office 2000**

Office 2000 is packed with a host of new features offering new ways to share information. Here's just a taster of what you get with the package:

- **Loads of new design themes** for creating web pages. Each theme comes with graphical backgrounds, bullets and various design elements to make web page design simple.
- **Workgroup members** can collaborate on projects across intranets and the web. Office 200 integrates email into each application.
- **The Clipboard** lets you copy up to 12 different bits of text or pictures from one or more documents, email, web pages, presentations or other files simultaneously, and you can paste them into any Office application.

Another great feature is the self-repairing applications. Any files deleted from your hard disk can automatically be found and reinstalled if you run an Office application that needs them... The list is endless.

WIN 50 copies of PCW on CD-ROM

Our newest version of the *PCW* CD-Rom gives you access to 24 issues' worth of *PCW* product reviews, workshops and group tests. It features all back issues from 1997 through to and including March 1999, in full text, with search and browser facilities. There's even an easy-to-use *PCW* Supplier Source section. And all at the click of a button.

www.pcwsurvey.co.uk

A new lease of life

BEFORE YOU BANISH YOUR BELOVED SYSTEM BOX TO THAT GREAT SKIP IN THE SKY, THINK: COULD SOMEONE ELSE FIND A USE FOR IT? SUSAN PEDERSON SUGGESTS WAYS TO PROLONG THE LIFE OF YOUR PC.

Computer hardware and software gets faster and cheaper every year, the consequence being that you're buying a product with built-in redundancy. Sooner rather than later, it's going to be old news. In the last year, the City of London alone discarded nearly 1,800 tons of electronic rubbish. But there are things you can do to help extend your PC's natural life and ensure it doesn't just end up in a tip somewhere.

Community spirit

You may not want your PC any more, but you can bet there are millions of people out there who'd give their eye-teeth for it. The question is, how do you get it to them? Quite a number of organisations have sprung up over the past couple of years that specialise in taking in old kit from businesses (and to a lesser extent, from individuals), cleaning it up, then passing it on to charities and schools in the UK and further afield. So if you'd like your PC to see India, or you want to give inner city kids a leg up the technology ladder, this is the place to start.

Bytes Twice can put you in touch with your closest community computer re-use project, most of which will take all working PCs with a 386 processor or higher. Many projects are only able to accept lots of donations from businesses because of the economies of scale involved, but it's always worthwhile for individuals to check. Charities, community organisations and schools can apply to Bytes Twice to receive free PCs (there will be a transport charge).

ComputerAid will send old PCs to education, health and community organisations in developing countries. The Charities Aid Foundation publishes a book called *Waste Not*, listing organisations in need of computers, printers and faxes.

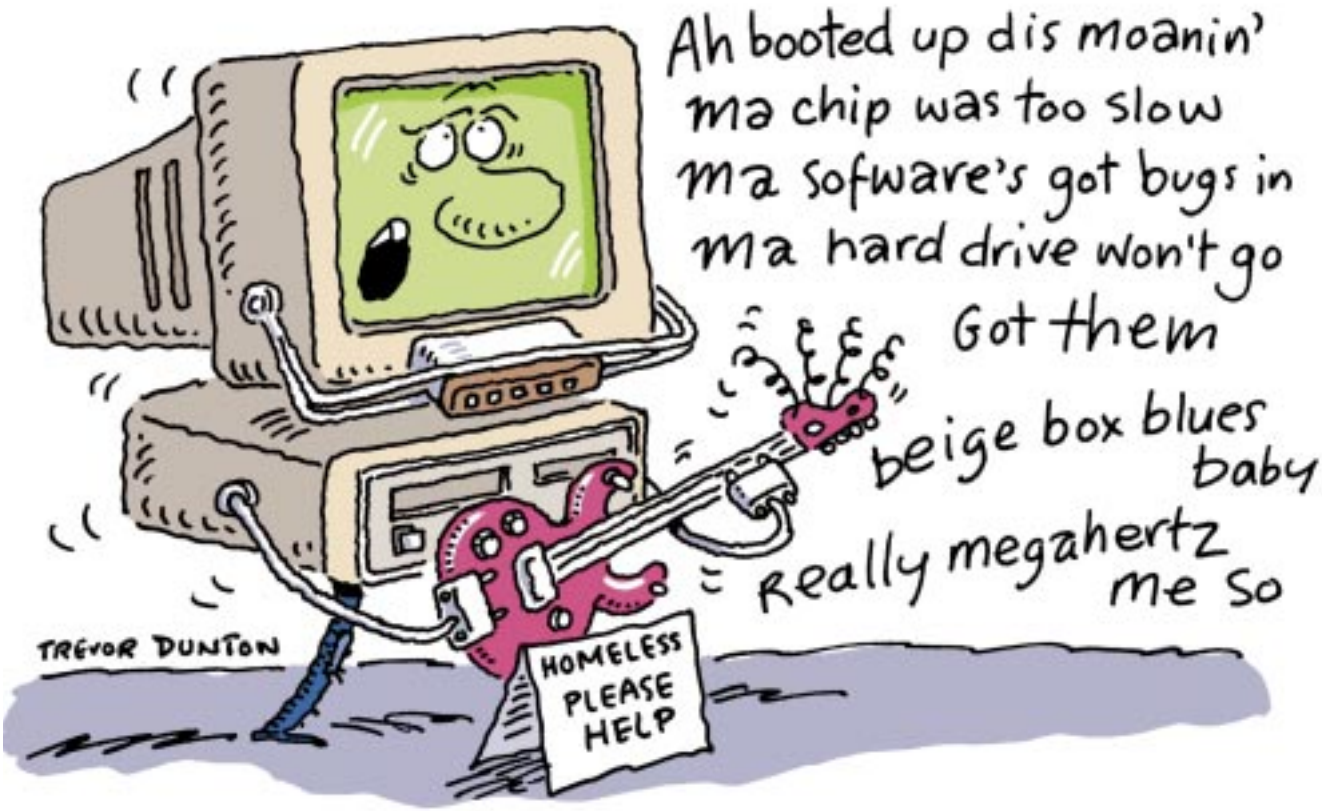
Businesses are also realising there's money to be made out of redundant PCs. Technical Asset Management (TAM) takes old PCs from businesses (50-1,000 units), reconditions them and resells them for a commission, sometimes to another part of the same company. All the PCs are thoroughly cleaned, tested, data-wiped and given new software.

TAM has opened a retail showroom in Welwyn Garden City where you can pick up an IBM or Compaq P100 with a 15in screen and CD-ROM for £300 ex VAT. It also sells 486s for about £100, as well as laptops, software and games. Further showrooms may be opened shortly. (*See page 132 for contact numbers.*)

Charity begins at home

So, you've just bought a new PC and your extended family and friends have been making noises about how much they'd like to give the old one a new home. In many ways, this is an ideal solution. You get rid of the old clunker, they get a free (or at least cheap!) PC, and you also get the warm glow that only comes from giving. And it's not just families with children that can benefit: older and retired people are also taking up computing in great numbers. As someone who lives 4,500 miles from her parents, it was a joyous day for me when they acquired an email address (although not so joyous for BT).

But there can be pitfalls. Your PC is likely to have 'quirks' (otherwise, why would you be getting rid of it?) and you may well find yourself acting as an unofficial and unpaid technical support hotline whenever it starts playing up. The recipient may also have support and licensing difficulties if the PC and software is registered in your name. And if they haven't any computer skills, you'll have to resign yourself to showing them how to use various programs each



time you visit them. It may be a small price to pay, though, for reclaiming the cupboard where it's been languishing for six months.

Alternatively, you could look into DIY networking. The easiest solution will probably be to place the PCs on opposing desks and connect them directly to each other to create instant Doom marathons. If you really want to impress your friends, try wiring the PCs together throughout the house to create a unique paging system for dinner. Remember, many networking configurations will require Windows 95 on all PCs. You could also designate one as an internet terminal and place it in a communal area for easy access and supervision. An online guide to creating your own home LAN is at www.geocities.com/siliconvalley/pines/1903.

Clean-up operation

When a PC has been around the block a few times, it tends to get grubby. While you won't be able to do much about the natural yellowing of a PC's casing, you can use special computer cleaners. Kevin Heydon, who collects and restores old PCs, has a list of suggestions from other collectors for removing dirt without harming the computer, at www.heydon.org. You should also ensure the PC and its components are safe to use, especially if you're handing it on to someone else. You could be liable if they are injured by a faulty electrical connection. If you're confident in your abilities, Morris Rosenthal's online version of *The Hand-Me-Down PC: Upgrading and Repairing Personal Computers* is at www.daileyint.com/hmdpc. If you're not, call a qualified technician.

If you want your PC to run more smoothly, you may want to consider reformatting the hard disk to get rid of random drivers and bits of uninstalled programs. But be warned — you'll have to know exactly what you're doing before you attempt this, and you'll need all the relevant operating system and application disks to hand if you ever want it to work again. You should check the disks are still in good condition. If they've been sitting in a dusty box for the last five years, they may not work. You don't want to discover this when it's too late.

If you decide to pass on your computer to a school, charity, friend or relative, make sure you haven't left anything on the hard disk that might come back to haunt you. It can be difficult to be sure that you've deleted all of your financial records and private correspondence from the directories. Even reformatting the hard disk won't permanently eliminate them if the recipient knows what they're doing, because often, when something is deleted, it's only the link to the file that disappears, not the file itself.

▲ BEFORE HANDING YOUR OLD COMPUTER OVER TO ITS NEW OWNER, IT MIGHT BE WORTH GIVING IT A WASH AND BRUSH-UP. SAFETY IS AN IMPORTANT CONSIDERATION, THOUGH (SEE MAIN TEXT, THIS PAGE)

Illustration by Trevor Dunton

JUST LIKE THE OLD DAYS

We may not have yet reached the day when a Commodore Vic-20 sells for millions at Sotheby's, but it doesn't mean they're not valuable. The computer industry has evolved with such incredible speed, there are fears that older specimens could disappear — and take a whole era of technological history with them. Some people are trying to keep these memories alive, and a search for retro computers turns up hundreds of internet sites devoted to even the most ill-fated machines. By and large, these sites are maintained by dedicated enthusiasts who receive no funding for their virtual museums. Many of these 'curators' are keen to acquire missing links in their collections, as well as working parts and software.

The Computer Conservation Society, which runs the Computer Museum at Bletchley Park, also works to conserve historic computers. The Computer Museum houses the rebuilt Colossus as well as a collection of machines showing the history of the PC from a 1975 Altair to the present. It is looking for people to help restore and maintain exhibits and write visitor information sheets. It is also looking for donations of any significant computer hardware — the older (and more British) the better — as well as appropriate software, games and documentation.

The Computer Conservation Society 01908 640404
www.cs.man.ac.uk/CCS
Virtual Museum of Computing
www.comlab.ox.ac.uk/archive/other/museums/computing.html
Kevan Heydon's Computer Collection
www.heydon.org/kevan/collection/index.html

THREE USES FOR A DEAD PC

Reached the conclusion that the old war-horse is a lost cause? Don't worry. There are still a few options...

☛ Jewel case
They say the future of haute couture is silver lamé suits and coats that think. Get a jump on the fashion victims and make a statement with eye-catching chip earrings or monogrammed cufflinks made out of keys.

☛ That's smashing!
If you've had a hard day at work, don't take it out on your loved ones. The Illustrated Guide to Breaking your Computer <http://members.aol.com/spoons1000/break/index.html> explains in hilarious detail exactly how to wreak your revenge on the machine that's been tormenting you for so long. Remember to bring your safety goggles and your hacksaw.

☛ Fun for pets
It's rumoured that the head honcho at Intel uses a clapped-out 286 case as a cat-litter box. But why stop there? Try fashioning a swing for your canary out of leftover cable, or carve out your monitor's insides to make an ultra-modern ant farm or fishbowl (just make sure you have some duct tape handy).

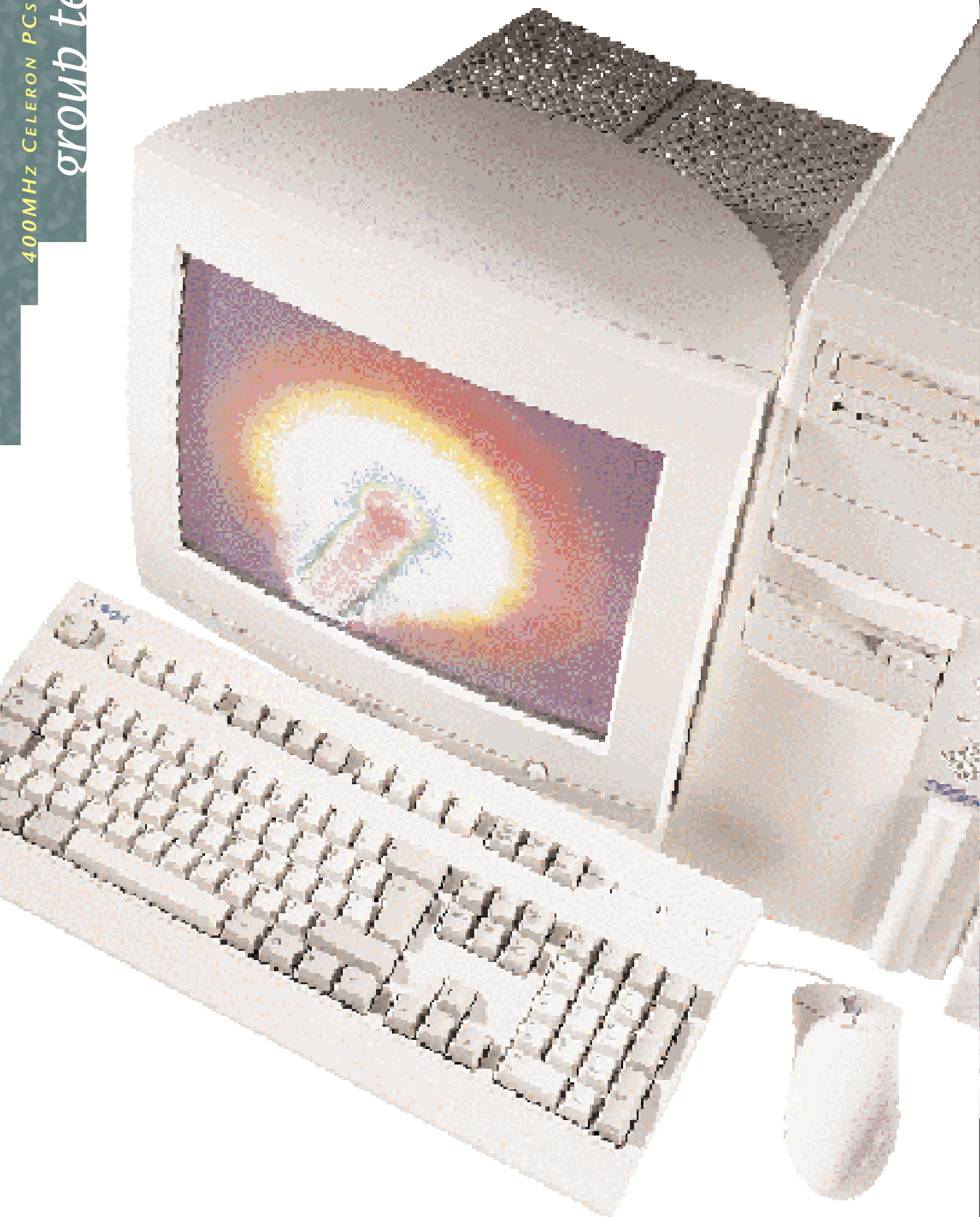
TAM offers two products to ensure that when you delete something, it stays deleted. Shredder sits on your system and permanently erases every file you delete, while Sanitizer wipes absolutely everything off the system — the OS included. These products can be pricey as a one-off purchase for an individual, but the price drops dramatically if you're buying multiple copies for your business. If you plan to donate your PC through a broker or a recycling project, make sure you find out what kind of cleansing process they use before you hand it over.

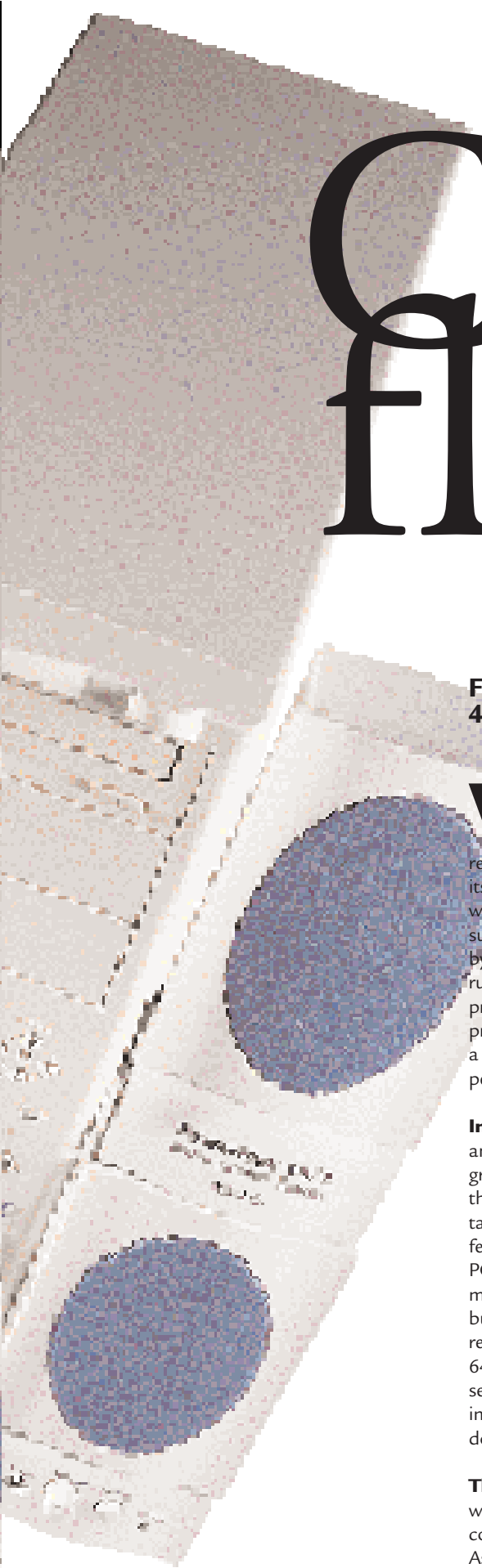
Upgrading: is it worth it?

We haven't yet discussed upgrading your old PC hardware, mainly because if your machine is old enough, it probably won't be worth it. A better monitor and an external hard drive may be good investments, however. Your PC might not be equipped with the latest and greatest processor, but with the right kind of software, you'll find its performance improves dramatically. Surprisingly, if your system is tuned properly, you may get better results sticking with the hardware you have, along with a compact operating system and software with a smaller footprint, than upgrading to a Pentium with bloatware. Sometimes, it really is best to leave well enough alone.

PCW CONTACTS

Bytes Twice *0171 248 0242*
www.wastewatch.org.uk
Charities Aid Foundation *01732 520000*
www.caf.org.uk
ComputerAid International *0831 190099*
www.cit.org.uk/computeraid
Technical Asset Management
01707 333555 **www.tam.co.uk**





Cache flow

For the home and small-business user on a budget, these 400MHz Celeron systems offer high-quality solutions.

When Intel released the first CPU in its budget Celeron range, it had a cool reception from many quarters due to its lack of L2 cache. But this oversight was soon rectified in the 300A and all subsequent higher-clocked Celerons, by the inclusion of 128Kb of L2 cache running at the same core speed as the processor. Since then, the Celeron has proved to be a competent performer and a popular OEM choice, offering good performance at a budget price.

Intel recently introduced the 366MHz and 400MHz Celerons, and in this PC group test we test ten systems based on the 400MHz Celeron. As the Celeron is targeted at budget users, it is likely to feature in both home and small-business PCs. We therefore asked vendors for machines which would suit both the budget and the performance requirements of these users. We specified 64Mb of RAM and a 15in monitor, and set a maximum price limit of £799 including VAT. Any other hardware was down to the vendor.

The emphasis on judging these systems was firmly on ease of use, quality of components and value for money. As these PCs are expected to be used by relatively inexperienced users, we kept an eye out for the presence of well written setup manuals and other useful documentation. And, as always, we were looking for excellent build quality.

Contents

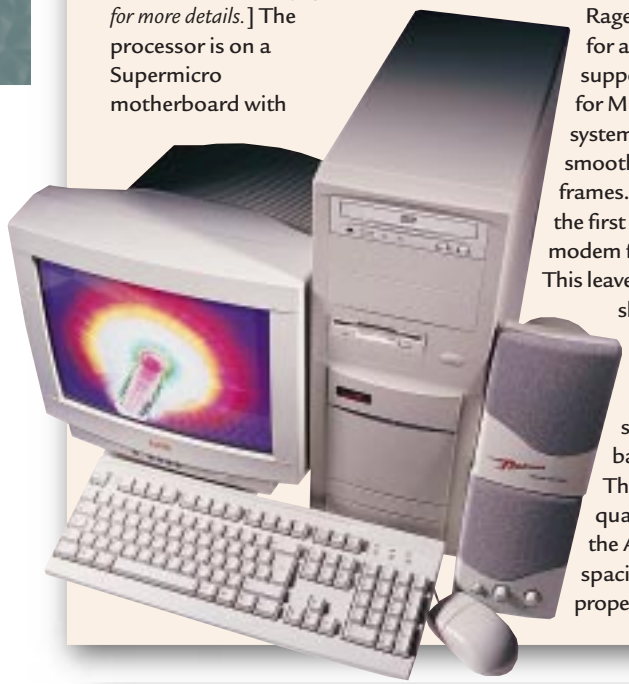
F *Tested and reviewed by Ajith Ram*

Ratings

★★★★★ **Highly recommended**
★★★★ **Great buy**
★★★ **Good buy**
★★ **Shop around**
★ **Not recommended**

Carrera **Gemini C400**

The Carrera system is the only one in this group to come with a Socket 370 Celeron 400 fitted into a Slot 1 riser card. This lets you put a Socket 370 processor into a standard Slot 1 motherboard. [*See page 149 for more details.*] The processor is on a Supermicro motherboard with the 440BX chipset, so the PC can be upgraded to all varieties of Intel CPU. The 64Mb of RAM comes in a single module, leaving two slots free for further upgrading. An ATi Xpert 98 with 8Mb of RAM takes up the AGP slot. The Rage Pro chipset is quite sufficient for a general-purpose PC and supports motion compensation for MPEG-2 playback, so the system's LG DVD will provide smooth playback without dropped frames. The SoundBlaster 64 sits on the first PCI slot. Next to this is a 56K modem flash upgradeable to V.90. This leaves two PCI and three ISA slots free for upgrading. A large 6.4Gb hard drive takes up one of the 3.5in bays just below the DVD drive, with a single 3.5in and two 5.25in bays left free for upgrading. The Gemini has very good build quality. Due to the large size of the ATX case, the interior is very spacious, with components properly secured and easy to access.



HIGHLY COMMENDED
PERSONAL COMPUTER WORLD

The 15in LG 57M monitor can support resolutions as high as 1280x1024 although not at a refresh rate you could look at for long. At a lower 1024x768, refresh rate is 70Hz. Image quality is very good and the controls are easy to use.

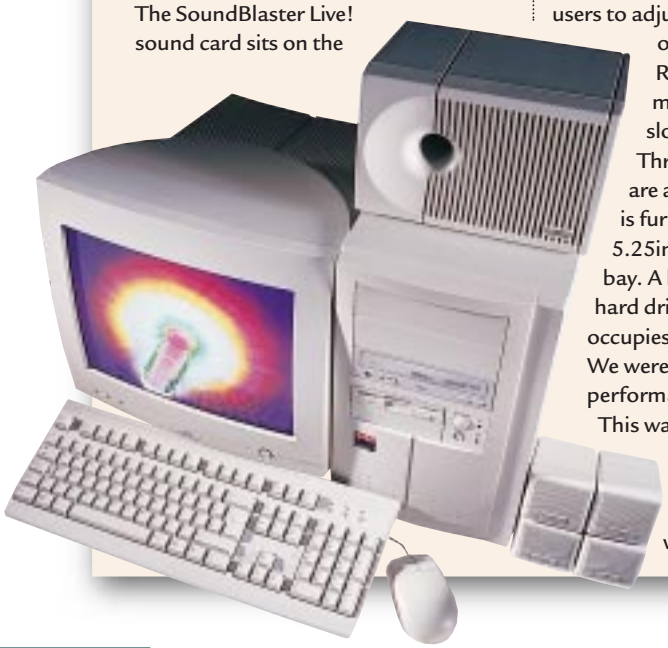
PCW DETAILS

Price *£799 (£680 ex VAT)*
Contact *Carrera 0181 307 2800*
www.carrera.co.uk
Good Points *Excellent build quality. Easily upgradeable.*
Bad Points *Documentation not comprehensive.*
Conclusion *A well-equipped system.*

Build Quality	★★★★
Performance	★★★
Value for Money	★★★★
Overall Rating	★★★★

Dabs Direct **Atlantis 3D**

The graphics display on the Atlantis is provided by the 3D Blaster Banshee from Creative Labs. An impressive performer in 3D applications, it provides sharp images at high resolutions. The 3D Blaster has 16Mb of RAM, but unlike the TNT chipset does not support full 32-bit colour. The SoundBlaster Live! sound card sits on the first PCI slot, and a generic 56K PCI modem which supports the V.90 standard is also included. All these components sit on the equally impressive Abit BH6 motherboard. The dream motherboard of overclockers the world over, the BH6 provides a CPU Soft Menu in the BIOS, which allows users to adjust CPU speed without opening the PC. 64Mb of RAM comes in a single DIMM module, leaving two DIMM slots free for upgrading. Three PCI and two ISA slots are also left free. Upgradeability is further enhanced by two free 5.25in bays and a single 3.5in bay. A large 6.4Gb Maxtor hard drive spinning at 7200rpm occupies the second 3.5in bay. We were impressed by the performance results of the Atlantis. This was the fastest PC in our SYSMark 98 tests, and graphics performance in the 3DMark tests was also impressive.



The 15in ADI ProVista monitor provides crisp images at a resolution of 800x600 while sustaining a refresh rate of 85Hz. Clarity and refresh rates both fall dramatically at higher resolutions, down to just 70Hz at 1024x768.

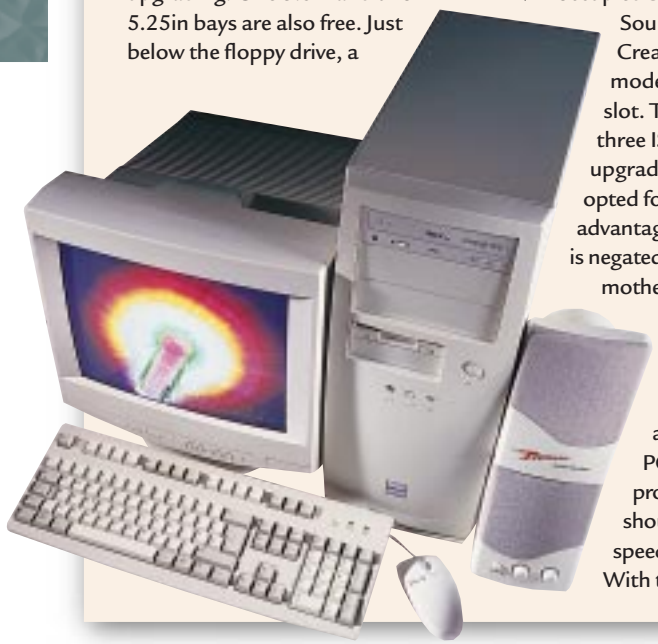
PCW DETAILS

Price *£799 (£680 ex VAT)*
Contact *Dabs Direct 0800 558866*
www.dabs.co.uk
Good Points *High performance. Good-quality components.*
Bad Points *Little documentation.*
Conclusion *A fast PC with good components.*

Build Quality	★★★
Performance	★★★★
Value for Money	★★★★
Overall Rating	★★★★

DCS **Business**

DCS provided a high-quality PC for this group test. The excellent manual is exhaustive, and a two-hour video on Windows 98 is also provided. 64Mb of RAM occupies a single DIMM slot, leaving two free for upgrading. One 3.5in and two 5.25in bays are also free. Just below the floppy drive, a Creative Labs 36X CD-ROM occupies one of the 5.25in bays. A large 6.4Gb Fujitsu hard drive is in another 3.5in bay. The Matrox Millennium G200 with 8Mb of memory provides excellent 2D and 3D display, the first PCI slot is occupied by the powerful SoundBlaster Live! from Creative Labs, and a Jetway 56K modem takes up another PCI slot. This leaves two PCI and three ISA slots empty for further upgrading. Although DCS has opted for a Slot 1 Celeron, the advantage is negated by the Supermicro motherboard with Intel's BX chipset. This chipset supports a bus speed of 100MHz so the PC can be upgraded to faster Celerons and Pentiums. And with the PC100 RAM, replacing the processor with a Pentium should bring much faster bus speeds. Build quality is excellent. With the IDE cables tucked well away from the hot components, air circulation is unhindered.



The 15in Samsung monitor provides impressive image quality at 1024x768 with a refresh rate of 70Hz, rising to 75Hz at 800x600. The controls are intuitive and easy to use.

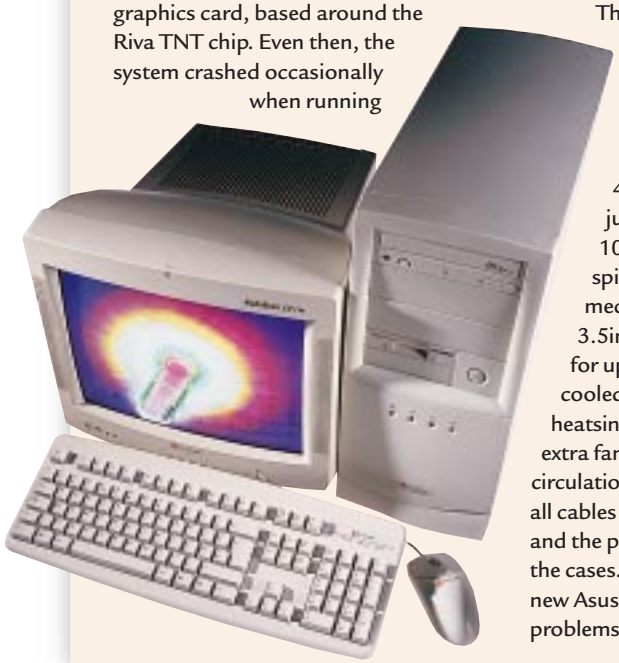
PCW DETAILS

Price *£799 (£680 ex VAT)*
Contact *DCS 0121 414 7575*
www.dcsplc.co.uk
Good Points *Excellent build quality. Useful manual and video. Good performance and components.*
Bad Points *Not easily upgradeable to a Pentium CPU.*
Conclusion *A well-built PC let down slightly by the choice of motherboard.*

Build Quality	★★★★
Performance	★★★
Value for Money	★★★
Overall Rating	★★★

Hi-Grade **Ultis PV2 400**

We initially encountered problems with this Hi-Grade PC, as it would not reboot. A few phone calls to the manufacturer later, the solution arrived in the form of a new BIOS for the Asus graphics card, based around the Riva TNT chip. Even then, the system crashed occasionally when running graphics applications. The Ultis has a Slot 1 Celeron sitting on an Asus P2B motherboard. The TNT graphics card comes with 16Mb of RAM and occupies the AGP slot. The high-fidelity SoundBlaster Live! from Creative Labs, along with a PCI modem, take up two PCI slots. This leaves another two PCI and three ISA slots free. An Asus 40X CD-ROM is included, and just below it sits a large, fast 10Gb Maxtor hard drive spinning at 7200rpm. Despite the medium size of the ATX case, two 3.5in and 5.25in bays are available for upgrading. The CPU itself is cooled by the standard Celeron heatsink and fan, plus there are two extra fans to provide adequate air circulation. Build quality is good, with all cables neatly clipped out of place and the power supply unit well inside the cases. However, the inclusion of the new Asus card did create certain problems in the software configuration.



These should be sorted out by now, but do check this if you want the Asus card.

The 15in Sampo monitor has a flicker-free refresh rate of 70Hz at a resolution of 1024x768, rising marginally to 75Hz at 800x600. The controls are intuitive and image quality is acceptable.

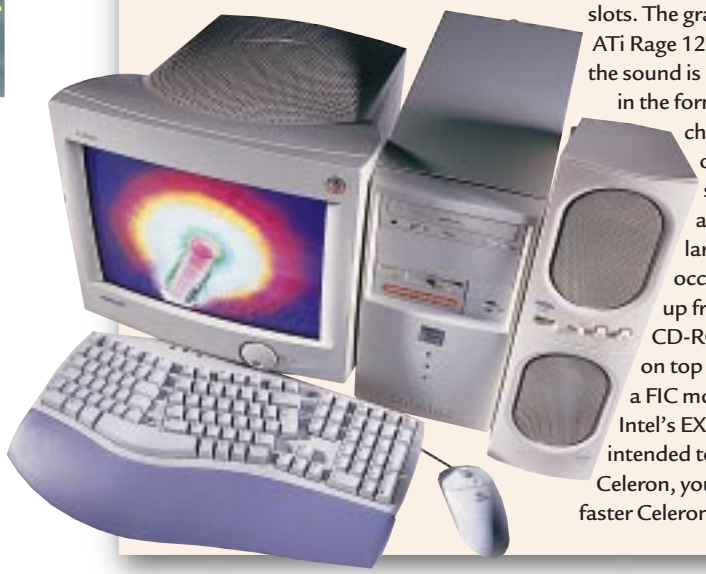
PCW DETAILS

Price *£799 (£680 ex VAT)*
Contact *Hi-Grade 0181 532 6123*
www.higrade.com
Good Points *High graphics performance. Decent monitor.*
Bad Points *Initial problems with the graphics card.*
Conclusion *A decent system let down by teething problems with the graphics card.*

Build Quality	★★★
Performance	★★★
Value for Money	★★★★
Overall Rating	★★★

Impact **High Impact**

When we first turned on the High Impact, it wouldn't boot up. We tracked down the problem to a loose-fitting CPU: the Slot 1 Celeron had not been properly secured and so had a tendency to wobble. Build quality is generally disappointing. In addition to the loose CPU, the interior is a litle overcrowded. The problems did not end there, however. After booting up, we had difficulty benchmarking the system. We found over 15 programs running in the background, including Internet Explorer, PC Cillin anti-virus and Lotus SmartSuite functions. These, along with Windows 98, took up a large chunk of the system resources. 64Mb of RAM occupies one of only two DIMM slots. The graphics card is the powerful ATi Rage 128GL with 16Mb RAM, and the sound is built into the motherboard in the form of the Yamaha OPL3 chipset. A 56K modem occupies one of the PCI slots, leaving a single PCI and two ISA slots free. A large 8.4Gb IBM hard drive occupies one of the 3.5in bays up front, and a 32X Samsung CD-ROM sits on the 5.25in bays on top of it. The High Impact has a FIC motherboard which uses Intel's EX chipset. As this chipset is intended to work only with the Celeron, you could only upgrade to a faster Celeron, not to a Pentium II. The BX chipset, which supports front-side bus speeds of 100MHz for faster RAM access and works with both Celeron and Pentium II, might be a better choice.



The Mag XJ530 monitor has good picture quality at all resolutions. The refresh rate is a flicker-free 75Hz at 1024x768, rising to 85Hz at 800x600.

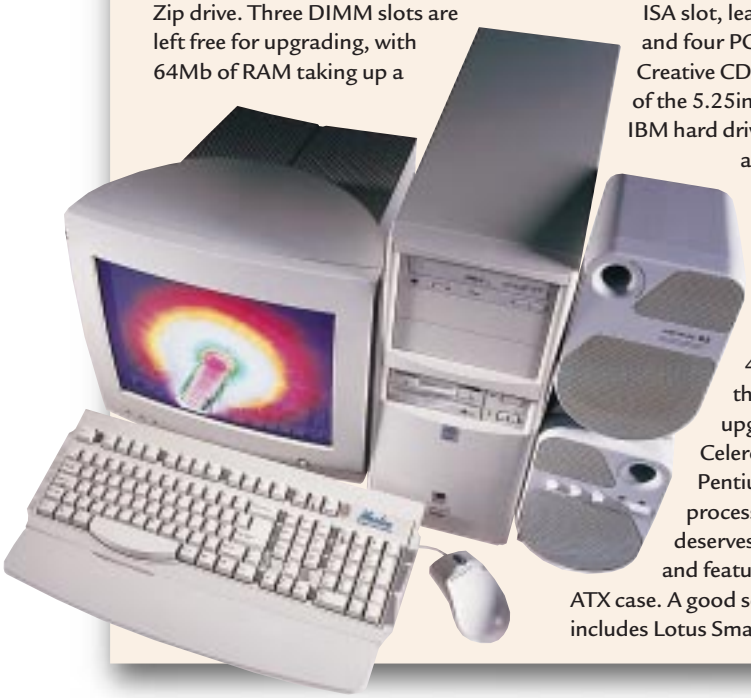
PCW DETAILS

Price *£799 (£680 ex VAT)*
Contact *Impact 0800 833157*
www.impact-net.co.uk
Good Points *High graphics performance. Good software package.*
Bad Points *Poor software installation. Loose CPU. Poor build quality.*
Conclusion *Failed to make an impact.*

Build Quality	★★
Performance	★★★
Value for Money	★★★
Overall Rating	★★★

Mertec **Merit C400**

Mertec has always provided high-quality PCs for our group tests, and the Merit C400 did not disappoint. Built around a Slot 1 Celeron, it is the only PC in this test to come with an Iomega Zip drive. Three DIMM slots are left free for upgrading, with 64Mb of RAM taking up a single slot. The Matrox Millennium G200 sits in the AGP slot, and the SoundBlaster PCI 128, one of the few PCI sound cards with two outputs, is included. A 56K modem takes up an ISA slot, leaving a single ISA and four PCI slots free. A 36X Creative CD-ROM occupies one of the 5.25in bays. A huge 8.3Gb IBM hard drive takes up an adjacent internal 3.5in bay, leaving another 3.5in and two 5.25in bays free. The FIC motherboard sports Intel's SE 440BX chipset, so the Merit can be easily upgraded to faster Celerons as well as Pentium II or Pentium III processors. Build quality deserves special mention and features a well-ventilated ATX case. A good software bundle includes Lotus SmartSuite Millennium, IBM Via Voice and the Microsoft Consumer Value pack.



The 15in ADI Pro Vista monitor provides excellent image quality. It supports a refresh rate of 85Hz at 800x600 resolution, dropping to 70Hz at 1024x768.

PCW DETAILS

Price *£799 (£680 ex VAT)*
Contact *Mertec 01792 473700*
www.mertec.co.uk
Good Points *Excellent build quality. Large hard drive. Zip drive.*
Bad Points *None.*
Conclusion *An extremely competent system for home or office use.*

Build Quality	★★★★
Performance	★★★★
Value for Money	★★★★
Overall Rating	★★★★★

Mesh **Elite 400 CE**

HIGHLY COMMENDED Personal Computer World

The Elite 400CE is an excellent performer with high-quality components. Built around a Slot 1 Celeron, the Mesh system has 64Mb of RAM in a single DIMM module, leaving two DIMM slots free for upgrading. The Intel motherboard uses the SE 440BX chipset, so the Elite is easy to upgrade to Pentium II or Pentium III. The display is driven by the excellent Matrox Millennium G200 graphics card. Its high 250Hz Ramdac provides high resolutions without flickering, while its 2D and 3D image quality is among the best provided by any graphics card.

The SoundBlaster PCI 64 chipset is built onto the Intel motherboard, which frees up a slot but makes upgrading tricky. One of the PCI slots is filled by a 56K modem, leaving two PCI and three ISA slots free.

The Elite 400CE has a 32X Teac CD-ROM and a massive 8.4Gb Western Digital hard drive. With an average access time of 9ms, the drive is fast enough for home or office use.

The build quality of the Mesh system is outstanding, with all components enclosed in a large ATX case. With the power supply unit and cables tucked out of the way, the interior is easy to access. A setup manual is provided.

The 15in ADI Provista E44 monitor is more than capable of handling the sharp images produced by the graphics card. Its refresh rate is a decent 70Hz at a high resolution of 1024x768, and the controls are easy to manipulate.

PCW DETAILS

Price *£799 (£680 ex VAT)*
Contact *Mesh 0181 208 4706*
www.meshplc.co.uk
Good Points *Good-quality components. Useful manual.*
Bad Points *Sound on the motherboard.*
Conclusion *A fast system with build quality to match.*

Build Quality	★★★★★
Performance	★★★★
Value for Money	★★★★
Overall Rating	★★★★

Nebraska **HQ Multimedia MT PC400**

The MT PC400 comes in a rather cute-looking case with colourful switches at the front. Inside, a Slot 1 Celeron sits on an Abit BX6 motherboard which uses the Intel 440BX chipset. Therefore, it supports Pentium II and Pentium III processors as well as front-side bus speeds higher than 66MHz. This new Abit board can even support speeds up to 133MHz with an 8X multiplier, so in theory at least, it can support CPUs faster than 1GHz. All five PCI slots are free. The AWE 64 sound card and the modem are ISA devices. The display is provided by a QDI Legend graphics card with the Rendition V2200 chipset.

Although it supports 32-bit colour, it is not a brilliant performer. The 6.4Gb hard drive is from Fujitsu and the Creative 36X CD-ROM takes up a 5.25in bay above it, leaving one 3.5in and two 5.25 in bays free.

The interior of this system is a world apart from its eye-catching exterior. The IDE and power cables are coiled together inseparably, and the hard-drive cable had found its way around the lone DIMM module. And in addition to background applications eating up system resources, DirectX 6 had not been installed.

The 15in monitor has large, pushbutton controls and on-screen menus. Refresh rate is a flicker-free 75Hz at 800x600, dropping slightly to 70Hz at 1024x768.

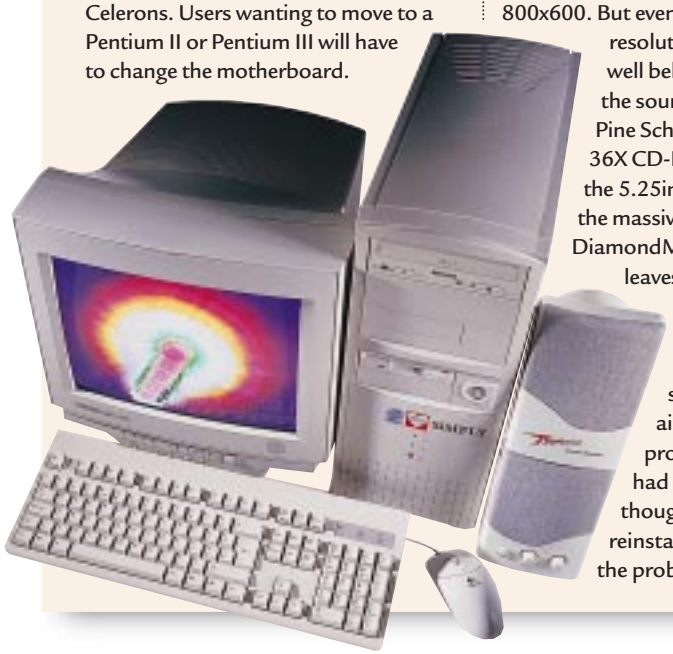
PCW DETAILS

Price *£799 (£680 ex VAT)*
Contact *Nebraska 0171 702 0702*
www.nebraska.co.uk
Good Points *Good monitor. Motherboard.*
Bad Points *Poor build quality. No PCI devices.*
Conclusion *Disappointing in most areas.*

Build Quality	★★
Performance	★★
Value for Money	★★★
Overall Rating	★★

Simply **Power 400 PPGA**

The Simply Power 400 PPGA is the only PC in this group to have Intel's new Socket 370 Celeron. The motherboard is from Supermicro and has the new ZX-66 chipset. Although adequate for running the Celeron, it does mean that upgradeability is limited to faster Celerons. Users wanting to move to a Pentium II or Pentium III will have to change the motherboard.



Upgradeability is further limited by the single free PCI and ISA slots. 64Mb of RAM comes in a single DIMM module, leaving two slots free, and a Diamond SpeedStar A70 graphics card sits in the AGP slot. Despite its 8Mb RAM, 3D resolutions are limited to 800x600. But even at this lower resolution, performance is well below average. Similarly, the sound card is the modest Pine Schubert Solo. A Philips 36X CD-ROM takes up one of the 5.25in bays, and below it is the massive 10Gb Maxtor DiamondMax hard drive. This leaves one 3.5in and two 5.25in bays free. Build quality is above average. In spite of only one fan, air circulation is not a problem. The Power 400 had difficulty rebooting, though, and we had to reinstall Windows to rectify the problem. On the plus side, Simply does provide a good software bundle which includes Corel WordPerfect Suite 8 and some games.

The 15in Taxan monitor supports a refresh rate of 70Hz at 1024x768 and its image quality is excellent. The pushbutton controls with on-screen menus are easy to learn and use.

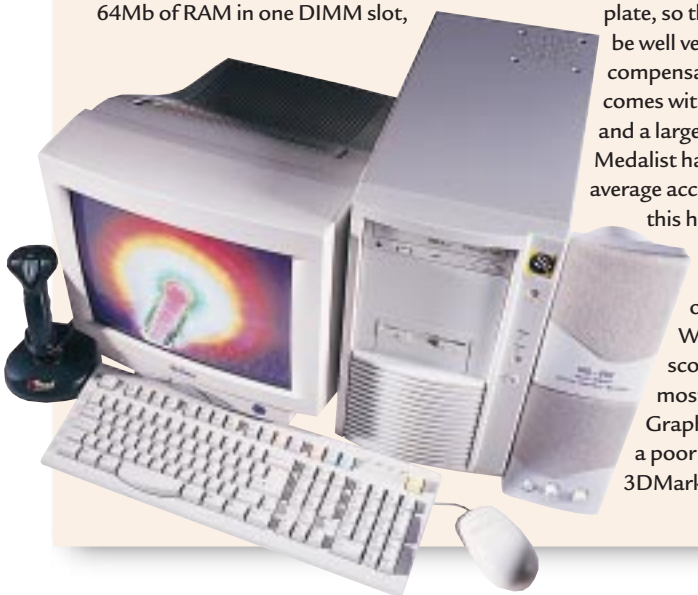
PCW DETAILS

Price *£799 (£680 ex VAT)*
Contact *Simply Computers 0181 498 2130 www.simply.co.uk*
Good Points *Large hard drive. Good monitor.*
Bad Points *Poor graphics performance. Limited upgradeability.*
Conclusion *Excellent in parts, disappointing in others.*

Build Quality	★★★
Performance	★★
Value for Money	★★★
Overall Rating	★★★

Strand **3D Plus**

Immediately after setting up the 3D Plus, we encountered a problem with the ATi Rage II graphics card. Strand had apparently not installed the latest drivers for Windows 98 and DirectX 6 for this card. As the Rage II is now a relatively old chipset, its image quality is also well below more recent offerings like the Matrox G200. The 3D Plus has 64Mb of RAM in one DIMM slot, leaving three slots free. There are also two 3.5in and 5.25in bays free. The Chaintech motherboard uses the 440BX chipset from Intel, so the 3D Plus is easy to upgrade to other, more powerful Intel CPUs. The SoundBlaster PCI 64 chipset is built on to the board. The Slot1 Celeron has a heatsink without the common heat-conducting graphite back plate, so the case will need to be well ventilated to compensate. The 3D Plus comes with a 36X CD-ROM and a large 4.3Gb Seagate Medalist hard drive. With an average access time of 11ms, this hard drive was a factor in lowering the performance of the Strand system. With a SYSMark 98 score of 147, it trails most other PCs. Graphics is worse, with a poor score of 310 in 3DMark 99.



The 15in Belinea 10 20 10 monitor has excellent picture quality, with a refresh rate of 70Hz at 1024x768. However, the controls are extremely difficult to understand and operate.

PCW DETAILS

Price *£799 (£680 ex VAT)*
Contact *Strand Computers 01392 860077 www.strand.co.uk*
Good Points *Large ATX case. Decent build qualit.y*
Bad Points *Poor system and graphics performance. Improper driver installation. Slower hard drive than others in this test.*
Conclusion *A slow PC with average-quality components.*

Build Quality	★★★
Performance	★★
Value for Money	★★★
Overall Rating	★★★

Celeron **processor:**
the best choice for your PC?

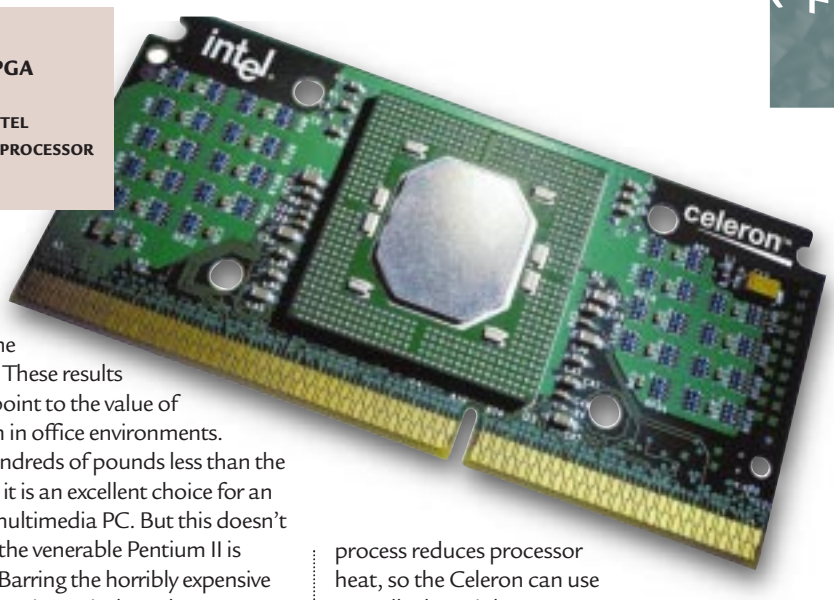
Early last year, the first batch of Celerons was released at clock speeds of 266MHz and 300MHz. Although in terms of clock speed they were only slightly slower than their Pentium II counterparts, performance in business applications left much to be desired because the early Celerons did not have a L2 cache. Business applications like Excel use the L2 cache to store frequently accessed data. Without it, the CPU had to retrieve the data from system RAM, which takes longer than fetching it from the cache memory.

Intel rectified this ommission when it introduced the Celeron 300A, which has 128Kb of L2 cache on the processor die itself. More importantly, this cache runs at the same core clock speed as the CPU. The Pentium II has 512Kb of L2 cache, but it only runs at half the core speed of the processor.

With the introduction of the 400MHz Celeron, the clock speed gap between Intel's premium and budget CPUs has narrowed dramatically. It also brings into sharp focus the performance difference between the Celerons and the Pentium IIs. Our lab tests show that Celerons and Pentium IIs of the same clock speed have virtually identical performance. In most business applications like Excel and PowerPoint, the cheaper Celerons matched the more expensive Pentium IIs. In some games, the Celeron is actually slightly faster.

It brings into sharp focus the performance difference between the Celerons and the PIIs

At first glance, this high performance may be rather surprising. However, a closer look at the design of the two CPUs helps to identify the reasons. Both the Celeron and the Pentium II are based on the same Deschutes core, which means that their integer and floating-point units are identical. Therefore, the only difference is the L2 cache on the CPUs. Our tests show that 128Kb of L2 cache on the Celeron running at full CPU speed is more than a match for the 512Kb half-speed cache on the Pentium II. These results inevitably point to the value of the Celeron in office environments. Costing hundreds of pounds less than the Pentium II, it is an excellent choice for an all-round multimedia PC. But this doesn't mean that the venerable Pentium II is worthless. Barring the horribly expensive Xeon, the Pentium II is the only x86 CPU capable of running in multiprocessor configurations. This makes it an excellent choice for dual-processor workstations and entry-level servers. The Pentium II's support for the 100MHz front-side bus counts in its favour. The full range of Celeron processors is provided in the single edge processor package (SEPP) also known as Slot 1, while 400, 366, 333 and 300A megaherz processors also come in a plastic pin grid array (PPGA) form factor. PPGA is compatible with the Socket 370, a new socket which looks like Socket 7 but with an extra row of pins. Socket 370 is proprietary and Super/Socket 7 chips such as AMD's K6-2 are not pin compatible. In this test, all but one of the vendors opted for Slot 1 as the more readily upgradeable.



▶ **The PPGA version of the Intel Celeron processor**

The SEPP packaging technology is very similar to the Pentium II's single edge contact (SEC) cartridge, but without the PII's BSRAM componentry, it is much cheaper to produce. It does not have a thermal plate or cover, although Intel claims the 0.25 micron manufacturing process reduces processor heat, so the Celeron can use a smaller heatsink.

The Celeron is Intel's answer to AMD's K6-2, which has 21 3D Now! instructions that help to improve floating-point performance. To get this improved performance, applications had to be specifically written to take advantage of the instructions. The performance of the K6-2 varies greatly depending on whether the applications used are 3D-Now! compatible or not.

The K6-2 runs on a Super 7 motherboard with a 100MHz bus speed, and like the Pentium II, the K6-2 has 512Kb of L2 cache. But unlike Intel's CPU, the speed of this L2 cache is tied to the front-side bus speed of the motherboard. As the Pentium II's clock speeds increased, the speed of its L2 cache increased correspondingly. But the speed of the cache on the K6-2 remained locked at around 100MHz.

Intel's Pentium III is already available in 450MHz and 500MHz clock speeds, and has 70 new instructions which enhance floating-point performance. AMD, meanwhile, has just released its K6-3 processor. This has 256Kb of on-die L2 cache which runs at the same speed as the CPU, so removing one of the limitations which beset the K6-2.

Ajith Ram and Ian Robson

Table of features

Manufacturer	Carrera	Dabs Direct	DCS	Hi-Grade	Impact Systems
Model	**Gemini C400**	**Atlantis 3D**	**Business PC**	**Ultis PV2 400**	**High Impact**
Price (ex VAT)	£680*	£680*	£680*	£680*	£680*
Price (inc VAT)	£799*	£799*	£799*	£799*	£799*
Telephone	0181 307 2800	0800 558866	0121 414 7575	0181 532 6123	0800 833157
Fax	0181 307 2850	0870 129 7000	0121 414 7565	0181 532 6110	01527 576025
URL	www.carrera.co.uk	www.dabs.com	www.dcsplc.co.uk	www.higrade.com	www.impact-net.co.uk
Main specification					
Processor	Celeron 400MHz	Celeron 400MHz	Celeron 400MHz	Celeron 400MHz	Celeron 400MHz
RAM	64Mb PC100	64Mb PC100	64Mb	64Mb PC100	64Mb
No of DIMM slots occupied/free	1/2	1/2	1/2	1/2	1/1
Hard disk manufacturer	IBM 6.4Gb	Maxtor 6.4Gb	Fujitsu 6.4Gb	Maxtor 10Gb	IBM 8.4Gb
Hard disk access time/interface	11ms / IDE	9ms / IDE	10ms / IDE	9ms / IDE	9ms / IDE
Motherboard components					
Motherboard	Supermicro SBA	Abit BH6	Supermicro P6SBA	Asus P2B	FIC EX VL603
Chipset	Intel 440BX	Intel 440BX	Intel 440BX	Intel 440BX	Intel 440EX
L2 cache/Max cache	128Kb/128Kb	128Kb/128Kb	128Kb/128Kb	128Kb/128Kb	128Kb/128Kb
I/O					
No of spare 3.5in / 5.25 bays	1 / 2	1 / 2	1 / 2	2 / 2	1 / 1
No of PCI only/ISA only/shared slots	3 / 3 / 1	4 / 2 / 1	3 / 3 / 1	3 / 3 / 1	2 / 2 / 1
No of USB/serial/parallel/PS2 ports	2 / 2 / 1 / 2	2 / 2 / 1 / 2	2 / 2 / 1 / 2	2 / 2 / 1 / 2	2 / 2 / 1 / 2
Multimedia					
CD-ROM/DVD drive	LG 2X DVD	Creative Labs 36X	Creative Labs 36X	Asus CD-5400	Samsung SCR-3232
CD-ROM/DVD speed/interface	20X / IDE	36X / IDE	36X / IDE	40X / IDE	32X / IDE
Sound card	CL SoundBlaster PCI 64	CL SoundBlaster Live! Value	CL SoundBlaster PCI 64	CL SoundBlaster Live! Value	Yamaha OPL3-Sax
Speakers	Turando	CL Four Point Surround	Typhoon	On monitor	Platinum sound P5630
Graphics and Monitor					
Graphics card	ATi Xpert 98	Creative Labs 3D Blaster	Matrox Millennium G200	Asus V3400TNT	ATi Fury Rage 128GL
Graphics card interface	AGP	AGP	AGP	AGP	AGP
Graphics card RAM/Max RAM	8Mb/8Mb	16Mb/16Mb	8Mb/16Mb	16Mb/16Mb	16Mb/32Mb
Monitor	LG 57M	ADI ProVista E44	Samsung CXK15E	Sampo 711m	Mag XJ530
Monitor size	15in	15in	15in	15in	15in
Max refresh rate at 800x600	75Hz	85Hz	80Hz	75Hz	85Hz
Max refresh rate at 1024x768	70Hz	70Hz	70Hz	70Hz	75Hz
Bundled Extras					
Modem	Generic Rockwell 56K	Generic Rockwell 56K	Jetway 56K	Accord	Generic Rockwell 56K
Modem-highest supported standard	V.90	V.90	V.90	V.90	V.90
Other hardware					
Other software	Lotus SmartSuite Millennium IBM Via Voice	Lotus SmartSuite 97 plus 13-title pack		Norton anti-virus Lotus SmartSuite Millennium Home multimedia pack	Lotus SmartSuite 97
Service and Support					
Sales hours	M-F 9-6, 10-6 Sat	M-T 8-8, F 9-5, Sat 9-3, Sun 10-3	M-F 9-5.30, Sat 10-4	Mon-Fri 9am - 5.30pm	M-F 9-6, Sat 10-2
Standard warranty	1 yr parts, 3 yrs labour RTB	1 yr OSM + 4 yrs labour only RTB	5 yrs RTB, 1 yr parts	1 yr on-site	1 yr on-site, 4 yrs labour RTB
Warranty options	1 yr OSM £39	3 yrs OSM £149		3 yrs on-site £95	3-5 yrs on-site
Technical support	Lifetime	Lifetime	Lifetime	Lifetime	Lifetime

* All prices correct for the on-sale period of *PCW* May 99. All prices exclude delivery.

Table of features

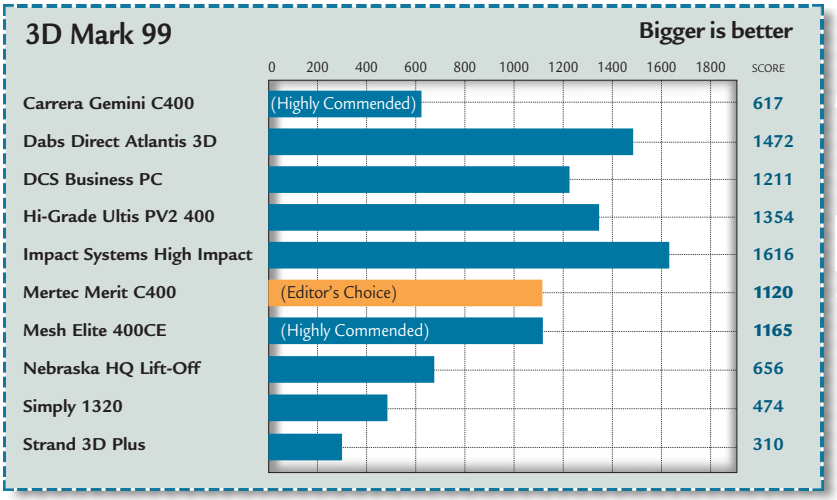




Manufacturer	Mertec	Mesh	Nebraska	Simply	Strand
Model	**Merit C400**	**Elite 400CE**	**HQ MT PC400**	**Power 400 PPGA**	**3D Plus**
Price (ex VAT)	£680*	£680*	£680*	£680*	£680*
Price (inc VAT)	£799*	£799*	£799*	£799*	£799*
Telephone	01792 473700	0181 208 4706	0171 702 0702	0181 498 2130	01392 860077
Fax	01792 473887	0181 208 4493	0171 702 0808	0181 523 4002	01392 860220
URL	www.mertec.co.uk	www.meshplc.co.uk	www.nebraska.co.uk	www.simply.co.uk	www.strand.co.uk
Main specification					
Processor	Celeron 400MHz	Celeron 400MHz	Celeron 400MHz	Celeron 400MHz	Celeron 400MHz
RAM	64Mb PC100	64Mb PC100	64Mb PC100	64Mb PC100	64Mb PC100
No of DIMM slots occupied/free	1/3	1/2	1/3	1/2	1/3
Hard disk manufacturer	IBM 8.3Gb	Western Digital 8Gb	Fujitsu 6.4Gb	Maxtor 10Gb	Seagate 4.3Gb
Hard disk access time/interface	9.5ms / UDMA	9ms / IDE	11ms / IDE	8ms / IDE	11ms / IDE
Motherboard components					
Motherboard	FIC VB-601	Intel SE440BX	Abit BX6	Supermicro 370SBA	Chaintech 6BTM
Chipset	Intel SE 440BX	Intel 440BX	Intel 440BX	Intel 440ZX-66	Intel 440BX
L2 cache/Max cache	128Kb/128Kb	128Kb/128Kb	128Kb/128Kb	128Kb/128Kb	128Kb/128Kb
I/O					
No of spare 3.5in/5.25 bays	1 / 2	1 / 2	1 / 2	1 / 2	1 / 2
No of PCI only/ISA only/shared slots	4 / 2 / 1	3 / 2 / 1	4 / 0 / 1	2 / 1 / 1	3 / 2 / 1
No of USB/serial/parallel/PS2 ports	2 / 2 / 1 / 2	2 / 2 / 1 / 2	2 / 2 / 1 / 2	2 / 2 / 1 / 2	2 / 2 / 1 / 2
Multimedia					
CD-ROM/DVD drive	Creative Labs 36X	Teac 32X	LG CDR-8360B	Philips 36X	Creative Labs 36X
CD-ROM/DVD speed/interface	36X / IDE	32X / IDE	36X / IDE	36X / IDE	36X / IDE
Sound card	CL SoundBlaster PCI 128	CL SoundBlaster PCI 64 V	Creative Labs AWE 64 V	Pine Schubert Solo	Creative Labs PCI 64
Speakers	Mertec 80W	PowerMax 80	Aiwa SC-C57	Typhoon	Multimedia speaker
Graphics and Monitor					
Graphics card	Matrox Millennium G200	Matrox Millennium G200	QDI Legend	Diamond SpeedStar A70	ATI CardExpert
Graphics card interface	AGP x 2	AGP	AGP	AGP	AGP
Graphics card RAM/Max RAM	8Mb/16Mb	8Mb/16Mb	8Mb/8Mb	8Mb/8Mb	8Mb/8Mb
Monitor	ADI ProVista E44	ADI ProVista E44	Shino TMS87D	Taxan 550 TCO 95	Belinea 10 20 10
Monitor size	15in	15in	15in	15in	15in
Max refresh rate at 800x600	85Hz	85Hz	75Hz	75Hz	85Hz
Max refresh rate at 1024x768	70Hz	70Hz	70Hz	70Hz	70Hz
Bundled Extras					
Modem	Generic Rockwell 56K	Diamond Supra Express 56K	Generic Rockwell 56K	Modular Technology	Modem on Earth
Modem-highest supported standard	V.90	V.90	V.90	V.90	V.90
Other hardware	Iomega Zip drive				Trust joystick
Other software	Lotus SmartSuite 97 IBM Via Voice Ms Consumer Value Pack	Lotus SmartSuite Millennium, IBM ViaVoice		Corel WordPerfect Suite 8 Norton Anti-Virus Rescue Me	
Service and Support					
Sales Hours	Mon-Fri 9am - 5.30pm	M-F 9-6, Sat 10-4, Sun 10-2	Mon-Fri 9.30am - 6pm	Mon-Fri 9am - 6pm	M-F 9-5, Sat 10-1
Standard warranty	5yrs RTB, 2yrs P&L, 3yrs L	1 yr on-site, 2 yrs BTB	3 yrs, 1st yr on-site	1 yr on-site	3yrs RTB, 1 P&L, 2/3 L only
Warranty options	Up to 3 yrs on-site	3 yrs on-site	3 yrs on-site	3 yrs on-site	3 yrs next day support
Technical support	Lifetime	Lifetime	Lifetime	Lifetime	Lifetime

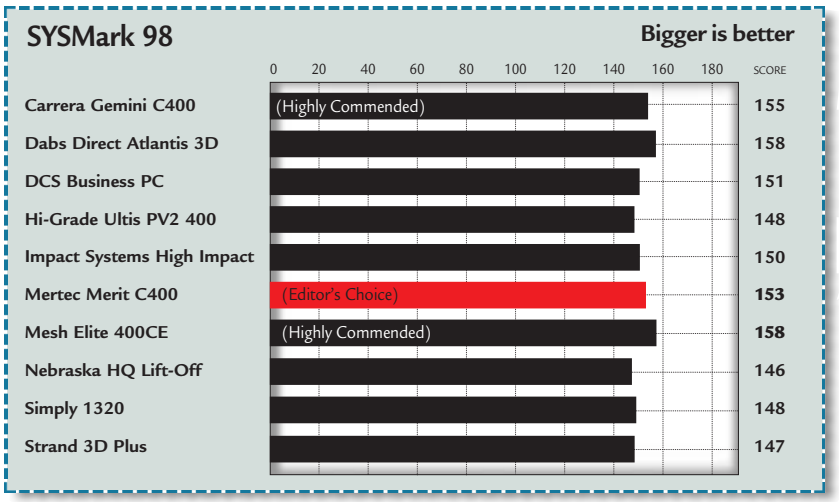
* All prices correct for the on-sale period of *PCW* May 99. All prices exclude delivery.

PCW Labs Report



3DMark99 specifically tests the graphics card and AGP throughput and it's here that real variation in performance shows up. This is mainly due to the amount of RAM on the graphics card, the type of RAM and the actual abilities of the graphics chipsets. Graphics cards with TNT chipsets, such as in the Hi-Grade, easily beat the competition. A full 128-bit chipset, the TNT has support for AGP 2X and 16Mb of RAM. This produces much better results than the 64-bit chipsets such as the Rage II, which supports only 8Mb of RAM.

We set a level playing field in this group test, asking for Celeron 400s and 64Mb of RAM in every case. As a result it is not surprising that the performance of the fastest machine was not greatly in excess of that of the slowest. In general, the fastest PCs were those with an excellent software configuration: for instance, the fast Mesh Elite 400CE and the Atlantis 3D from Dabs Direct have the latest drivers installed. They also have minimal applications running in the background. The faster hard drives of these systems would have made a difference, too.



How we did the tests

We ran two sets of tests on the PCs in this group test: **SYSMark 98** to test the speed of the machines when running 2D and 3D applications, and **3DMark 99** to test the graphics capabilities.

☛ **SYSMark** measures the speed of the PC running 14 common office and content creation applications, and the time it takes to perform a variety of tasks in each application. Each test is run three times to ensure consistent results. The applications are divided into two categories:

☛ **Office Productivity**: CorelDraw 8, Microsoft Excel 97, Dragon Systems NaturallySpeaking 2.02, Netscape Communicator 4.05 Standard Edition, Caere OmniPage Pro 8.0, Corel Paradox 8, Microsoft PowerPoint 97 and Word 97.

☛ **Content Creation**: MetaCreations Bryce 2, Avid Elastic Reality 3.1, Macromedia Extreme 3D 2, Adobe Photoshop 4.01, Adobe Premiere 4.2, and Xing Technology XingMPEG Encoder 2.1.

The number of tests run, and the type of applications used in this benchmark, ensure that all PCs are pushed to the limit, and that even those machines with very powerful processors are given a thorough workout. Performance depends on processor speed, RAM, graphics card and disk I/O. As the tests are based on widely available software packages, SYSMark scores accurately reflect how the machine will perform in a real-world situation.

☛ **3DMark 99** is a suite of tests designed to examine the 3D performance of your PC. It uses a Real World DirectX6 3D game engine, MAX-FX, from Remedy Entertainment, and 3D Realms. It produces one result from a balanced testing methodology that includes image quality, rendering speed and CPU capability. For comparison, all 3Dmark 99 benchtests are performed at a resolution of 1024x768 in 16-bit colour depth with the test suites set to loop three times. Again, the higher the score, the better the result. You can get a taster by downloading 3DMark 99 Lite from www.3dmark.com.

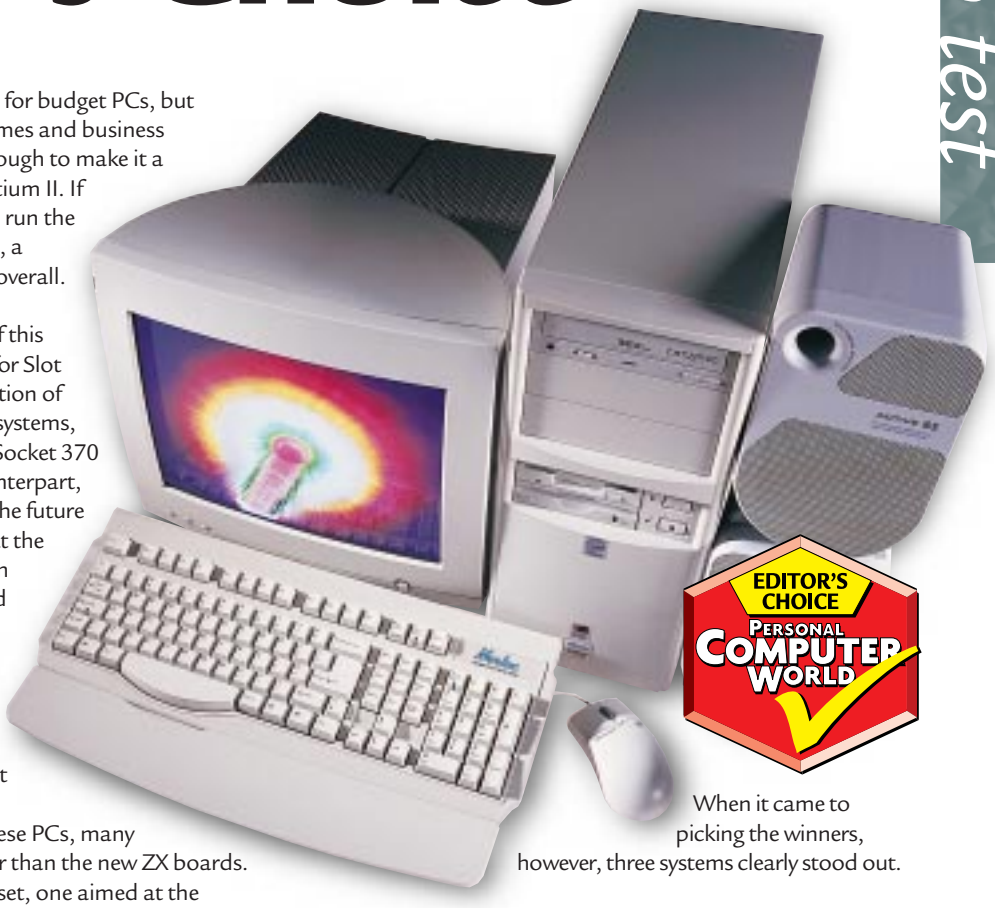
Editor's **Choice**

The Celeron is a low-cost CPU for budget PCs, but its overall performance in games and business applications is impressive enough to make it a serious alternative to the costlier Pentium II. If you're looking for a budget system to run the more common business applications, a Celeron processor is a very good bet overall.

One interesting fact to come out of this group test is the vendors' preference for Slot 1 Celerons. Although they had the option of supplying either Slot 1 or Socket 370 systems, many of them chose the former. The Socket 370 Celeron is cheaper than its Slot 1 counterpart, and while Intel assures us that this is the future direction for many of its processors, at the moment it does not provide as easy an upgrade path as Slot 1. Also, provided you have the right version of the BX chipset on your Slot 1 motherboard, you will be able to upgrade later to a Pentium III. One manufacturer opted for the best of both worlds by using the Socket 370 Celeron 400, but inserted it in Intel's Slot 1 riser board.

Despite the low price points of these PCs, many had superior BX motherboards rather than the new ZX boards. There are two versions of the ZX chipset, one aimed at the Pentium II and the other, the ZX-66, intended for use with the Celeron. The ZX-66 has more limited functionality than the ZX, keeping the front-side bus speed static at 66MHz, rather than the 100MHz speed of the ZX and BX chipsets.

Most of the PCs in this group test have good build quality. Some, like those from Mesh, Mertec and Dabs Direct, also have excellent software configurations in the form of the latest drivers and few applications running in the background.



When it came to picking the winners, however, three systems clearly stood out.

☛ **If there's one system** that had exceptional build quality, it's the **Mesh Elite 400CE**. Like the Mertec PC, the Elite comes with the Matrox Millennium G200, a good all-round graphics card. For everyday office use, the 15in ADI monitor has few peers, and the accompanying instruction manual is second to none.

☛ **Carrera's Gemini C400** sports a DVD drive, a 6Gb hard drive and an excellent monitor. The Gemini is also the only one that can accommodate faster Socket 370 and Slot 1 processors, with its combination of a Socket 370 processor in a Slot 1 riser card. Overall system performance is well above average and the extensive software bundle gives the package an extra edge. So, for providing high-quality solutions for home or office use, the **Carrera** and **Mesh** systems get our **Highly Commended** awards.

☛ **The Editor's Choice award** goes to the **Mertec Merit C400**. It's the only PC in the group test with an Iomega Zip drive, and the hard drive is a massive 8.3Gb. A flicker-free high-quality 2D display is an absolute necessity in office environments, and is provided in this case by the combination of a Matrox Millennium G200 graphics card and the ADI ProVista E44 monitor. A good software bundle and setup manual complement the Merit C400's excellent build quality.

● *Next month we take an in-depth look at Intel's Pentium III, running it head to head against the Pentium, and recommend which technology to go for.*

● *For buying advice, see the PCW Best Buys section at the back of the magazine [see Contents, pp6/7].*

Pop parts

Get better performance and extend the life of your PC by popping in a new motherboard. We've tested 18 tasty numbers.

New cars depreciate at a frightening rate and PC technology moves at such a pace that one month's speed demon can look like a sluggard the next. Few would take the drastic measure of replacing their car's engine, but keeping your PC up to date is a little easier.

Replacing your motherboard is one of the most cost-effective options for extending the life of your system. If your PC seems slow in comparison to newer models, it's more likely to be caused by a combination of the slow bus systems which carry data from your components and main memory, rather than being entirely the fault of your processor. It is the bus system which is upgraded when replacing an old motherboard and drastic performance increases can sometimes result. If your budget is tight, you may need to carry on using some or all or your existing components, so you will need compatible slots. And, certain motherboard layouts may be more suited to your system than others.

Here, we've covered the main considerations such as on-board chips, BIOS software and new slot technologies. More experienced readers may want to look at how to push the safety limits with overclocking. And, we offer some essential advice on how to install your new motherboard. In case you want a closer look at all motherboards: we have put high-resolution pictures on this month's cover CD.

Ratings

★★★★★ **Highly recommended**
★★★★ **Great buy**
★★★ **Good buy**
★★ **Shop around**
★ **Not recommended**

Contents

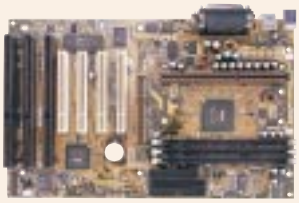
◆ *Motherboards tested and reviewed by Ian Robson*

ABIT AB-LM6

Although this is a Slot 1 board, it only supports a maximum 66MHz front-side bus and has been included in this group test for comparison with the Socket 370 Celeron boards. Where it seems the Socket 370 alternatives have been designed from the base up as economical solutions, this is a fully-featured board with a full quota of bus and DIMM slots. The larger board layout affords enough room to avoid any cable tangles or obstructions to airflow around the Celeron, although this is at the loss of the baby ATX case option. The manual is littered with photographs and diagrams but just doesn't hit the mark in explaining sufficiently well the details that other manuals cover admirably.

Construction	★★★★★
Usability	★★★
Features	★★★★
Value for Money	★★★
Overall	★★★★

ASUS P2V



Providing a board that supports an overwhelming number of front-side bus configurations may prove tempting for the overclockers, and the fully supported hardware monitoring will come in handy, but the average user will generally stick with the recommended, fully supported 100MHz FSB and may see this as an unnecessary expense. It may have been a small premium to offer this substantial choice, but it's at the expense of a few minor considerations that needed attention elsewhere, such as a heat sink for the northbridge chip. The manual is tailored to the technically minded person who could nevertheless be a novice in motherboard installation.

Construction	★★★
Usability	★★★★
Features	★★★
Value for Money	★★★★
Overall	★★★

CHAINTECH CT-6BTA3

It is rare that a motherboard, once correctly connected to your system, will fail to power up as this one did, so some frustration ensued until a few simple chip checks were applied: sure enough, the BIOS chip wasn't completely housed. To Chaintech's credit, the rest of the construction was of high quality with an inspired layout and processor supports already expertly fixed. Ample bus slots haven't suffered through the adoption of on-board sound, and four DIMM slots provide extra housing for those smaller-capacity modules transferred from an older machine. The manual is pitched at an experienced user, but with use of the blank memo pages, a newcomer could muddle through.

Construction	★★★
Usability	★★★★
Features	★★★★
Value for Money	★★★★
Overall	★★★★

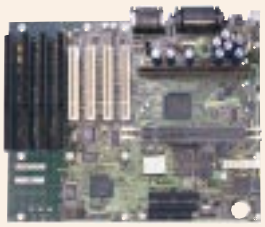
GIGABYTE GA-6BXE

EDITOR'S CHOICE PERSONAL COMPUTER WORLD

Those with less than perfect sight will praise Gigabyte's colourful offering with its hefty orange mini-sink on the northbridge chip, a sky blue DIP switch, and brightly coloured jumpers scattered elsewhere. Without having to resort to maximum form-factor size, a very generous quota of DIMM and peripheral slots have been squeezed on, and the inspired layout hasn't resulted in the likelihood of criss-crossing of cables. The manual is not quite so colourful but holds something for other manuals to aspire to in its simplicity in explaining technical details. The quick-start section is just large schematic diagrams with little or no text, but pulls no punches in instructing the user.

Construction	★★★★★
Usability	★★★★★
Features	★★★★★
Value for Money	★★★★★
Overall	★★★★★

INTEL Rochester (RC440BX)



The Rochester incorporates not only on-board sound but also an excellent AGP graphics sub-system from nVidia. This does, of course, scupper any intentions for improving upon the primary display adapter, but it is nevertheless a powerful choice that will see a non-gamer through to their next whole system upgrade. Taking advantage of the full ATX form factor has allowed for a spacious layout with no likely cable tangles and a generous supply of bus slots. However, this should also have allowed for the front panel, floppy and EIDE connections to be placed in an area less susceptible to an overhanging system box structure.

Construction	★★★★
Usability	★★★★
Features	★★★★★
Value for Money	★★★★★
Overall	★★★★

MICRO-STAR MS-6163

Micro-Star has pulled out all the stops to produce possibly the most reliable and sturdy of constructions, with even the processor retention mechanism attached expertly for you. There are ample slots biased towards the preferred PCI option, and connection positioning reflects awareness of opening up system airflows. The northbridge chip heatsink has even been clipped down on the off-chance that glue may not retain its modest weight. The manual is not for the newcomer but nonetheless covers enough areas in sufficient detail to cope with your queries. If it could just be reformatted in a more user-friendly way, it could be in the running as a generic motherboard manual.

Construction	★★★★★
Usability	★★★★
Features	★★★★
Value for Money	★★★★★
Overall	★★★★★

Slot 1

SOYO SY-6BA+

SOYO boards should be used for tutorials on installing motherboards, as they set out to make light work of an otherwise daunting task with their no-nonsense quick-start guide. But the edge really becomes apparent from where others give up, in its quick BIOS setup. After completing four simple steps, including the Soyo Combo Setup for configuring your processor settings, you're away. A generous quota of bus and memory slots has not resulted in a compromised construction. Although it's a tight squeeze in some areas, the positioning of the connections has provided ample allowance for cable obtrusions to processor airflows.

Construction	★★★★
Usability	★★★★★
Features	★★★★
Value for Money	★★★★★
Overall	★★★★

SUPERMICRO P6SBA

Supplying a slightly thinner than average ATX board could have resulted in a compromised design. But not so. Some inspired re-shuffling has resulted in all cable connections being tucked tidily away from the bus slots, providing a clear access route. Also, it's quite encouraging to see thoroughly sturdy processor supports in an otherwise delicate product. Only one point of caution is that as the power plug is so close to some component circuitry, connecting is slightly restricted. The manual is not to everyone's taste as it is clearly written for those who wish to delve into the subject matter in more detail. Although there is no quick-start offering, the BIOS guide is excellent.

Construction	★★★★
Usability	★★★★
Features	★★★★
Value for Money	★★★★
Overall	★★★★

TMC MB-TI6NBS+

Incredibly, within the tempting asking price, TMC has managed to incorporate 64Mb of PC100 system memory onto the motherboard. It's quite a triumph of design to squeeze this onto a board which is already generous with its bus slots. There has been no skimping on other areas of design either, particularly with careful consideration being given to airflows when placing connections. The manual is a bit stark and charts are favoured over diagrams for most of its contents. This leaves much of the explanations to lengthy text that is clearly laid out and detailed, but is no replacement for a good schematic picture.

Construction	★★★★★
Usability	★★★
Features	★★★★★
Value for Money	★★★★
Overall	★★★★

Socket 370

ASUS MEL-M

ASUS obviously thought that cryptic model names were no longer desirable and opted for the sixth Spice Girl. This board may not match up to supergroup standards, but its excellent Yamaha XG on-board sound will provide good tunes. There is the obvious bus slot trade-off with an on-board peripheral but more so here than was really necessary, restricting upgrade options. The manual is a true enthusiast's dream, and good for newcomers, too. Every aspect and detail is described, with high-res pictures clearly labelled. There's even a comprehensive BIOS user guide to help you get the most out of your purchase.

Construction	★★★★
Usability	★★★★★
Features	★★★★
Value for Money	★★★
Overall	★★★★

INTEL FIJI

By incorporating basic sound and graphics on-board, Intel has pitched this motherboard at the same intended market as the Celeron itself. If you're after a cheaper, no-fuss alternative to separate peripheral cards plus motherboard, then the trade-off is a drastic reduction in bus slots. As the board is designed for lower-profile system boxes you may find that if you want to use it in a standard tower ATX case, the wide layout puts your front panel, floppy and EIDE connections under the 3.5in device bays. You can, of course, make all connections prior to screwing the board down, but for future alterations this can be very awkward.

Construction	★★★★
Usability	★★★★
Features	★★★★★
Value for Money	★★★★
Overall	★★★★

SOYO SY-6VZA

EDITOR'S CHOICE PERSONAL COMPUTER WORLD

Soyo's quick-start guide does just what it says on the cover and provides the first-timer with an open-arm approach. It focuses on exactly what is required for elaborate system configurations so that the user is quickly up and running and can then revert to the excellent comprehensive manual on the CD-ROM. The board is very slim and expertly designed to ensure that no cables will become tangled or restrict airflow across the processor. There is also on-board sound which is an ideal design consideration for this board's intended marketplace, still leaving ample slots for upgrading.

Construction	★★★★★
Usability	★★★★★
Features	★★★★★
Value for Money	★★★★★
Overall	★★★★★

ASUS P5A (Rev.1.04)

EDITOR'S CHOICE Personal Computer World

Where others have supplied a quick-start guide, here the summary details are printed on the board itself. Other vendors may have offered similar configuration charts, but only ASUS has managed to overcome the difficulties in printing coherent information within the integrated circuitry. For the experienced, this can be enough to get the system up and running without spending too long with the manual. Constructed with expertise, the layout seems almost spacious with no device connections likely to intertwine with one another. The processor may seem lonely in this configuration but it does benefit from unrestricted airflows.

Construction	★★★★★
Usability	★★★★
Features	★★★★★
Value for Money	★★★★★
Overall	★★★★★

CHAINTECH 5RSA2

Chaintech has managed to squeeze on-board sound onto an already cluttered micro-ATX motherboard, but this may have been at the expense of a couple of much-needed PCI slots. A more serious victim of the space-saving form factor is the positioning of the ATX power plug between the two memory slots and the floppy connector. With both EIDE connectors also in such close proximity, only the most nimble fingered person will feel confident enough to tackle any maintenance. Only a photocopied quick-start guide is supplied for initial installation, with a truly detailed software manual via Acrobat. But this isn't much good if you do get stuck and require more detailed instructions.

Construction	★★★
Usability	★★★★
Features	★★★★
Value for Money	★★★★★
Overall	★★★★

GIGABYTE GA-5AX

Design consideration has been applied to the positioning of component connections: no cables need cross over the processor, allowing for maximum airflow. Not so much consideration has been applied to simple memory upgrading. You are forced to remove the graphics adapter from the AGP slot, as the clips which house the modules spring right back over the slot. The manual too reflects some mixed ideas, containing as it does a full graphical quick installation guide, with a bare minimum of text proving difficult to follow. The more detailed section is hardly much larger and is far easier to comprehend.

Construction	★★★
Usability	★★★★
Features	★★★★
Value for Money	★★★★
Overall	★★★★

MICRO-STAR MS-5169 v3 AL9

Micro-Star's offering is a no-nonsense affair designed from extensive experience, ensuring that all component connections are placed where convenient for the user. One of the more practical implications of this is that the denser cables such as the floppy, EIDE and ATX power can be kept clear of the airflow required by the CPU and its heatsink/fan combo. Labelling on the board and the approach taken by the user manual does suggest a degree of computer literacy is required. A great improvement over previous manuals is that a detailed BIOS user guide provides enough guidance for the inexperienced while offering more advanced users some useful insights.

Construction	★★★★★
Usability	★★★★
Features	★★★★
Value for Money	★★★★★
Overall	★★★★

SOYO SY-5EMA+

Soyo provides a refreshing handheld approach with its quick-start guide. Experienced users will still find their requisite information, but for the first-timer upgrading, it may be a less traumatic experience than you had anticipated. The board itself is firmly constructed, and has been designed with the shortest route connections for all cables without causing an obstruction. Whereas some vendors have opted for a small heatsink for their northbridge chip, which can only be of benefit, Soyo has omitted this little luxury. Only time will tell if this is an economical decision too far.

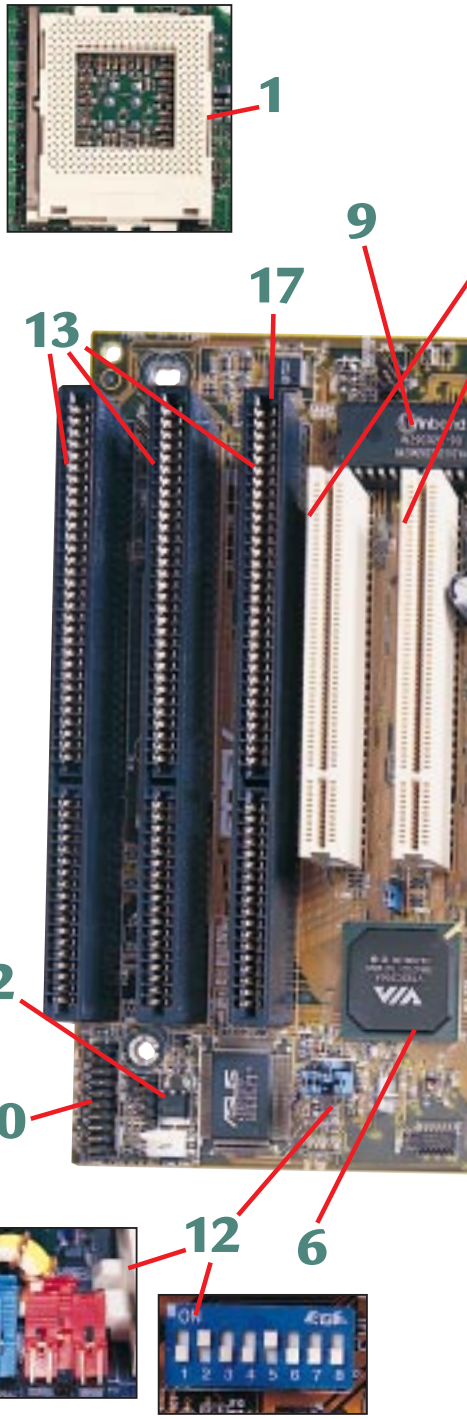
Construction	★★★★
Usability	★★★★★
Features	★★★★
Value for Money	★★★★
Overall	★★★★

TMC T15VG+

TMC does offer this model of board with a subdued 66MHz FSB, but for a minimal premium you can opt for the one tested here which fully supports 100MHz FSB. Although there are no on-board peripherals, the board is littered with additional features such as two 72-pin SIMMs for transferring memory from an older system. Squeezed elsewhere are connectors for IrDA and Wake-on-LAN with manual bus settings modulated by the less fiddly DIP switches. An extra feature is a full 1Mb of on-board L2 cache, although it has to be stated that if your processor is already running an L2 cache it will make very little use of this unless it's a K6-III!

Construction	★★★
Usability	★★★★
Features	★★★★★
Value for Money	★★★★
Overall	★★★★

Anatomy of a motherboard



1 Socket 370. Socket for Intel's 370-pin Plastic Pin Grid Array (PPGA) Celeron processor. Distinguishable from Socket 7 by its extra row of pinholes and a second cut-off corner.

2 Socket 7. Zero Insertion Force (ZIF) socket for 321-pin fifth generation processors including the Intel classic Pentium, Intel Pentium MMX, AMD K5/K6/K6-2/K6-III, IDT C6, and Cyrix 6x86/6x86L/6x86MX.

3 Slot 1. Slot for Pentium II/III Single Edge Cartridge Connector (SECC/SECC2) or Celeron Single Edge Processor Package (SEPP).

4 Three Dual Inline Memory Module (DIMM) sockets. For synchronous DRAM (SDRAM) memory and, in some cases, EDO memory.

5 Northbridge chip. An integrated chip essentially co-ordinating the northbridge architecture components with control circuitry which includes the memory and the CPU, AGP and PCI interfaces. Together with the southbridge chip it makes up the system chipset, the core logic of the board. (*For more on chipsets, see p170.*)

6 Southbridge chip. An integrated chip essentially co-ordinating the southbridge architecture components with control circuitry that includes the PCI to ISA bridge, IDE devices and, in some cases, the hardware monitor, advanced power management, USB controller and real-time clock.

7,8 Primary and secondary EIDE channels /floppy diskette channel

9 1 or 2Mit bit flashable BIOS EEPROM chip. The motherboard's system BIOS provides the Power-On Self Test (POST), the BIOS setup program and the PCI and IDE auto-configuration utilities. (*For more on BIOS software, see p172.*)

10 Real-time clock battery. Also provides a sustained power supply for user configuration data for the system hardware that is required prior to the operating system stored in the Complementary Metal-Oxide SemiConductor (CMOS).

11 ATX power supply connector. In very rare instances a board may also feature the older AT-style power connector. Be sure your current system box can supply power to the right connector for your new motherboard.

12 Jumpers. When set over two pins, shorts the connection, sending a configuration signal to the core logic. A combination of jumper settings may be required to configure bus frequencies and voltages. DIP switches are an alternative configuration device. Where there are no devices (i.e. a jumperless board), settings will either be configured automatically or via the BIOS software.

13 Industry Standard Architecture (ISA) bus slots. 16-bit bandwidth with a clock frequency of 8MHz.

14 Peripheral Component Interface (PCI) bus slots. 32-bit bandwidth with a clock frequency of 33MHz.

15 Accelerated Graphics Port (AGP). The new standard 2X specification has a 64-bit bandwidth with a standard clock frequency of 66MHz, although other frequencies are possible depending on the motherboard.

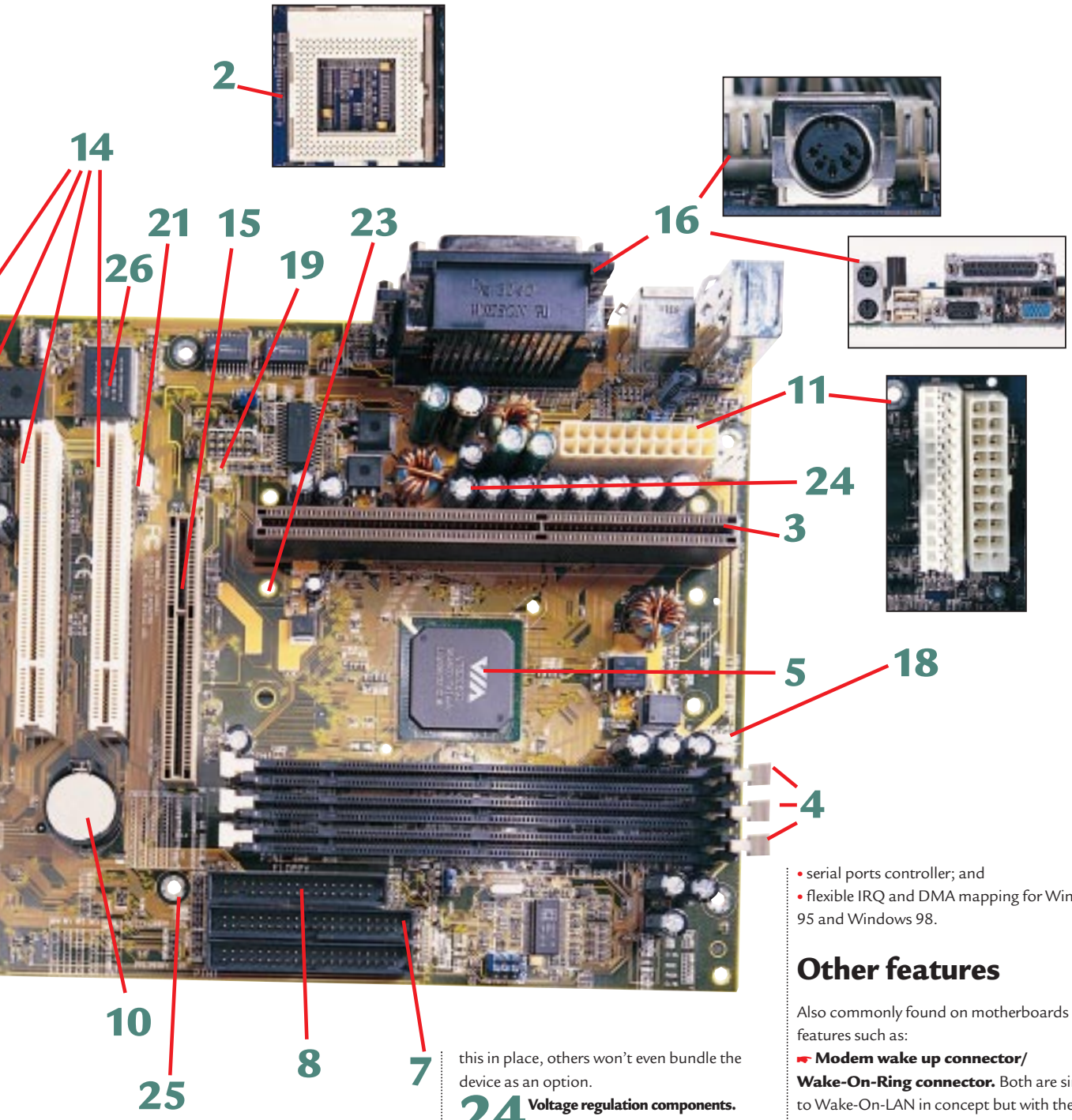
16 Ports. Two Universal Serial Bus (USB) ports, two serial ports, one parallel port, one PS/2 mouse connector and one PS/2 keyboard connector. Whereas a PS/2 will have six pinholes, the older-style keyboard connector will have five, hence the name '5-pin DIN', and will be almost twice the size.

17 Hardware monitor. Separate from the southbridge chip for this board. Monitors fan speeds, critical voltages and temperatures. If critical levels are reached, settings via the BIOS software will kick-in safety precautions such as slowing the CPU clock. In extreme circumstances it will shut down the system to protect it from permanent failure. Requires a small amount of system resource (a memory address) to perform its actions.

18 Fan connectors. One each for processor, power supply and chassis. They are preferable to direct power supply-connected fans as these on-board connections support rotational signal fans for monitoring purposes.

19 Thermal sensor connector. Some motherboards require manual installation of optional temperature sensors for critical areas of the boards.

20 Front panel connectors. For ATX-powered machines the vital power-on connector is located in this array, as are the connections for the reset switch and the system speaker. Other common connectors located here are for front panel LEDs, such as IDE activity and power-on, and occasionally for



a keyboard lock switch for connecting to a case-mounted switch which prevents the keyboard from responding to keystrokes.

21 **Wake-On-LAN connector.** This feature supports a system power-up when a wake-up packet or signal is received from a network through a compatible LAN card.

22 **IrDA-compliant infra-red module connector.** Support for a wireless-data transmitting and receiving infra-red module. Configuration of the device is also required through the BIOS software to switch the use of the UART2 resources from COM2 to IrDA. The module is rarely shipped with motherboards.

23 **Universal retention mechanism holes.** Two either end of a Slot 1 will house the retention device for physical processor support. Some motherboards will already have this in place, others won't even bundle the device as an option.

24 **Voltage regulation components.** A collection of coils and capacitors for smoothing the various voltages received from the mains supply.

25 **Mounting holes.** Scattered across the board and close to the corners for fully supporting the motherboard via mounting screws.

26 **Multi I/O controller.** Separate from the southbridge chip for this board. Handles the exchange of information between the processor and external devices. Common features include:

- integrated keyboard and mouse controller;
- industry standard diskette drive controller;
- one multimode bi-directional parallel port controller for standard Centronics-compatible operation and, in high-speed mode, support for Extended Capabilities Port (ECP) and Enhanced Parallel Port (EPP);
- serial ports controller; and
- flexible IRQ and DMA mapping for Windows 95 and Windows 98.

Other features

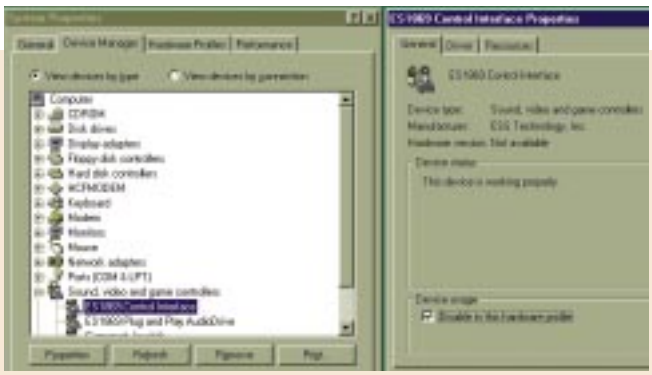
Also commonly found on motherboards are features such as:

☛ **Modem wake up connector/ Wake-On-Ring connector.** Both are similar to Wake-On-LAN in concept but with the obvious difference in the choice of hardware.

☛ **On-board peripherals.** In the case of on-board sound an extra connector, the SB-Link, may feature which enables support for modem voice transfers to the sound processor. (*For more about on-board chips, see p170.*)

☛ **L2 cache.** Socket 7 boards can feature second-level cache memory in an array of chips on the motherboard, commonly ranging in size from 512Kb to 2Mb. Constrained to the speed of the front-side bus clock, this synchronous pipelined burst static RAM (PBSRAM) is optimised for cacheing functions and will improve performance in systems running processors without a second-level cache. Tri-Level cacheing functionality is supported by AMD's K6-III and will adopt any on-board second-level cache for this purpose.

ON-BOARD CHIPS



Peripherals designed as integrated chips placed directly onto the motherboard are becoming more diverse and popular, including not just audio and video chips but also SCSI, LAN and even RAID controllers. But apart from a subsequent reduction in the number of bus slots provided, there can be major limitations imposed by some on-board devices.

An on-board AGP graphics solution may be a fraction of the cost of the slot card alternative, but you'll be stuck with no upgrade path to take advantage of better alternatives a year into the life of your motherboard. At present there is no vendor supplying a motherboard with an option to disable on-board AGP graphics and plug a card into a vacant AGP slot. Sound, LAN, IrDA and even SCSI controllers can usually be disabled by means of repositioning a jumper or DIP switch. This method will speed up your boot time as the motherboard omits the devices from its POST (Power-On Self Test) and frees-up BIOS-allocated resources. A modern OS will also give the user this option and, apart from AGP graphics, the following example for disabling on-board sound can be applied equally to other devices.

☛ **Pictured here** is the System Properties box from Windows 9x. If you expand the Sound, Video and Game Controllers branch you will see a number of devices which refer to your sound chip, usually by its model name — in this case, the ES1869. Double-clicking each device brings up the dialogue on the right with a check box for disabling. Once checked, you can shut down your system and install your preferred audio device with all resources previously allocated to your on-board audio now available for your new device. Any on-board peripheral that was fully installed will have had its drivers installed, any other supporting software and possibly a permanent Registry entry. Uninstalling the supporting software is advisable but the other legacies shouldn't be a concern if the OS is doing its job properly. Just to be sure, make a note of the installed device driver details so that if you install a similar device at a later date, your OS won't be confused by its presence and you can steer the driver update browser to the correct location.

SYSTEM CHIPSETS

One of the most important components of your PC is the system chipset. It is vital that you choose the right type to gain optimum system performance with your current configuration and ensure a smooth future upgrade path. The chipset consists of northbridge and southbridge chips, controls the flow of instructions and data between the CPU, system memory and motherboard bus, and determines how fast and how efficiently these transfers happen. It also looks after power management features.

Intel divides its chipsets into two main segments: performance and basic. In the former there are the BX and the ZX chipsets, and in the latter are the EX, LX and ZX-66 units. They all support 1X and 2X AGP, and SMM and ACPI power management. Users of faster Slot 1 CPUs will most likely opt for the BX chipset. This supports front-side bus speeds of 66MHz or 100MHz, up to 1Gb of SDRAM memory and dual processors. It works with the Celeron, PII and, if you have an enhanced version, the Pentium III line of CPUs.

Intel recently released the ZX, a cut-down version of the BX. It only supports 256Mb of SDRAM and does not support parity checking. Nor does it support dual processors. It can be used with the PIII although for most PIII users, the BX will be the chipset of choice. The other version of the ZX chipset, the ZX-66, is intended for use with Celeron processors.

Of the three chipsets in the basic category, the LX has been around the longest. With a maximum rated front-side bus speed of 66MHz it supports both Celeron and PII CPUs, up to 512Mb of SDRAM or 1Gb of EDO system memory at front-side bus speeds of 66MHz, and error correction for memory.

Lastly, there is the EX chipset, a budget chipset for a budget processor. Like the LX, the EX can support a maximum front-side bus speed of only 66MHz and just 256Mb of either EDO or SDRAM memory. It does not support parity checking for memory.

Intel's Camino chipset for the PIII is scheduled to be released soon, with full support for a bus speed of 133MHz.

At present, users who wish to upgrade are better off with the BX chipset as it supports three of Intel's CPU ranges. Intel will be announcing new chipsets in the middle of this year. New CPUs from AMD and Cyrix use chipsets that support the Super 7 standard. Like Intel's BX chipsets, Super 7s support front-side bus speeds up to 100MHz and are AGP 2X compliant. Users of AMD's K6-2 CPUs have a relatively painless upgrade path to faster K6-III processors. Later this year, though, AMD will introduce the K7 processor which will use a completely different motherboard and chipset.

AJITH RAM

BIOS SOFTWARE

When you switch on your PC, before it accesses the disk drives and boots into your operating system, it must have been given certain parameters that describe the disk drives attached to it. These, along with other details of how your PC is configured, are entered by the user via the Basic Input-Output System (BIOS) software.

The BIOS software is usually reached by hitting a single access key immediately after the system memory check, most commonly the <Del> key but occasionally <F1> or even a combination of keys. Pictured here is of one of the more common styles of BIOS software with sections for configuring all I/O devices, peripheral resources and settings, security options, power management setup, and auto-detection of IDE device settings. Jumperless boards will also contain a section for configuring your processor and bus speeds through software without the need for fiddling with your motherboard.

Detailed explanations of your specific motherboard's configuration entries are usually clearly explained in the supplied manual. Bear in mind that the best way to start is to trust the manufacturer's default settings and select 'auto' wherever possible. When you feel more confident, you will find that you're able to fine tune your system using the BIOS software to produce quite substantial improvements in boot-up times and even performance. Future hardware releases inherently provide an unknown factor for BIOS designers and it may become necessary to upgrade your BIOS for updated support or software revisions. However, never update your BIOS if your system appears to work fine, as revisions mostly address specific problems and are not designed to offer all users any kind of performance improvements.

The days of levering out your BIOS ROM chip to update the BIOS software are long gone. These days you can write to Electrically Erasable Programmable Read-Only Memory using floppy disk-based utilities which safeguard your return path by backing up your BIOS before replacing it. All the boards we reviewed for this group test had EEPROM BIOS ROM, but some manufacturers offered more extensive support for revisions than others.

CPU OVERCLOCKING

Overclocking is running your CPU at a clock or bus speed for which it has not been specified. Most PCs can benefit from mild overclocking. As long as you don't go mad, your PC will probably run fine, but CPU manufacturers don't like overclocking and discourage it. Nearly every sort of x86 processor can be over-clocked but the best results are often obtained from Intel silicon. AMD and Cyrix processors tend to run hot to start with, so overclocking makes them hotter still.

Heat is the main problem. Unless the CPU is properly cooled, overheating can cause the processor to misbehave and cause a kind of internal chip 'rot' called electromigration. Most chips can safely run at 80° C, but a cooling fan can drop this to 50° or less, so the degradation needn't be a major threat. First, track down a decent heatsink plus cooling fan, preferably a decent-quality ball bearing motor fan. Use some silicon heatsink compound to bond the heatsink to the CPU top, which makes a big difference to the heat transmission.

Step by step

I must warn you that over-clocking your processor is not for the fainthearted and if you don't know what you're doing you could end up frying your processor or motherboard, or worse. Only attempt this if you're not worried about your warranty (which will probably be invalidated) or toasting your CPU.

☛ **If you have** a modern, 'jumperless' motherboard the changes required can be done via CMOS setup. The others will require you to move some jumper sleeves or DIP switches, so you'll need your motherboard manual. Sometimes the jumpers are labelled on the motherboard but often they're not, so read the manual.

☛ **Two motherboard** settings need to be changed: the bus speed and the processor multiplier. To change the bus speed, look in your motherboard manual for something like 'CPU External (BUS) Frequency Selection' — these are the jumpers that need moving. At faster bus speeds, memory can get iffy and you really need good-quality RAM to run at these speeds.

☛ **Each CPU** uses a multiple of the bus speed, the so-called bus multiplier. For example, a P120 uses a X2 multiplier on a 60MHz bus, while a Celeron 300A uses a X4.5 multiplier on a 66MHz bus. To change this setting, find something like 'CPU to BUS Frequency Ratio Selection' in your motherboard manual.

☛ **Another thing** that often needs changing is the power supply to the CPU because processors which run faster, draw more power. Do not be overly concerned about pumping too many volts into your processor as a Pentium has a relatively wide voltage safety margin.

☛ **Finally,** you should bear in mind that very often the best, most stable results are achieved by going up a notch in speed. If you overdo it, you will probably just wind up with a hung system or maybe worse, in which case, simply put the jumpers back the way they were.

ROGER GANN

Table of features






Manufacturer	ABIT	ASUS	Chaintech	Gigabyte	Intel	Micro-Star
Model Name	**AB-LM6**	**P2V**	**CT-6BTA3**	**GA-6BXE**	**Rochester (RC440BX)**	**MS-6163**
Price (ex VAT)	£57	£73	£75	£78	£95	£73
Price (inc VAT)	£66.98	£85.78	£88.13	£91.65	£111.63	£85.78
URL	www.abit.com.tw	www.asus.com	www.chaintech.com.tw	www.gigabyte.com.tw	www.intel.com	www.msi.com.tw
UK supplier	Simply Computers	Dabs Direct	EveshamVale	Micro Direct	Intel Response Centre	Dabs Direct
UK supplier's telephone	0870 7274020	0800 558866	0800 496 0800	0161 248 4848	0870 607 2439	0800 558866
Form factor/size (l x w)	ATX / 305x191mm	ATX / 304 x 192mm	ATX / 304 x 205mm	ATX / 305 x 190mm	ATX / 305 x 244mm	ATX / 305 x 192mm
CPU						
Socket type	Slot 1	Slot 1	Slot 1	Slot 1	Slot 1	Slot 1
CPU vendors supported	Intel	Intel	Intel	Intel	Intel	Intel
CPU Bus freq mult mod [1]	Soft CPU via BIOS	jumpers	SeePu via BIOS	DIP switch	via BIOS	CPU P & P II via BIOS
CPU Bus freq mult options	x2.5 - x8 (0.5 integrals)	x2 - x8 (0.5 integrals)	x2 - x5.5 (0.5 integrals)	x3 - x5.5 (0.5 integrals)	Set proc speed in BIOS	x3 - x8 (0.5 integrals)
CPU Bus freq modulator	Soft CPU via BIOS	jumpers	SeePu via BIOS	DIP switch	via BIOS	CPU P & PIII via BIOS
CPU Bus freq options	66 - 83MHz (3 Set)	66.8 - 150MHz (14 set)	66 - 133MHz (7 set)	66 - 133MHz (7 set)	66MHz or 100MHz	66 - 153MHz (16 Set)
Core voltage modulator	n/a	n/a	n/a	n/a	n/a	n/a
Core voltage I/O options	n/a	n/a	n/a	n/a	n/a	n/a
Northbridge chipset	Intel 82443LX	VIA VT82C693	Intel 82443BX	Intel 82443BX	Intel 82443BX	Intel 82443BX
Southbridge chipset	Intel 82371AB	VIA VT82C596A	Intel 82371EB	Intel 82371EB	Intel 82371EB	Intel 82371EB
Bus and connections						
AGP/PCI/ISA/shared slots	1 / 4 / 1 / 1	1 / 3 / 2 / 1	1 / 3 / 1 / 1	1 / 4 / 1 / 1	0 / 3 / 3 / 1	1 / 4 / 1 / 0
USB/Ser/Par/PS2/DIN [2]	2 / 2 / 1 / 2 / 0	2 / 2 / 1 / 2 / 0	2 / 2 / 1 / 2 / 0	2 / 2 / 1 / 2 / 0	2 / 2 / 1 / 2 / 0	2 / 2 / 1 / 2 / 0
Parallel port support	Norm/EPP/ECP/ECP+EPP	Norm/EPP/ECP/ECP+EPP	Norm/EPP/ECP/ECP+EPP	Norm/EPP/ECP/ECP+EPP	Norm/EPP/ECP	Norm/EPP/ECP/ECP+EEP
IR port support	✓	✓	✓	✗	✗	✓
Memory						
168-pin DIMM slots	4	3	4	4	2	3
72-pin SIMM slots	0	0	0	0	0	0
Max system mem support	512Mb (1Gb EDO)	768Mb	512Mb	1Gb	256Mb	768Mb
On-b L2 cache/Upgr/Freq [3]	n/a	n/a	n/a	n/a	n/a	n/a
Power supply connectors	ATX	ATX	ATX	ATX	ATX	ATX
Fan Conn CPU/ps/chassis [4]	✓ / ✓ / ✓	✓ / ✓ / ✓	✓ / ✓ / ✓	✓ / ✓ / ✓	✓ / ✓ / ✓	✓ / ✓ / ✓
BIOS s/w supplier/version	Award v4.51PG	Award v4.51PG	Award v4.51PG (B)	Award v4.51PG	AMI 4R4CB0XA	Award V4.51PG
Antivirus/lang/auto EIDE [5]	✓ / ✗ / ✓	✓ / ✗ / ✓	✓ / ✗ / ✓	✓ / ✗ / ✓	✓ / ✓ / ✓	✓ / ✗ / ✓
On-board						
Sound manuf/model	n/a	n/a	Creative Labs/ES1373	n/a	Creative Labs/ES1373	n/a
Graphics manuf/model	n/a	n/a	n/a	n/a	Nvidia Riva 128ZX (8Mb)	n/a
EIDE / floppy channels	2/1	2/1	2/1	2/1	2/1	2/1
DMI	✓	✓	✓	✓	✓	✓
Fan speed/volt/temp	✓/✓/✓	✓/✓/✓	✓/✓/✓	✓/✓/✓	✗/✗/✗	✓/✓/✓
Wake-on LAN	✓	✓	✓	✓	✓	✓
Other supported features	-	-	SB-Link	SB-Link	Wake-on-Ring	SB-Link, modem wake
Extra supplies	EIDE/floppy cables	EIDE/floppy cables	EIDE/floppy cables	EIDE/floppy cables	EIDE/floppy cables	EIDE/floppy cables
	I/O shielding plate	spare jumpers	spacer		CPU retention mech	CPU retention mech
					I/O shield	CPU temp sensor
User Manual						
Installation instr (out of 5)	★★★★★	★★★★★	★★★	★★	★★★	★★★★
BIOS s/w overview (out of 5)	★★★★★	★★★★★	★★★★	★★★	★★★	★★★★

Key: [1] CPU Bus frequency multiplier modulator [2] USB/Serial/Parallel/PS2/5-pin DIN [3] On-board L2 cache/Upgradable/Frequency [4] Fan connections CPU/power supply/chassis [5] Antivirus/language options/auto EIDE

Table of features






Manufacturer	SOYO	SuperMicro	TMC	ASUS	Intel	SOYO
Model Name	SY-6BA+	P6SBA (Rev. 2.00)	MB-TI6NBS+	Mel-M	Fiji	SY-6VZA
Price (ex VAT)	£71.12	£79.00	£125	£72	£75	£58.65
Price (inc VAT)	£83.57	£92.83	£146.88	£84.60	£88.13	£68.91
URL	www.soyo-europe.com	www.supermicro.com	www.tmc-uk.com	www.asus.com	www.intel.com	www.soyo-europe.com
UK supplier	CCL	Boston	TMC Technology (UK)	Dabs Direct	Intel Response Centre	CCL
UK supplier's telephone	01274 664110	01923 699399	01438 842305	0800 558866	0870 6072439	01274 664110
Form factor/size (l x w)	ATX / 304 x 191mm	ATX / 304 x 178mm	ATX / 305 x 201mm	microATX / 244 x 216mm	microATX / 244 x 244mm	ATX / 304 x 170mm
CPU						
Socket type	Slot 1	Slot 1	Slot 1	Socket 370	Socket 370	Socket 370
CPU vendors supported	Intel	Intel	Intel	Intel	Intel	Intel
CPU Bus freq mult mod [1]	SOYO COMBO via BIOS	jumpers	via BIOS	DIP switch	Automatic	SOYO COMBO via BIOS
CPU Bus freq mult options	x2 to x5.5 (0.5 integrals)	x3.0 - x6.5 (0.5 integrals)	x3 - x6.5 (0.5 integrals)	x3 - x5.5 (0.5 integrals)	Automatic	Set process speed in BIOS
CPU Bus freq modulator	SOYO COMBO via BIOS	Jumper	via BIOS	DIP switch	Automatic	SOYO COMBO via BIOS
CPU Bus freq options	66 - 133MHz (7 settings)	66MHz, 100MHz, Auto	66 - 153MHz (15 Settings)	50 - 83 MHz (6 Settings)	Automatic	66 -133MHz (7 settings)
Core voltage modulator	n/a	n/a	n/a	n/a	n/a	n/a
Core voltage I/O options	n/a	n/a	n/a	n/a	n/a	n/a
Northbridge chipset	Intel 82443BX	Intel 82443BX	Intel 82443BX	Intel 82443LX	Intel 82443ZX	VIA VT82C693
Southbridge chipset	Intel 82371EB	Intel 82371EB	Intel 82371EB	Intel 82371EB	Intel 82371EB	VIA VT82C596
Bus and connections						
AGP/PCI/ISA/shared slots	1 / 4 / 1 / 0	1 / 3 / 2 / 1	1 / 3 / 2 / 1	1 / 2 / 0 / 1	0 / 2 / 0 / 1	1 / 3 / 0 / 1
USB/Ser/Par/PS2/DIN [2]	2 / 2 / 1 / 2 / 0	2 / 2 / 1 / 2 / 0	2 / 2 / 1 / 2 / 0	2 / 2 / 1 / 2 / 0	2 / 2 / 1 / 2 / 0	2 / 2 / 1 / 2 / 0
Parallel port support	Norm/EPP/ECP	Norm/EPP/ECP	Norm/EPP/ECP	Norm/EPP/ECP/ECP+EEP	Norm/EPP/ECP	Norm/EPP/ECP
IR port support	✓	✓	✓	✓	✗	✓
Memory						
168-pin DIMM slots	4	3	3	3	2	3
72-pin SIMM slots	0	0	0	0	0	0
Max system mem support	1Gb	768Mb	448Mb	768Mb	256Mb	768Mb
On-b L2 cache/Upgr/Freq [3]	n/a	n/a	n/a	n/a	n/a	n/a
Power supply connectors	ATX	ATX	ATX	ATX	ATX	ATX
Fan Conn CPU/ps/chassis [4]	✓ / ✓ / ✓	✓ / ✓ / ✓	✓ /✓ /✓	✓ / ✓ / ✓	✓ / ✓ / ✓	✓ / ✓ / ✓
BIOS s/w supplier/version	Award v4.51PG	AMIBIOS P6SBAR1.4	Award v4.51 PG	Award v4.51 PG	AMI 4F4J20IA	Award v4.51PG
Antivirus/lang/auto EIDE [5]	✓ / ✗ / ✓	✓ / ✗ / ✓	✓ / ✗ / ✓	✓ / ✗ / ✓	✓ / ✓ / ✓	✓ / ✗ / ✓
On-board						
Sound manuf/model	n/a	n/a	n/a	Yamaha /XG YMF740C	Creative Labs/ES1373	Creative Labs/ES1373
Graphics manuf/model	n/a	n/a	n/a	n/a	ATI/Rage Pro Turbo AGP 8Mb	n/a
EIDE / floppy channels	2/1	2/1	2/1	2/1	2/1	2/1
DMI	✓	✓	✓	✓	✓	✓
Fan speed/volt/temp	✓/✓/✓	✓/✓/✓	✓/✓/✓	✓/✓/✓	✗/✗/✗	✓/✓/✓
Wake-on LAN	✓	✓	✓	✓	✓	✓
Other supported features	SB-Link, modem wake		SB-Link	Wake-on-Ring	Wake-on-Ring	SB-Link, modem wake
Extra supplies	EIDE/floppy cables,	EIDE/floppy cables	EIDE/floppy cables,	EIDE/floppy cables	EIDE/floppy cables	EIDE/floppy cables
	CPU retention mechanism		CPU retention mechanism		CPU retention mechanism	
			64Mb SDRAM on-board		I/O shield	
User Manual						
Installation instr (out of 5)	★★★★★	★★★★	★★★★	★★★★	★★★	★★★★★
BIOS s/w overview (out of 5)	★★★★	★★★	★★★	★★★★	★★★	★★★★

Key: [1] CPU Bus frequency multiplier modulator [2] USB/Serial/Parallel/PS2/5-pin DIN [3] On-board L2 cache/Upgradable/Frequency [4] Fan connections CPU/power supply/chassis [5] Antivirus/language options/auto EIDE

Table of features






Manufacturer	ASUS	Chaintech	Gigabyte	Micro-Star	SOYO	TMC
Model Name	P5A	5RSA2	GA-5AX (Rev4.10)	MS5169 (v3 AL9)	SY-5EMA+	TI5VG+
Price (ex VAT)	£60	£55	£52	£56.00	£48.16	£59
Price (inc VAT)	£70.50	£64.63	£61.10	£65.80	£56.59	£69.33
URL	www.asus.com	www.chaintech.com.tw	www.gigabyte.com.tw	www.msi.com.tw	www.soyo-europe.com	www.tmc-uk.com
UK supplier	Dabs Direct	Evesham Vale	Micro Direct	Dabs Direct	CCL	TMC Technology
UK supplier's telephone	0800 558866	0800 496 0800	0161 248 4848	0800 558866	01274 664110	01438 842305
Form factor/size (l x w)	ATX / 304 x 192mm	microATX / 244 x 220mm	ATX / 307 x 184mm	ATX / 304 x 186mm	ATX / 304 x 191mm	ATX / 304 x 180mm
CPU						
Socket type	Socket 7	Socket 7	Socket 7	Socket 7	Socket 7	Socket 7
CPU vendors supported	AMD/IBM/Cyrix/IDT/Intel	AMD/IBM/Cyrix/IDT/Intel	AMD/IBM/Cyrix/IDT/Intel	AMD/IBM/Cyrix/IDT/Intel	Intel, IBM, Cyrix, AMD	AMD/IBM/Cyrix/IDT/Intel
CPU Bus freq mult mod [1]	jumpers	jumpers	DIP switch	jumpers	DIP switch	DIP switch
CPU Bus freq mult options	x1.0 - x5.5 (0.5 ints)	x2.0 - x5.5 (0.5 ints)	x1.5 - x5.5 (0.5 ints)	x1.5 - x5.5 (in 0.5 ints)	x1.5 - x4.5 (in 0.5 ints)	x1.5 - x5.5 (0.5 ints)
CPU Bus freq modulator	jumpers	jumpers	jumpers	jumpers	DIP switch	DIP switch
CPU Bus freq options	60 - 120MHz (10 set)	60 - 120MHz (6 set)	66 - 140MHz (13 set)	50 - 100MHz (8 set)	66 - 124MHz (7 set)	60 - 100MHz (5 set)
Core voltage modulator	jumpers	jumpers	DIP switch	jumpers	jumpers	DIP switch
Core voltage I/O options	2.0v - 3.5v (0.1v ints)	1.7v - 3.5v (24 set)	1.3v - 3.5v (0.1v ints)	2.2v - 3.5v (0.1v ints)	2.0v - 3.5v (16 sets)	2.1v - 3.5v(6 sets)
Northbridge chipset	ALi Aladdin V M1541	ALi Aladdin V M1541	ALi Aladdin V M1541	ALi Aladdin V M1541	ETEQ 82C6638	VIA VT82C598MVP
Southbridge chipset	ALi M1543C	ALi M1543C	ALi M1543C	ALi M1543C	ETEQ 82C6629	VIA VT82C586B
Bus and connections						
AGP/PCI/ISA/shared slots	1 / 4 / 1 / 1	1 / 1 / 1 / 1	1 / 4 / 1 / 1	1 / 3 / 2 / 1	1 / 4 / 1 / 1	1 / 4 / 1 / 1
USB/Ser/Par/PS2/DIN [2]	2 / 2 / 1 / 2 / 0	2 / 2 / 1 / 2 / 0	2 / 2 / 1 / 2 / 0	2 / 2 / 1 / 2 / 0	2 / 2 / 1 / 2 / 0	2 / 2 / 1 / 2 / 0
Parallel port support	Norm/EPP/ECP/ECP+EEP	Norm/EPP/ECP/ECP+EEP	Norm/EPP/ECP/ECP+EEP	Norm/SPP+EPP/ECP	Norm/EPP/ECP+EPP	Norm/EPP/ECP
IR port support	✓	✓	✓	✗	✓	✓
Memory						
168-pin DIMM slots	3	2	3	3	3	3
72-pin SIMM slots	0	0	0	0	0	2
Max system mem support	768Mb	512Mb	768Mb	768Mb	768Mb	768Mb
On-b L2 cache/Upgr/Freq [3]	512Kb/No/FSB	n/a	512Kb/No/FSB	512Kb/No/FSB	1Mb/No/FSB	512Kb/No/FSB
Power supply connectors	ATX	ATX	ATX	ATX	ATX	ATX
Fan Conn CPU/ps/chassis [4]	✓ / ✓ /✓	✓ / ✓ / ✓	✓ / ✓ / ✓	✓ /✓ /✓	✓/ ✗/ ✓	✓ /✓ / ✓
BIOS s/w supplier/version	Award v4.51PG	Award v4.51PG	Award 4.51PG	AMIBIOS v2.6 121598	Award v4.51PG	Award v4.51PG
Antivirus/lang/auto EIDE [5]	✓ / ✗ / ✓	✓ / ✗ / ✓	✓ / ✗ / ✓	✓ / ✗ / ✓	✓/ ✗ /✓	✓ / ✗ / ✓
On-board						
Sound manuf/model	n/a	Ensoniq/Solo-1 ES1938S	n/a	n/a	n/a	n/a
Graphics manuf/model	n/a	n/a	n/a	n/a	n/a	n/a
EIDE / floppy channels	2/1	2/1	2/1	2/1	2/1	2/1
DMI	✓	✓	✓	✓	✓	✓
Fan speed/volt/temp	✓/✓/✓	✓/✓/✓	✓/✓/✓	✓/✓/✗	✗ /✗ /✓	✓/✓/✓
Wake-on LAN	✓	✗	✓	✓	✓	✓
Other supported features						
Extra supplies	EIDE/floppy cables	EIDE/floppy cables	EIDE/floppy cables	EIDE/floppy cables	EIDE/floppy cables	EIDE/floppy cables
	spare jumpers					
User Manual						
Installation instr (out of 5)	★★★★★	★★★★	★★★	★★★★	★★★★★	★★★★
BIOS s/w overview (out of 5)	★★★★★	★★★★	★★★	★★★★	★★★★	★★★

Key: [1] CPU Bus frequency multiplier modulator [2] USB/Serial/Parallel/PS2/5-pin DIN [3] On-board L2 cache/Upgradable/Frequency [4] Fan connections CPU/power supply/chassis [5] Antivirus/language options/auto EIDE

Choosing and installing your **motherboard**

The first stage in upgrading your motherboard is to decide which board will best suit your needs. But just settling for a board alone may not be enough: you may want to consider upgrading your case and power supply as well, to widen your options.

Choosing your case and board

Of the two main styles, the AT power supply has two six-hole plugs for supplying various voltages, which connect via power cables to the motherboard. The newer ATX standard consists of one 20-hole plug offering support for power management functions. Although you can still buy motherboards with AT-style power supply connectors, most support only ATX power supplies. Also, AT-style cases have a nasty habit of blocking off input device connections to your motherboard. But fear not. These days, you can buy a new system box with an ATX power supply from as little as £30.

Next, decide how much of your existing system is worthy of extended use in your new system. New boards have tended to feature fewer ISA card slots, and where peripherals have been integrated on-board, slot counts will be lower. So, before you buy, be sure to have enough for your devices. If your current system's memory modules are 72-pin SIMMs you will find that very few new boards have slots for these, so consider purchasing some 168-pin DIMMs before going further.

Installation

No two boards are the same, but in addition to the installation details in your user manual, the following guidelines are highly recommended.

☛ **For safety's sake,** switch off the main power supply at the wall and on the back of your system if there's a switch, but it's useful to leave the plug connected to an earthed socket.

☛ **Before placing** the board into your system, take advantage of the full access you currently have by looking carefully over the board, pressing down any chips that may appear unhoused. If you're worried about static electricity damaging your board, then a gentle touch of the metal power supply casing will earth you.

▲ (TOP) RAM MODULES, WHETHER OLDER-STYLE SIMMS OR NEWER DIMMS, SHOULD BE EASY TO SLIP IN (ABOVE) SUPPORTS FOR THE MOTHERBOARD. MAKE SURE NOTHING IN THE CASE WILL OBSTRUCT THE UNDERNEATH OF THE BOARD

☛ **It is easier** to set your configuration jumpers or DIP switches (if any) while the board is in your hands. This is also an ideal time to plug in your memory and processor, and connect your heatsink/fan, with the board supported underneath by a thick piece of cardboard on a flat surface.

☛ **When screwing your board** into the case it's important to remember that you will be plugging in more devices, sometimes quite firmly, and will need to provide enough support across the surface of the board. Locate which holes on your board will correspond to spacers provided with your system box and remove any that will not, as these are likely to short underside connections, preventing your board from working. Likewise be careful not to let any other objects find their way under the board as you screw it down.

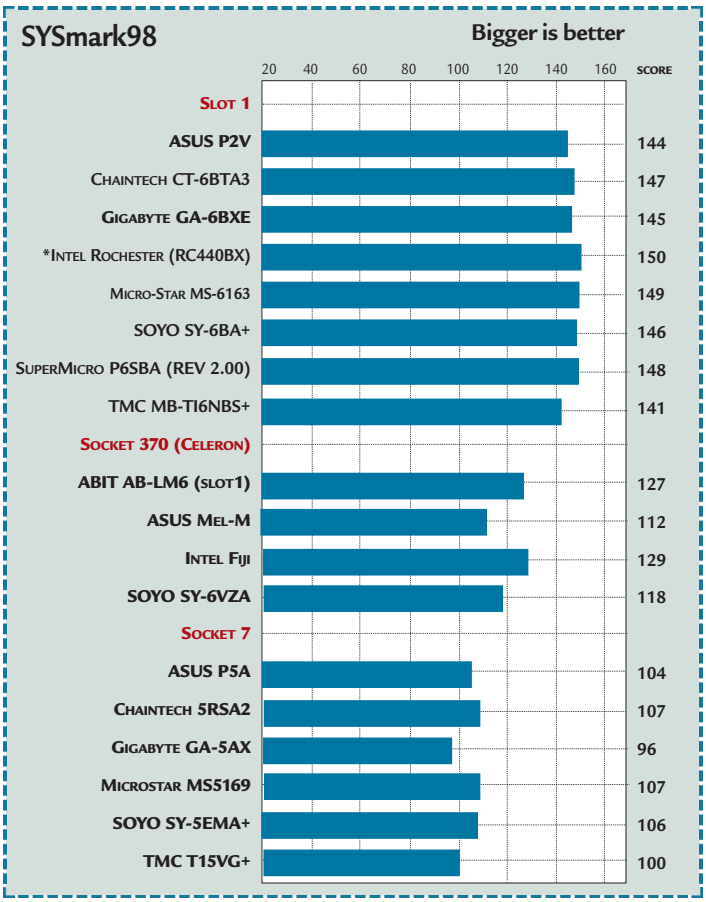
☛ **Restrict yourself** to plugging in the bare minimum at this point, such as keyboard, mouse, graphics adaptor and, once that's in place, your monitor. For ATX power supplies you will also need to locate the power switch front panel connector. Then plug in the motherboard power supply and switch on. If nothing happens, at least you won't have to go far to retrace any problems. But most likely you'll get the POST screen displayed, indicating that you're almost there, so switch off to complete the installation.

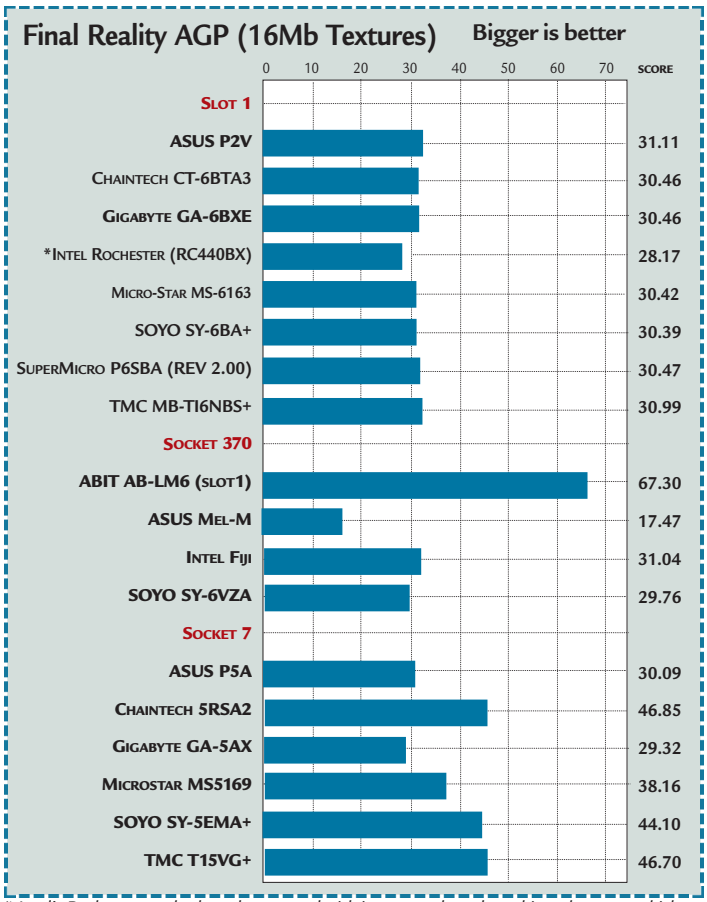
☛ **Referring to your manual** at all times, plug in the rest of your peripheral cards, front panel connectors, hardware monitoring connectors and I/O devices, ensuring that the disk from which you boot your operating system is plugged into the first EIDE channel. If you're booting from another device, you'll have to set this through the BIOS software.

☛ **Now you can switch on** for the final time before entering your BIOS software to put in the configuration details needed for your specific hardware setup.

To your operating system, the motherboard installation is rather like adding around 50 devices all in one instance, but thankfully the majority of drivers required are in legacy databases contained by most operating systems. More specific drivers will be contained on any supplied CD or diskettes, but you can have a working system without them. However, a new board will generally seek support for its new chipset and the bus master drivers, which are the main culprits in under-performing systems. Check which drivers are currently installed and, if necessary, install newer bus master drivers: you may see drastic improvements over the entire system's performance.

PCW Labs Report





** Intel's Rochester motherboard was tested with its own on-board graphics sub-system which was slightly different to that used with all the other boards. In this case, the scores could reflect differences other than those highlighted by the quality of the motherboard.*

How we did the tests

We tested each of the motherboard types with an appropriate processor: Intel's Pentium II 400MHz for the Slot 1 boards, Intel's Celeron 366MHz for the Socket 370 boards plus one Slot 1 board, and AMD's K6-2 300MHz for the Socket 7 boards. All other hardware configurations remained the same: ATi's Rage Pro Turbo AGP2x graphics accelerator with 8Mb video memory, 64Mb PC100 system memory (restricted to 66MHz for the Celeron boards) and a 2.4Gb Fujitsu ATA33 hard disk.

☛ **SYSMark98 results** depend on a variety of factors, but as we were only testing the motherboards, we are reflecting results based on the performance of the bus transfers and any other intricacies that a quality board may highlight. The better the score, the longer the bar graph. (*See p156 for a detailed description of SYSMark98.*)

☛ **Final Reality** is primarily designed to examine the processing power of the graphics sub-system using a 3D engine developed by Remedy. It runs through the DirectX 5.0 API developed by Microsoft. There is a special section designed to test the AGP performance. With the same graphics adaptor used in each setup, we were able to highlight performance differences between each motherboard in these specific areas. Again, the higher the score, the better the result.

SYSMark scores explained

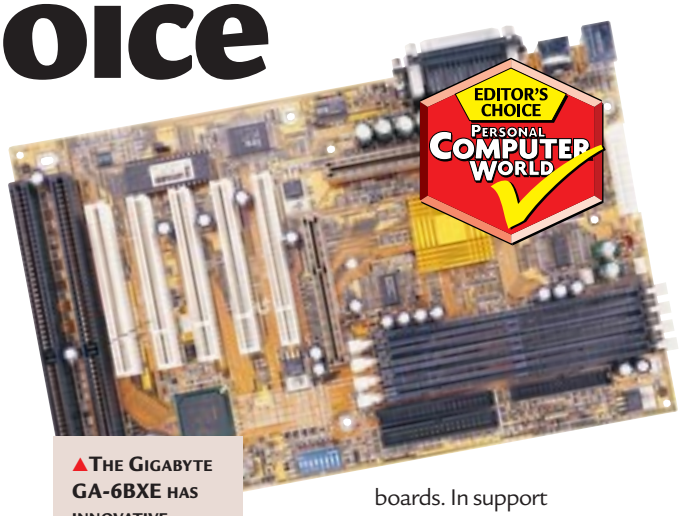
We saw no major performance differences between the boards under the SYSMark98 test. In the Slot 1 category, the highest scored only five percent more than the lowest. All the boards sport the same Intel 440BX chipset save for ASUS, which again kept the scores on an even footing. The Celeron boards gave a different flavour to the results with almost a 15 percent maximum difference. All the boards had different combinations of chipsets, with the highest performance achieved by Intel's new ZX-66 chipset on its own board. Chaintech's best performing Socket 7 board manages an 11 percent gain over the lowest performer from Gigabyte. In this case, though, both use exactly the same chipsets, and reasons for the difference can only be put down to the quality of the electronics.

Final Reality scores explained

In the Final Reality AGP test, Abit's Slot 1 Celeron motherboard was the overall best performer, scoring twice that of most others. Rather than using a Socket 370 adaptor, a Slot 1 Celeron was used, which may have contributed partially to the results. Or it could be that the Socket 370 boards are very new and may be in need of performance modifications. Of the Socket 7 boards, the best and the worst performers were as in the SYSMark98 tests with similar reasons contributing to these results. The biggest margin for the Slot 1 PII boards was less than two percent between the best and worst performance. There is an accepted fluctuation of results in any benchmark and this result warrants no discussion.

Editor's **Choice**

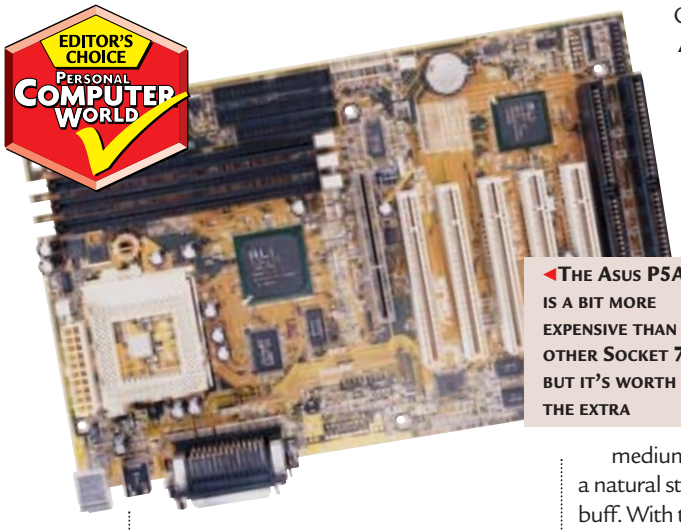
When selecting motherboards for this group test, we decided on those which were likely to be put into machines used for a wide range of tasks, and tried to avoid those that constrained upgrading by having too many on-board peripherals. This brought about difficulties in picking the best, as all vendors submitted quality equipment equally capable of providing the required end result. However, when it came to selecting the winners, they did present themselves as the optimal packages, with little or no fuss on installation, and at very tempting prices.



▲The Gigabyte GA-6BXE has innovative touches

Slot 1 motherboards

Our **Editor's Choice** in this category is **Gigabyte's GA-6BXE** – a clear winner, not just for an impressive build and design, but for all those innovative touches that helped it to poke its head above the crowd. Usability was a key feature, with clear labelling, bright colours and easily configurable switches all admirably accompanied by a manual pitched perfectly at the enthusiast and newcomer alike. Although there were no on-board peripherals, all other features offered a full spectrum of support with no compromises accorded to the tight price.



◀The Asus P5A is a bit more expensive than other Socket 7s, but it's worth the extra

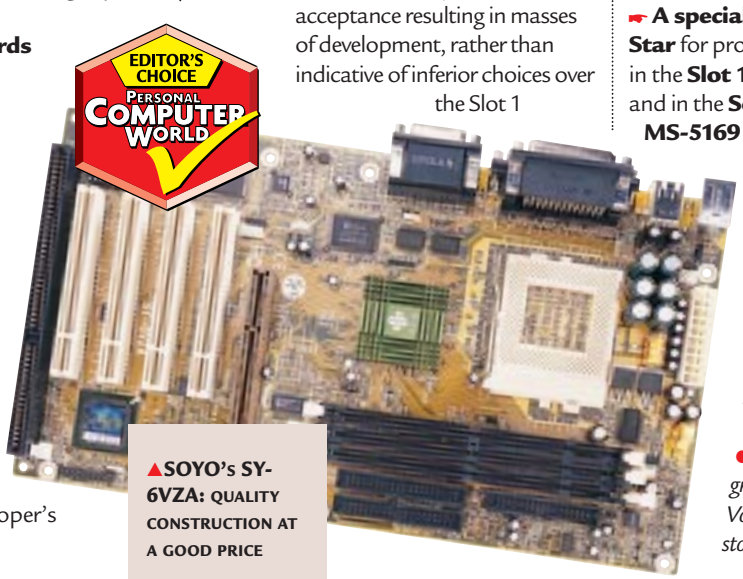
Socket 7 motherboards

The prices of the Socket 7 boards was more of a reflection of their widely established acceptance resulting in masses of development, rather than indicative of inferior choices over the Slot 1 boards. In support of this, there was a definite focus on boards designed and based on actual users' feedback, providing finely-tuned features across all the submissions with almost identical pricing.

Our **Editor's Choice** is the **ASUS P5A**, which was marginally more expensive than the others, but the extra money was spent wisely. Options for personal settings had been widely expanded, providing support for most configurations of processor frequencies, bus speeds and core voltages. It's fine to just plug in your CPU at the requisite settings and proceed, but to offer a medium for dabbling in the unknown is a natural step for the enthusiastic computer buff. With the excellent manual providing the answers you'll be optimising the settings for your system in no time at all.

Celeron motherboards

Our **Editor's Choice** in the Celeron category eventually went to a Socket 370 from SOYO, although the only Slot 1 Celeron board from ABIT did highlight the qualities of its experienced platform. **SOYO's SY-6VZA** was the only motherboard in this category not to feature an Intel chipset, VIA proving that its recently acquired core logic developer's licence was of benefit to the industry as a whole. This healthy competition has provided an opportunity to focus on extensions to features usually not thought of as necessary on a Celeron-based motherboard. But what was most impressive, and clearly helped SOYO to become our Editor's Choice, was the offer of an uncompromised quality construction with the least impact on your finances.



▲SOYO's SY-6VZA: quality construction at a good price

A special mention goes to **Micro-Star** for providing excellent submissions in the **Slot 1** category for its **MS-6163**, and in the **Socket 7** category for its **MS-5169 v3**. Both motherboards ran as very close seconds, losing out only because of slight compromises in features and usability.

Our thanks go to Intel and AMD for supplying processors, and to Kingston Memory for its generous supply of memory.

Next month we look at 18 new graphics cards, including the new Voodoo3, and at removeable storage and hard disks.

The Domino effect

FROM PROPRIETARY DATABASE TO OPEN STANDARDS: EVERYTHING YOU EXPECT FROM LOTUS NOTES IS HERE. THERE'S WEB FUNCTIONALITY, TOO. TERENCE GREEN CHECKS THE LATEST BETA.

Lotus Domino Release 5.0 was announced for February delivery, a couple of months later than expected, but judging by the final preview version, it's well worth the wait. At the time of writing Lotus had only announced a suggested US price for the standard Domino package called the Lotus Domino Application Server Release 5, or R5 for short. Mail Server and Enterprise Server packages will also be offered.

The basic components of R5 are the web- and Java-enabled Domino Notes database server and the Domino Designer, which can be used to create collaborative or groupware applications which work with web browsers like Internet Explorer and Netscape Navigator. Also available is a Notes client which integrates Notes groupware and workflow services as well as standards-based web browsing and authoring, newsgroups and email.

Domino R5 completes a fairly rapid transition for Notes from proprietary database development environment to open standards platform. It now delivers Notes services as Java components, enabling third-party tools to be used for building applications and allowing existing Notes applications to be dished up for web browsers without re-coding. Although the Domino server is required as the backbone for the Notes groupware and workflow services, Lotus actively supports third-party developer tools. There is support for Java and Java development tools from vendors like Borland and Symantec, web design tools from NetObjects Fusion and Microsoft FrontPage, and either the Domino HTTP server or Microsoft's Internet Information Server can be used for web serving. Support for other web servers is promised later in 1999, as is a Linux version.

Domino R5 is big on Java. IBM's WebSphere Applications Server bundled with Domino

Illustration by Joe Presedo

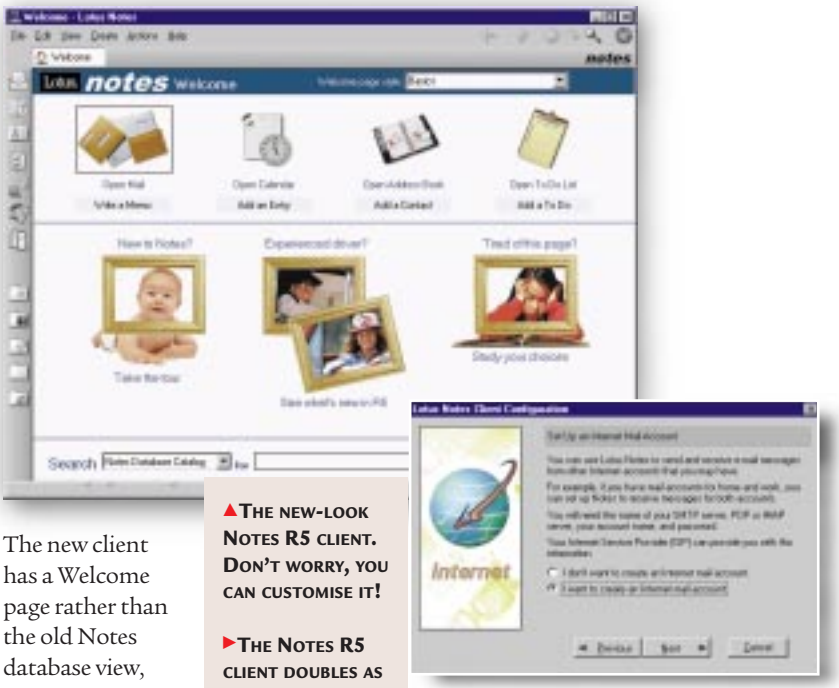
Application Server provides support for Java servlets, Java Server Pages, the Common Object Request Broker Architecture (CORBA) and the Internet Inter-ORB Protocol (IIOP).

In April, Lotus will ship the latest version of eSuite, a suite of Java productivity applets which can be used by developers to add basic word processing, spreadsheet, graphics and presentation functionality to Domino applications. Connectivity for back-end and legacy systems is available via an enterprise integration toolset for connecting Domino to databases (DB2, Oracle, Sybase), transaction systems such as CICS and Tuxedo, and applications such as SAP/3.

On the client side, the big change is that Notes R5 now operates as a standards-based mail client with newsgroups in addition to the familiar document management, searching, workflow, scheduling and calendering and business applications. Browsing with Internet Explorer is built into the R5 client, but you can opt instead for browsed pages to open in an external Internet Explorer or Netscape Navigator browser. All the services in the new client have been incorporated using standard net protocols, allowing the client to be used for regular email (POP3 and IMAP support), web-based email (HTML 4.0 and MIME), directory searches (LDAP) and newsgroups (NNTP). Security is provided through SSL and S/MIME plus support for X.509 digital certificates. When Notes clients are used at both ends of the communication, Notes supports encrypted mail, too.

The client has a new standalone mode similar to a regular email client in which it doesn't need to have access to a Domino server. This is not the same, though, as the disconnected mode in which the client maintains local replicas of server data allowing offline use for mobile users. It's easy to switch between standalone, connected and disconnected mode. In the latter mode, users can work as if connected. Editing, searching newsgroups, and sending mail and data is synchronised when the client next reconnects to the LAN.

Mobile clients now include handheld devices such as PalmPilots. Windows CE is also supported via many vertical market third-party solutions and a generic replication solution, Cadenza, from UK developer CommonTime. The R5 client also allows administrators to have more control over the client desktops. Most features of the client can be controlled centrally, via modifications to the public directory. This centralised approach also means that roaming users can automatically pick up their desktop settings wherever they log in, via a R5 client.



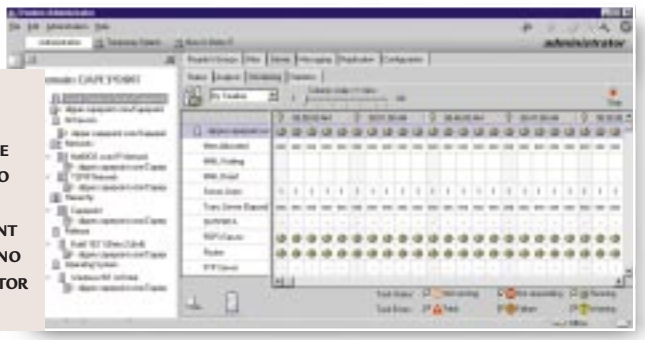
▲THE NEW-LOOK NOTES R5 CLIENT. DON'T WORRY, YOU CAN CUSTOMISE IT!

▶THE NOTES R5 CLIENT DOUBLES AS A REGULAR EMAIL CLIENT FOR ISP DIAL-UP ACCOUNTS

The new client has a Welcome page rather than the old Notes database view, but that is still available as a user option. It also has a new bookmark feature down the left-hand side. Bookmarks are hotlinks to any data or application such as Notes applications or web pages. A company can create its own customised opening page with automatic news and information updates.

Domino runs on Windows NT 4.0 (Alpha and Intel), AIX, HP/UX, Solaris (SPARC and Intel), OS/2 Warp Server 4, AS/400 and the IBM S/390. At the bottom end, Lotus has invested a lot of effort in improving performance on NT 4.0 and that version now supports high-availability clustering, failover, and load balancing. Lotus claims that the added performance allows more users to be hosted per server. We weren't able to test the shipping version in time for publication, but the beta 2 version displayed an excessive fondness for lots of memory. It could be a beta issue, but is just as likely to be down to the embedded Java Virtual Machine.

Network administrators who have to roll out Domino will find that the new task-orientated

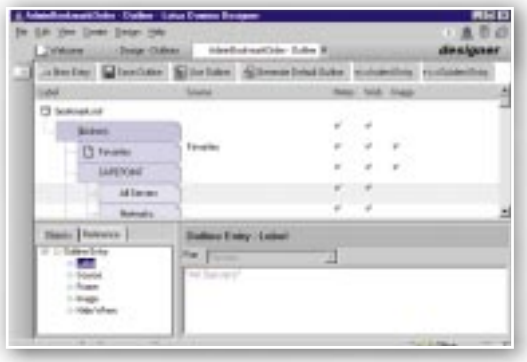


▶MONITOR AND ANALYSE THE DOMINO SERVER ENVIRONMENT WITH DOMINO ADMINISTRATOR

Domino Administrator provides a lot of help for monitoring and managing Domino servers. It has a more intuitive layout of administration tasks and lots of system monitoring options, including a graphical topology map. Fixing performance bottlenecks by reorganising database locations and replication can now be achieved through a drag-and-drop interface. Move a database from one server to another and R5 will automatically update mail links and replication services. There are timesaving features for handling users, too: multiple users can be managed collectively; management choices can be applied by means of setup profiles from the administrator instead of at the client desktop; and profiles can be applied automatically so that new users get the services you want to make available to them when they log in.

All these functions are in one place at last, under a single administration interface with a tree of servers on the left and the services for each listed on the right.

Systems management has further been addressed through new programming hooks for third-party tools. Not surprisingly, Tivoli, another IBM company, is one of the first to have management services available for Domino R5. But the new management interfaces have also been used to integrate mail migration tools licensed from Binary Tree. Other products will follow, as Lotus has an army of 20,000 business partners developing Notes applications and add-on tools. The Binary Tree tools support mail and directory migration from Microsoft, Netscape, and Novell mail systems and from Qualcomm Eudora into Domino R5.



▲ ALL ADMINISTRATION IS NOW UNDER THE SAME ROOF WITH THE NEW ADMINISTRATOR INTERFACE

▶ DOMINO DESIGNER R5 IS THE CENTRAL RESOURCE FOR APPLICATION DESIGN

Upgrading to Domino R5 from the previous release is supported through backwards compatibility with R4 databases and the directory, allowing for a phased migration. R4 applications work on R5, but R4 clients won't be able to access new R5 services. The Notes 5 client is similarly backwards compatible and can be made to look like the R4 client. □

New features of note in Release 5

The Notes client no longer requires that the user employs it within a Lotus Domino-based environment.

☛ It is designed to work with a wide range of other server environments. This gives the user greater freedom to do such things as retrieving ISP-hosted mail through a variety of protocols including POP3.

☛ Support for native MIME, the standard message format for internet mail, is now included.

☛ Support for LDAP (Lightweight Directory Access Protocol). This protocol allows users to locate people, devices or files across a network, whether intranet or internet. Among other things, this will allow the use of an LDAP server for local address books.

Lotus also aims to make Notes the easiest-to-use integrated internet client, and to this end there are several improvements.

☛ A navigation bar with forward, back, stop and refresh buttons, which is always accessible in the upper right-hand corner. These buttons, which provide an intuitive way of working, will allow users the ability to easily navigate through information in Notes, just as they would when using any popular web browser.

☛ Bookmark options have been improved. As well as having links to web pages, as you might expect, users can set up their own bookmarks for documents, views and more. It is also possible for a user to import Microsoft Internet Explorer favourites and Netscape Navigator bookmarks for use within Notes.

Previous releases of Notes have always been good on the email side of things and Release 5 builds on this with extra facilities.

☛ New mail preferences combined with calendar preferences now mean that it's possible to pre-set preferences for every message sent, so, for example, you could set all messages to be high priority.

As well as these major upgrades, the new Release 5 will contain other features too numerous to list here. These include better support for mobile users and the ability to use Notes for connecting to your Information Service Provider, and synchronise information with your PDA, too.

DAVID LUDLOW

Paper mate

The capture and management of digitised text is big business, and businesses of all sizes can benefit from an efficient system. Roger Gann scans the options.

Illustration by Cyrus Deboo

Contents

Once upon time, bold claims were made about computers, the future and the 'paperless office'. A swift reality check confirms that computers, far from reducing the amount of paper that clutters up offices, has actually increased it. These days, thanks to fast printers and copiers, producing a high-quality document on paper has never been easier. And that's despite the enormous increase in the volume of documents that never see paper, such as email.

One solution to this ocean of paper that threatens to drown us in our offices is document management. The only problem is that this term is a movable feast and has a multitude of meanings. For this feature, I'm taking the term to refer to one of the many highly evolved software systems for organising, storing and retrieving complex digitised documents.

Whatever it is, it's big business. Spending on document management products is predicted to hit $33 billion by 2002, according to a study conducted jointly by the industry body responsible for document management, the Association for Information and Image Management International (AIIM), and IDC.

The aim of document management software is simple: to reduce the workload and improve the productivity of most offices. An Ernst and Young study indicated that electronic document management can triple processing capacity, cut staff work time by up to 50 percent, provide immediate access to decision-critical data, cut document storage space by up to 80 percent and provide fail-safe, secure systems. Document management software technology has changed beyond recognition in recent years. All document management systems capture and manage digitised text and other images, but recently developers have added to the mix specialised techniques for image capture, workflow management, text mining and formatting. Today's document management packages often include document imaging, file management, workflow management, computer output to laser disk (COLD) processes, web page publishing, forms processing, text mining and even text formatting. Highly integrated web systems are beginning to dominate the market.

Optical Character Recognition (OCR) is part and parcel of the document management solution. This process turns a digitised image of a document, essentially a picture, into editable text. More importantly, it permits searching of the contents of a document, not merely for its filename. So for example, OCR would allow you to turn an incoming fax, say a draft contract, into an editable word processor document, neatly avoiding a heap of needless re-keying. It could then be filed away electronically, to be retrieved and printed at the click of a button.

The aim of document management software is to reduce the workload of most offices

OCR technology has been in the PC domain now for many years now and while basic recognition rates are dangerously close to perfect given a good clean original, most developments in OCR software have concentrated on the thornier OCR issues such as format retention and coping with very poor original documents. Leading edge OCR technology is still to be found in commerce, with organisations such as the Royal Mail and the clearing banks devoting much effort to mastering handwriting recognition.

Just recently, the vagueness over the precise meaning of document management has been compounded by the rise of a new buzzword (or two): knowledge management, which is loosely defined as that part of information technology that seeks to give organisations stronger, more thorough control over not just information, but the way it's handled over increasingly complex networks. Examples of the genre include collaborative groupware, such as Notes or GroupWise. Eventually, given the upcoming developments in document management and especially the rise of XML, the distinction between these two standalone technologies will become very blurred indeed, prompted by the advent of the internet and intranets as universal platforms for the propagation of electronic documents and processes.

How OCR works

All OCR software works in a similar manner. After a scanner inputs a paper document, the OCR program analyses the graphic image of the document, breaks it up in a number of zones (i.e. text, numbers or graphics), identifies the letters and numbers and converts that image into a text file. This done, the software refers to its internal dictionaries to compare the words it has found with known ones, and corrects them, just like a spell-checker. It then identifies words it doesn't recognise and shows you the original scan of that word, enabling you to manually interpret the unrecognised word. Finally, the OCR program saves converted documents in most popular word processor formats. The end result is text that you can edit and incorporate into letters, reports, newsletters and even web pages. In fact, most current OCR packages can convert documents directly into HTML.

OCR can probably never deliver 100 percent recognition accuracy and while state-of-the-art packages get pretty close to this, there's still some room for error. Much hinges on the quality of the type to be scanned. For example, it would be a poor OCR package that couldn't achieve extremely high recognition scores when recognising a clean page of laser printed 12-point Times Roman text. It's the ability to cope with the more complex material, the poor quality photocopies and faxes and complicated layouts, that separates the OCR winners from the losers.

Small office **OCR**

Document management for the user with modest means.

The SOHO user can enter the rarefied world of OCR and document management for a very low admission fee. At most they'll need a cheap flatbed scanner plus some inexpensive document management software. While the very cheapest scanners are not as capable as even those with £100 price tags, they're still more than capable of acquitting themselves when it comes to document management and OCR tasks.

And the scanner's price tag also includes most of the software you'll need to get started. Most flatbed scanners ship as standard with a raft of stripped-down 'lite' image editing and OCR software and so are OCR-capable out of the box. For the SOHO user, their OCR capabilities are generally adequate. If you want more features and functionality, then these 'lite' OCR packages count as upgrade fodder, letting you purchase an otherwise expensive package like OmniPage for a wallet-friendly £79 (inc VAT) instead of a rather crisp retail price of £465 (inc VAT), which includes the entry-level PageKeeper Standard document management package.

What about document management for the SOHO user? Well, the biggest document management problem, disk storage capacity, is no longer an issue; current PCs routinely ship with 12 or 16Gb hard disks plus a plethora of removeable storage options. So if you have a lot of paper to manage, putting it on disk is more than feasible.

If you have a lot of documents to archive, a simple flatbed scanner that lacks an ADF (Automatic Document Feed) will make the scanning job a chore, and you may need to spend a couple of hundred quid to get a scanner that can take an ADF. However, the upside is attractive: on top of the convenience in having every document to hand, you can gain some living space by ditching the filing cabinet. Clearly some important documents have to be retained as originals, but most don't and so are prime candidates for the cull.

Finally, a digital filing system gives you the ability to index and search for documents electronically. Although making insertions and revisions to existing documents can be tricky, the time you save by not having to rifle through mountains of paperwork will make digitising your important documents a worthwhile office project.

The bottom line here is that is that the SOHO user with modest requirements can get a quite reasonable OCR and document management system for not a great deal of money, perhaps less than £200 all in. Xerox's budget-priced Pagis ScanWorks is a one-stop SOHO document management solution, combining scanning, photo-editing, OCR, electronic forms and document management all for around £30 ex VAT, which makes it pretty good value for money — you get MGI PhotoSuite, the Textbridge Classic OCR engine. Document management is rudimentary, however: text searching isn't available.

OCR for beginners

Most scanners ship with basic OCR packages, so-called 'LE' or 'Lite' versions of full-feature, full-price retail versions. They still feature often complex interfaces, however, and can be difficult to use, especially for the first time user.

A new product from Caere, OmniPage Wizard, is designed to address these problems. This is a no-frills OCR package aimed at the first-time user. It uses the familiar wizard program structure to lead the user through the five steps needed to OCR a document. However, it eschews the usual Windows 98 wizard look and replaces it with a completely new web-like interface comprised of large graphical icons. The only time the lush interface disappears is during the proofing stage, when the thoroughly normal OmniPage proofing dialogue pops up.

◀DOES THIS LOOK LIKE ANY OCR PACKAGE YOU'VE SEEN BEFORE? AS YOU CAN SEE, THE EMPHASIS IS ON SIMPLICITY AND EASE OF USE

Priced at £40 including VAT, OmniPage Wizard doesn't feature OmniPage's most recent recognition technology but claims to better that which is typically bundled with a scanner.

Many OmniPage features have been removed, such as zoning and training, purely to keep it all simple. Comparing it to the full-blown OmniPage Pro, its overall accuracy is only slightly lower, and it's only when you present it with poor originals does the difference between the two products show.

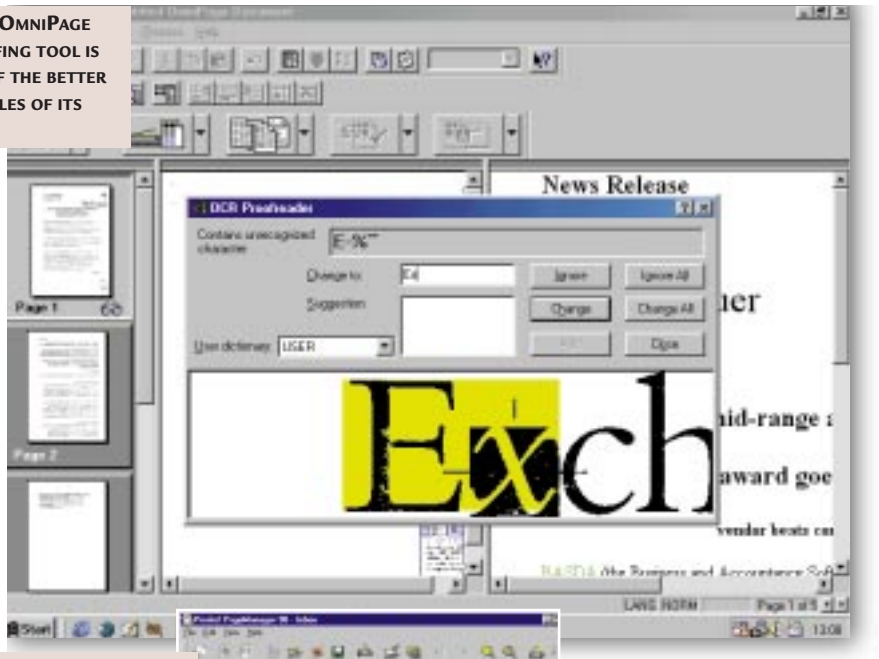
PCW DETAILS

★★★★

OmniPage Wizard
Price *£40 (£34.04 ex VAT)*
Contact *Caere UK 0171 233 6677*
www.caere.co.uk
Good Points *Simple to use. Moderate accuracy.*
Bad Points *For another £40 you can get the real thing.*
Conclusion *A genuine attempt to demystify the OCR process that succeeds.*

Small **business setup**

OCR technology can greatly benefit the larger office.



▶THE OMNIPAGE PROOFING TOOL IS ONE OF THE BETTER EXAMPLES OF ITS KIND

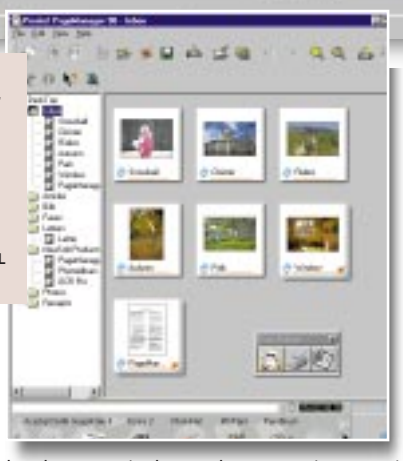
While OCR and document management may be handy for the SOHO user, larger businesses stand to reap more substantial benefits from these two technologies. You'll need a reasonably specified PC attached to a network, plus the desired OCR and document management packages. Probably the biggest difference lies in the scanner. This need not have a particularly better optical specification but it does need to be more rugged. Throughput will be crucial so the scanning speed becomes paramount, as will a SCSI or USB interface. It will almost certainly have to have an automatic document feed, an add-on that can cost more than the scanner.

At its most basic, Windows Explorer works as a rudimentary document management system. The only problem is that you can only search on the filename and not on the contents of that file. The answer here is to integrate OCR with the scanning and filing functions. For example, **Caere PageKeeper Standard** uses the OmniPage 7.0 OCR engine to sweep and index the words in the text pages you scan. The end result is an image file that you can then send to a full-blown OCR package like OmniPage Pro for OCR. But because PageKeeper Standard has already performed background OCR, you can still search on any text the image contains.

The latest version of **Presto! PageManager** has an improved OCR engine which creates a text version of a scanned document that preserves the document's original formatting. It can also output scanned documents as RTF or HTML files. It provides a wide range of annotation tools, including arrows, highlights, stamps and sticky notes.

While PageManager 98 supports Boolean and fuzzy searches, the search tool isn't easy to use. When you open one of the documents located in a search, PageManager provides no indication of the target text's location and no tools for locating it while viewing the document. Its handling of graphics images is better, though.

Not strictly in the document management field, **Enfish Tracker Pro** is a very interesting new personal information management package designed to let users index and locate data from a wide variety of sources on their hard disks. It can track everything, from the contents of email and common desktop applications, to the pages on user-specified web sites. It uses the Inso QuickView Plus viewer and so can index the text inside virtually any spreadsheet program or word-processing document.

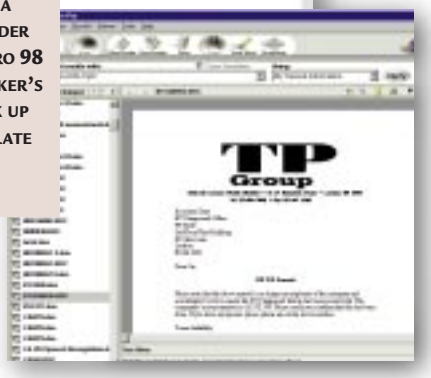


▶LIKE OTHER LOW-END DOCUMENT MANAGERS, PAGEMANAGER DOUBLES AS A PHOTO-ALBUM ORGANISER AS WELL

While document management is arguably best performed in a networking context, the opposite is probably true for OCR packages. All the current best of breed OCR packages are standalone packages, though most mesh well with networks. OCR packages have tended to be expensive software products — even today, OmniPage Pro 9.0 has an RRP of £395 (ex VAT) — but thanks to 'competitive upgrade' pricing, you shouldn't have to pay more than £80 (inc VAT) for a state-of-the-art OCR package, so they are very affordable, both for individuals and companies.

Version 9.0 of the doyen of OCR packages, OmniPage Pro, builds on the strengths of the previous version and somehow manages to increase its already impressive recognition accuracy, getting it perilously close to 100 percent in a few cases. The new version also features better support for colour, improved handling of table objects and spreadsheets, and improved format retention. A copy of PageKeeper Standard is thrown in for good measure. OmniPage Pro can operate either as a standalone application or from within most Windows word processors, thanks to its OCR Aware feature.

If you have a lot of OCR-ing to perform, it's also possible to batch acquire the images, either from disk or a scanner, and then schedule recognition at a later time, perhaps overnight, which is useful in office scenarios. Couple this with top-scoring accuracy scores, and with



▲ PROOFING IS A SIMPLE TASK UNDER TEXTBRIDGE PRO 98 ▶ ENFISH TRACKER'S ABILITY TO PICK UP DETAIL AND RELATE ITEMS IS QUITE UNCANNY

OmniPage Pro you have arguably the best OCR on a PC.

TextBridge too has consistently improved over the years. While it has always been cheaper than OmniPage Pro, it's always had to settle for second place, which is a pity for it offers strong competition. It's very simple to use, with a rather stark interface comprising just three large buttons plus a short Word/Office-style toolbar above it. The first button initiates an automatic wizard, while the other two allow you to acquire a page and recognise it, respectively.

As with OmniPage Pro, **TextBridge Pro98** goes a long way towards total automation of the entire OCR process. You can either choose to have the program perform the whole operation for you, or you can walk through the individual steps on your own. Application integration remains superior with TBP, and its Instant Access feature ties it in to all three major office suites, not just Office 97.

TextBridge Pro98 has no trouble correctly identifying both the text and graphics zones in a document. You can choose to zone a document manually if you want, but in general the auto-zoning is of a high order and fine-tuning should be unnecessary.

The results from TextBridge were similar to Presto!: it recognises most characters and it understands when a font is italic, bold, or both. Also like Presto!, TextBridge converts all coloured text to black and instead uses colours to highlight recognition problems; images are converted to black and white, too. **Presto!** OCR also supports batch scanning, useful when you have a pile of documents to scan and recognition can be deferred to a less busy time. Another potentially useful (and unique) facility is load-balancing: if you want to use older, slower PCs, you can have one PC scan the batch and another on the network recognise the resulting scanned pages.

Presto! OCR works in much the same way as its rivals — when a page is scanned and interpreted, Presto! OCR displays an image window after the scan to show the scanned page and the recognised zones to interpret. Recognition can then take place, and the result is presented for proofing in another window.

Tables are recognised as such and can be stored for exporting to a database as well as part of the document where you'll save the resulting text. Presto! has a dictionary for spell-checking, which is used only after the recognition engine is confident that it has recognised the word; the dictionary is not used to help improve recognition, but to help the user figure out whether the recognition engine correctly identified a word.

Presto!'s recognition scores were good but not on a par with OmniPage Pro, and its table handling and format retention capabilities were much weaker. File Save As options are also very limited, to RTF, HTML and ASCII text.

Overall, Presto! OCR is a competent OCR package, but with the much better OmniPage Pro available on upgrade for only a tenner more, it's hard to recommend Presto! OCR 3.0.

PCW DETAILS

★★★

Caere PageKeeper Standard
Price *£40 (£34.04 ex VAT)*
Contact *Caere UK 0171 233 6677 www.caere.com*
Good Points *Indexes text from scanned files using background OCR. Automatic indexing.*
Bad Points *Limited scanner settings; doesn't include full-blown OCR capability.*
Conclusion *Lacks power overall. Limited search facilities.*

★★★

Presto PageManager 98 Gold Edition
Price *£50 (£42.55 ex VAT)*
Contact *Guildsoft Computer Software 01752 895100 www.guildsoft.co.uk*
Good Points *Good one-stop document management solution.*
Bad Points *Searches aren't ranked.*
Conclusion *Search facilities not easy to use.*

★★★★

Enfish Tracker Pro
Price *£58.74 (£49.99 ex VAT)*
Contact *Roderick Manhattan Group 0181 875 4444 www.enfish.com*
Good Points *Powerful. Easy to use. Highly customisable*
Bad Points *Resource hungry.*
Conclusion *Sophisticated search tool.*

★★★★★

Caere OmniPage Pro 9.0
Price *£464.13 (£395 ex VAT). Upgrade £80 (£68.05 ex VAT)*
Contact *Caere UK 0171 233 6677 www.caere.com*
Good Points *Improved accuracy. Better table support.*
Bad Points *Expensive RRP. Still some way to go on format retention.*
Conclusion *Probably the best OCR you can buy.*

★★★★

ScanSoft TextBridge Pro98
Price *£81.08 (£69 ex VAT)*
Contact *ScanSoft 0118 966 8421 www.scansoft.com*
Good Points *Good recognition scores. Handles poor originals well.*
Bad Points *Weak training and zoning tools. No batch facilities.*
Conclusion *A good alternative to OmniPage Pro.*

★★★

Presto! OCR Pro 3.0
Price *£82.25 (£70 ex VAT)*
Contact *Guildsoft 01752 895100 www.guildsoft.co.uk*
Good Points *Batch processing.*
Bad Points *Weak format retention. Limited range of file formats supported.*
Conclusion *Competent, but not outstanding.*

Large **office setup**

Solutions for heavy-duty corporate publishing requirements.

Controlling documentation, particularly product information, in the larger company is not a trivial task. However, there are a wide range of heavy-duty client-server document management solutions available, such as Folio and Documentum. XML-based solutions are also beginning to surface.

ArborText's EPIC (Enterprise Product Information Chain) comprises a package of software and services for implementing XML-based corporate publishing solutions at the enterprise level. EPIC's goal is to reduce the time it takes to publish product-critical information in highly-competitive industries, where reducing the time it takes to bring products to market is crucial, e.g. car or aircraft manufacture. Because it offers beginning-to-end support for the creation, revision and publishing of complex documents, EPIC avoids many format and translation problems as documents are passed up and down the information chain.

Then there are the groupware solutions, which bridge the gap between the knowledge and document management fields. Three familiar names compete in this area, IBM/Lotus (with Notes/Domino), Novell (with GroupWise) and to a lesser extent Microsoft (with Exchange Server). These can have document handling capabilities bolted-on. **Domino.doc 2.0** is a web-based add-on for Domino that features document life-cycle management, rules-based workflow and archiving capabilities. It uses a familiar file cabinet and folder metaphor. File cabinets, or Notes database files, use Notes replication services to distribute, organise and manage documents, and related documents can be grouped together in a binder. Its Storage Manager is a back-end utility that lets administrators store documents offline in auxiliary archives, like optical disks or tapes.

By contrast, GroupWise offers full document management in its standard configuration, alongside messaging and scheduling. Users can store all types of documents and open them in all types of applications, and import individual documents or entire directory structures of documents into GroupWise libraries previously created by the administrator. Users can share individual documents with other users, or they can send email to other users and include document references that other users can save then access later. All documents may have multiple versions; and, as users update documents, they have the option to re-store them as new versions or simply update the original.

While third-party document management bolt-ons for **Exchange Server** are available, Microsoft has been a late entrant in this market and it has only recently announced future document management products. 'Tahoe' will succeed Site Server 3.0, which is currently part of the BackOffice family of server applications. This upgrade will provide document management and search capabilities, and will include approval workflow, templated publishing, document versioning, XML support for indexing documents and natural language processing, according to US reports. Tahoe will use a portal as a kind of 'knowledge desktop', allowing developers to build their own intranet portals, as well as use Tahoe's search and document management services within those portals. Another upcoming product, Polar Server, will focus on aspects of knowledge management such as document tracking, collaboration and analysis.

Production line scanning

To process serious quantities of documents, a conventional flatbed scanner, even one assisted by an ADF, really isn't up to the job. You need a dedicated, high-volume scanner. A number of companies produce heavy-duty scanners, including Xerox and Kodak and, of course, **Bell & Howell**. Its **Copiscan 4040D** is aimed at the mid-range market, at the workgroup level, and can handle 80 sides/40 pages per minute, or up to 3,000 documents a day. It carries a suitably serious price-tag — £4,500 plus VAT.

Externally, the 4040D resembles an old-fashioned laser printer. It's heavy, all-metal construction confirms its durability for high-volume scanning. As you'd expect, the device has a SCSI II interface. It uses contact image sensors (CIS) on both sides of the path to scan both sides of a document in one go. No TWAIN driver is supplied, only ISIS, but the 4040D works under Windows 3.1x, Windows 9x and Windows NT 4.0. It uses a straight-through paper path: paper is stacked at the front, and the feed can hold between 100 and 500 sheets, depending on paper thickness. Its maximum speed is only achieved in duplex mode at 200dpi. If you want 300dpi, performance drops a bit. A wide range of paper types, including NCR and thermal fax, are accommodated.

As the scanner can serve up images to an OCR program much faster than the most packages can handle, the 4040D has a deferred OCR option. Its ability to handle mixed types of documents was good, but despite my best tweaking efforts, it would still occasionally draw several pages through at once, so its paper-handling wasn't perfect, not at this price.

PCW DETAILS

★★★

Price *£5,287.50 (£4,500 ex VAT)*
Contact *Bell & Howell*
0800 783 8050
www.bellhowell.co.uk

Web solutions

Large-scale document management via the web and using the XML standard.

If many employees use remote access applications, web-based document management makes good sense because distributed client/server systems are harder to maintain than web servers. Furthermore, an inter/intranet-based system is client platform independent and provides cross-platform support. It's also scalable, not only in the enterprise but beyond it, too. A web-based system can also allow document updates in real time and get payback in less time, because more users can access the application as most end-users already have web browsers.

As a result, enterprise-wide electronic publishing over intranets is beginning to replace the traditional departmental approach. Increasingly, large corporations are turning to electronic publishing tools from companies such as Enigma, Folio and Xyvision. Ultimately web-based electronic publishing will provide companies with the ability to tie together data from separate repositories. It will be possible to create a single master table of content from multiple publications and sources on the fly. But for now, most data repositories are proprietary and not standards-based.

Help is on the way, however, in the shape of XML. The advantage of the XML standard is that it can assemble text and data from a variety of sources. That way, a user can create a complex electronic document that can still be easily searched or sent over the internet, typically using HTTP.

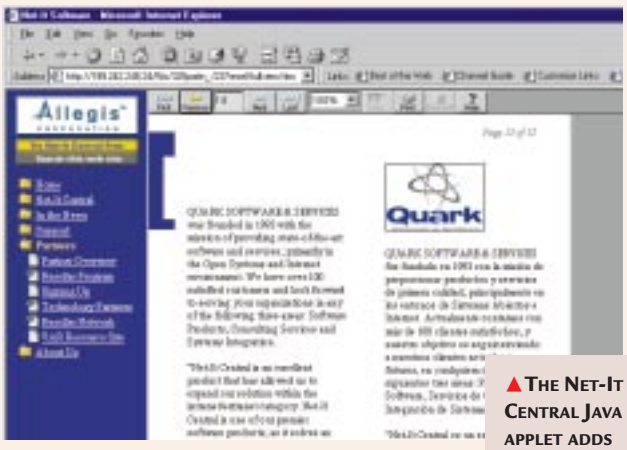
Take Insight, a document management system that includes a proprietary relational database that can drill down into nested levels of detail. For instance, Insight is deployed at the maintenance division of London Underground. A maintenance engineer can view a graphical breakdown of the parts of the train, drill down on each component: a click on the wheel pops up a graphic of the axle, which in turn can take the engineer down to component parts and identification numbers. A hyperlink can be set up to take the user into the warehouse to see if a part is available, or into instructional documentation.

The XML standard promises to revolutionise document management for the large-scale enterprise. As a result of ever-increasing regulation, most are obliged to commit large amounts of data to paper, in the form of procedure guides, products guides or maintenance manuals. Some companies produce such complex products, e.g. aircraft manufacturers, that the production of accurate manuals, which could contain hundreds of thousands of components, is a very real headache. They're also expected to keep up to date with a welter of government regulations, all of which are delivered on paper. Maintaining such a mountain of paper, keeping it current and doing it in a timely fashion, and remaini competitive, is no easy task.

Low-end web publishing solutions

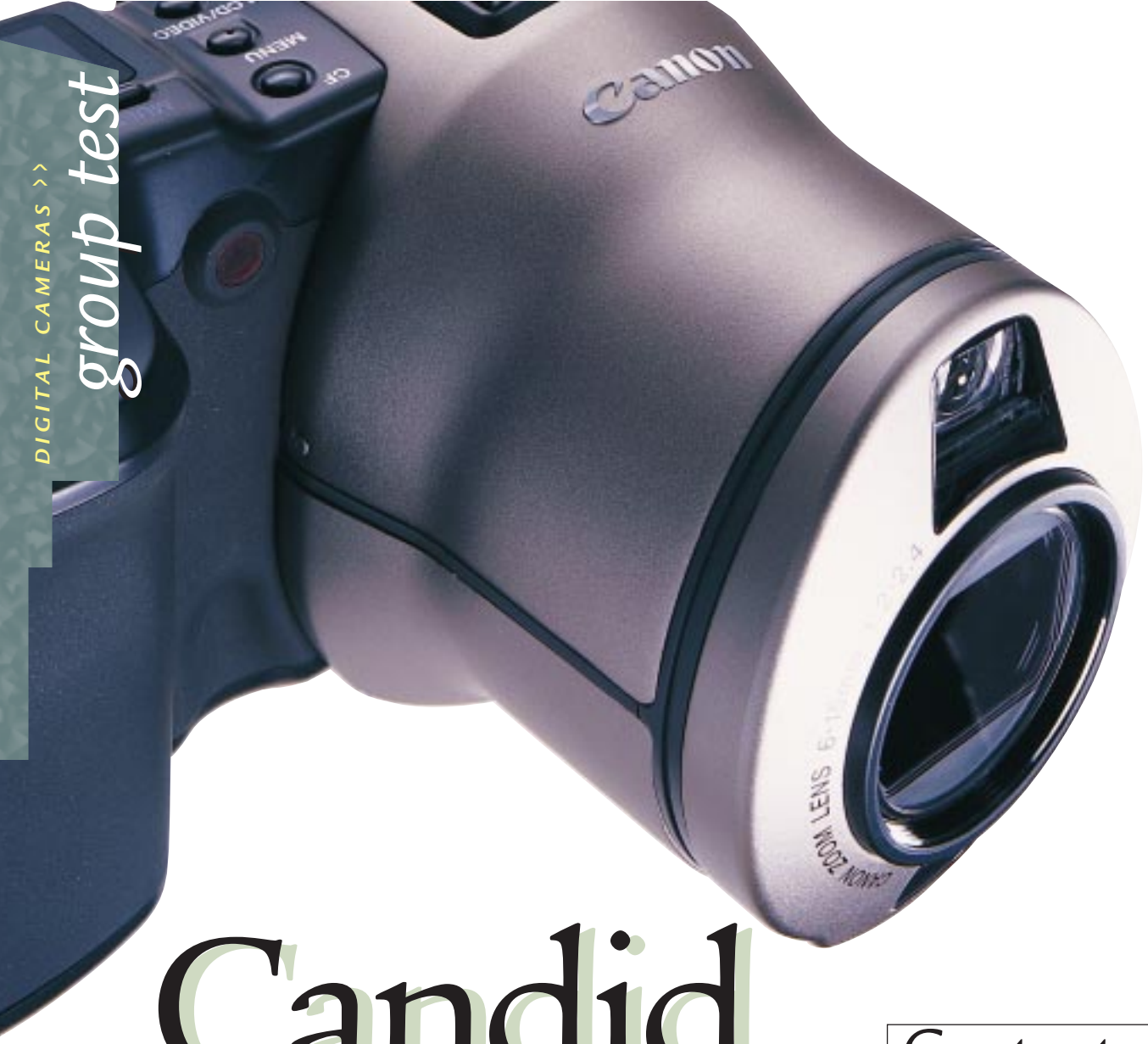
For smaller companies there is a simpler way of publishing documents on their intranet or company web site. Most word processors and several OCR packages include a 'save as HTML' option, but for large-scale document management there are more efficient solutions.

Adobe Acrobat is a universal page description and viewing format found mainly on the web and yet it makes no use of HTML. It converts documents into a cross-platform portable document format (PDF) that gives users more control in page design. Your pages can feature complex text formatting with different fonts, something that's awkward if not impossible using HTML. To republish work that you've already output using a DTP package like Quark XPress, then producing a PDF file takes just a matter of seconds, using Distiller. You can add hypertext links to connect documents within your web site. A 'capture' module lets you scan and OCR straight to PDF. It's available for all three Windows formats, plus (Power) MacOS and some Unix flavours. **Acrobat Reader**, a basic viewer, is available for free download at www.adobe.com and is on the *PCW* cover CD.



▲ THE NET-IT CENTRAL JAVA APPLET ADDS NAVIGATION AND PRINTER CONTROLS TO THE TOP OF THE DOCUMENT WINDOW

Net-It Central 3.0 www.net-it.com allows small workgroups to contribute documents to a corporate intranet or extranet. It automatically converts documents created with Windows applications into Java applets, and creates a web site to display those documents. You set up one or more 'drop boxes' on a server and simply drop the document in the box. If you set up a hierarchy of drop boxes, this structure will be retained on the intranet. Conversion is more than adequate for corporate use, but doesn't offer the precision of Adobe Acrobat.



Candid camera

Smile, please! These quality digital cameras put in focus what's available in a fast-growing and constantly improving market.

Not so long ago, the highest resolution you could expect from a mid-range digital camera was 640 x 480; now, 1024 x 768 is the minimum. New revisions of existing models are constantly being released, so we've taken a snapshot of the current market by evaluating ten middle to high-end models, priced between £400 and £1,100 (inc VAT).

The primary enhancement of the latest models is the improvement in CCD (Charge-Coupled Device) technology, the array of sensors which capture the images in place of conventional film. There's only one camera here with less than a million pixels in its CCD and this trend means higher resolution and more detail, so printing enlargements is now more feasible.

You'll also notice that digital cameras are in many instances beginning to resemble conventional film cameras as they enter the mainstream, although there's still some outlandish designs. As the current wave of free ISPs grows, there's a chance you've got 15Mb or so of web space to fill, and there's nothing like a few photos to brighten up a web site. And if you have one of the latest generation of photo printers you can print enlargements for a lot less than the £5 or so that Boots will charge — and the quality won't be too far off, either.

Contents

Ratings

★★★★★ **Highly recommended**
★★★★ **Great buy**
★★★ **Good buy**
★★ **Shop around**
★ **Not recommended**

Agfa ePhoto 1680

The 1680 delivers the highest-resolution images in this group test at 1600 x 1200 although the native CCD resolution, at 1.22 megapixels, is not the largest. This means that the highest-resolution images are being interpolated — a waste of the 4Mb SmartMedia's precious capacity. The Agfa has a distinct computer peripheral-style feel to it, in contrast to the conventional designs of the likes of the Canon PowerShot A5 [*below*]. It has to be said that it feels rather tacky, with the non-metallised silver finish and its overall light weight giving it the air of a toy rather than a £700 camera. Like the Ricoh and Casio models, the 1680 sports a swivelling lens for capturing overhead shots without breaking your neck, but doesn't have an optical viewfinder. Controlling the Agfa is easy. Most adjustments are made via the EasyPilot button, a rotary control for selecting and confirming an option. The range of controls on offer don't go to the extent of the Casio or Minolta units but the essentials are all there. We were impressed by the basic image quality of the 1680. The unit was in our top three after assessment of the main test photos. It wasn't good at getting close to the action for macro shots, though. Overall, the 1680 is simple but effective.

PCW DETAILS

★★★★

Price *£703.83 (£599 ex VAT)*
Contact *Agfa 0181 231 5511*
www.agfa.co.uk
Good Points *Very good quality for non-macro work. Reasonable price.*
Bad Points *A bit basic. Tacky design and feel.*
Conclusion *One of the best for straightforward, basic shots.*

Canon PowerShot A5 Zoom

The cheaper of the two Canons, the A5 Zoom is styled like a conventional camera. It's remarkably small but its build quality is very high and it feels extremely solid. Rotating the unit's selection dial automatically slides the lens cap across and extends the 28-70mm equivalent lens. The LCD monitor screen is fairly diminutive but it's clear and has a good refresh rate. There's an optical viewfinder, too. The A5 Zoom is powered by a special Nickel Metal Hydride battery pack and comes with a charger that doubles as a mains power supply. Conveniently, you can power the camera via the mains while the battery is charging. The A5 Zoom is the only sub-megapixel camera here, with an 810,000 pixel CCD array giving a maximum resolution of 1024 x 768. Consequently it suffers rather when it comes to detail reproduction and we also noticed colour misalignment when zooming in on details. The unit takes a single Compact Flash memory card; an 8Mb card is supplied, giving you up to 44 pictures in high-quality, high-resolution mode. Like most of the other cameras, the only way to get your pictures onto the PC is via the serial interface. The A5 Zoom comes with a TWAIN driver rather than a standalone application and this works well enough; it's just very slow.

PCW DETAILS

★★★

Price *£645.08 (£549 ex VAT)*
Contact *Canon 0121 666 6262*
www.canon.co.uk
Good Points *Small and chic. Great build quality.*
Bad Points *Relatively low resolution.*
Conclusion *A great executive toy, but others will deliver better quality.*

Canon PowerShot Pro 70

The PowerShot Pro 70 is the most expensive camera here and is aimed at the semi-professional or serious amateur. Although it's styled like an SLR camera, the viewfinder sits above the main objective lens. Open up the Pro 70 and there are two Compact Flash slots, one of which is filled by a 15Mb card. It has a custom Nickel Metal Hydride power pack with recharger included that can also power the unit directly via the mains. With its optical viewfinder, the Pro 70 can be used with or without the LCD. The mode dial lets you select standard or program modes, and there's a full range of aperture or shutter priority programs. Taking a picture, the 28-70mm equivalent zoom control falls naturally under the thumb when supporting the lens with the left hand. There's no flash though, so it must be bought separately. It's quality you're paying for if you buy a Pro 70 and in this department it doesn't disappoint, romping away as our Editor's Choice for its superbly 'undigital' 1536 x 1024 reproduction and colour balance. Macro mode was good too, although bettered by the Ricoh [*p202*].

EDITOR'S CHOICE
PERSONAL COMPUTER WORLD

PCW DETAILS

★★★★★

Price *£1,173.83 (£999 ex VAT)*
Contact *Canon 0121 666 6262*
www.canon.co.uk
Good Points *Superb quality. Very programmable. 15Mb of storage.*
Bad Points *Expensive, but that's about it.*
Conclusion *The one to buy if money is no object.*

Casio QV-7000 SX

The most prominent feature of the QV-7000 is its LCD monitor: it's very large at 2.5in, which helps no end with the framing of shots. It's also useful with the novel panorama mode: after taking the initial shot, you're helped with lining up the second by a translucent overlay of the first at the left-hand edge of the screen. There's no optical viewfinder on the QV-7000 so battery life is liable to be a problem, particularly since there's no mains power supply or rechargeable batteries supplied. The reason for the lack of viewfinder is the swivelling ability of the lens, letting you hold the unit above your head in a crowd while framing the shot in the LCD. An 8Mb Compact Flash card comes with the 7000 and it stores pictures in a unique way, placing an HTML index page on the card, with thumbnails and links to the pictures. So, if you have a Compact Flash reader or PC Card adaptor you can simply double-click on the index file to browse the contents. Unfortunately neither of these are supplied, so unless you want to spend extra you'll have to make do with the standard serial transfer cable and software. Image quality is somewhat marred, though, by a lot of CCD (Charge-Coupled Device) electrical noise.

PCW DETAILS

★★★★

Price *£499.99 (£425.52 ex VAT)*
Contact *Casio 0181 450 9131*
www.casio.co.uk
Good Points *Large display. Novel shooting modes.*
Bad Points *Some CCD noise evident. No optical viewfinder.*
Conclusion *One to consider if you're after a lot of features and don't mind the lack of an optical viewfinder.*

Kodak DC-210 Plus

The 210 continues the spate of Kodak cameras which look like vintage radios. It is chunky and has easy-to-use controls, complemented by a colourful and user-friendly menu system on the LCD monitor, complete with animations. The LCD display isn't particularly good quality though, with blocky images and a slow update rate. There's a separate power switch, and a large, unambiguous mode dial on the back prevents the kind of frustration we experienced with the Minolta. The Kodak is the only unit that lets you select from two different file storage formats, JPEG or FlashPix, but this doesn't affect the number of images the camera is able to store. The 8Mb Compact Flash memory card will hold 16 high-resolution 1152 x 864 images, increasing to 36 with higher compression. A set of rechargeable Nickel Metal Hydride batteries (plus charger) and a mains power unit are included. For downloading via serial cable we used the supplied TWAIN driver but experienced considerable problems. In the end we could only manage to transfer pictures at 9600bps. Apart from this, the Kodak was trouble free. Quality was only average though, and it displayed the worst macro ability of the bunch.

PCW DETAILS

★★★★

Price *£399.99 (£340.42 ex VAT)*
Contact *Kodak 0800 281487*
www.kodak.co.uk
Good Points *Easy to use. 8Mb storage. Cheap.*
Bad Points *Problems with download speeds. Quality is only adequate.*
Conclusion *Another good, fuss-free unit for no-nonsense shots.*

Minolta Dîmage EX Zoom 1500

The Dimage has the dubious distinction of being the second most expensive camera here. It's very hard to use, too. There are 17 small, fiddly control buttons and dials and we found it tricky to get anywhere without resorting to the manual, which was only supplied on CD-ROM — a ludicrous situation for a peripheral that's supposed to be portable. Once you've fathomed it, the camera offers sophisticated functions like grouping and naming sets of images, but we'd be surprised if many people used these functions. On the plus side you get a lot of extras for your money, including a total of 16Mb storage on one 8Mb and two 4Mb Compact Flash cards. There's also a SanDisk Compact Flash drive which plugs into a PC parallel port and simplifies downloading images: just pull out the card, plug it into the reader and download the whole contents in a couple of seconds. There's a set of batteries, charger and external power supply included. For its price, the Dimage wasn't all we'd hoped in terms of quality. Although it showed excellent detail reproduction with its unusual maximum resolution of 1344 x 1008, colour rendition was wide of the mark. Macro mode was reasonable but didn't get close to the Ricoh [*p202*].

PCW DETAILS

★★★

Price *£1,175 (£1,000 ex VAT)*
Contact *Minolta 01908 200400*
www.minolta.co.uk
Good Points *Loads of extras. Compact Flash card reader.*
Bad Points *Very hard to use. No paper manual. Expensive.*
Conclusion *High price and very quirky operation makes it hard to recommend.*

Olympus C-900 Zoom

The C-900 is styled very much like a conventional camera. It has a compact, camera-style lens cover which slides back whereupon the lens automatically extends. But it's a bit fiddly closing it again as you need to slide it part-way back, wait for the lens to retract and then slide it the rest of the way. Again, like standard compact cameras, the flash is the pop-up variety although it's not automatic. The C-900 has one of the least intuitive control systems. There are too many buttons and it's not immediately obvious what many of them do. But if you can't work out how to turn on the LCD monitor, there is at least an optical viewfinder. The serial transfer software is easy to use: just hit the 'download all' button and off it goes. No need to mess about with downloading thumbnails beforehand if you don't want to. There's no power supply or battery charger as standard, so the consequent power savings are welcome. The 4Mb SmartMedia means downloads will be necessary more often than others with larger capacities. The 1280 x 960 resolution CCD (Charge-Coupled Device) produced very good image quality in our studio tests, marred only by a slight lack of focus. It fared well in the macro test, too.

PCW DETAILS

★★★★

Price *£649.99 (£553.18 ex VAT)*
Contact *Olympus 0171 253 0513 www.olympus.co.uk/indexE.html*
Good Points *Great looks. Excellent quality. Reasonable price.*
Bad Points *Only 4Mb storage. No rechargeables or power supply.*
Conclusion *A good, compact all-rounder.*

Olympus C-1400XL

The C-1400XL has similar controls to the C-900 Zoom. The main differences are its higher-resolution 1.41 million pixel CCD providing 1280 x 1024 resolution and the fact that it has a through-the-lens viewfinder, so what you see is what the CCD sees when you press the shutter. It has a slightly extended zoom range of 36-105mm. The controls are less than intuitive and there's only a manual pop-up flash. It has an 8Mb SmartMedia card allowing up to eight pictures to be stored in the lowest compression mode, 24 with slightly higher compression and 49 at 640 x 512 resolution. The serial transfer software is straightforward and fuss-free and the inclusion of rechargeable batteries and a charger makes for less stressful downloads: no worry about the batteries dying halfway through and having to buy another set just to complete the transfer. There's also the option of printing straight to an Olympus photo printer via the integrated printer port. The 1400's quality in the main studio setup was among the best in this group. Macro mode was not as impressive though, as the unit was unable to get close to the subject.

PCW DETAILS

★★★★

Price *£849.99 (£723.40 ex VAT)*
Contact *Olympus 0171 253 0513 www.olympus.co.uk/indexE.html*
Good Points *High resolution. TTL viewfinder.*
Bad Points *Unintuitive controls. Fairly expensive.*
Conclusion *Good choice for the higher-end user, but check the Agfa 1680, too.*

Ricoh RDC-4200

The Ricoh has no optical view-finder by dint of its swivelling lens arrangement: the flash in the main body is mechanically linked and swivels in sympathy. It has a lens cover that automatically opens when you switch the camera on. There's a separate power switch for this, making it easy to flick the unit on or off without fiddling with a multi-way switch. The LCD monitor is rather small at 1.8in but it's very good quality and updates faster than any other camera in this group test: it appears to refresh at a full 25fps. The SmartMedia memory card supplied with the Ricoh is only 4Mb, giving just six images in the high-quality, 1280 x 960 resolution mode. But frequent image downloads are aided by the fact that the camera's LCD gives a constantly updated display showing the amount of each image still to transfer — a unique feature in this test. Special mention has to go to the RDC-4200's macro mode. It's head and shoulders above the rest, letting you focus down to just 8cm and revealing far more detail than any of the others. Image quality in standard mode wasn't so encouraging though, with poor white balance and some colour misalignment.

PCW DETAILS

★★★★

Price *£499 (£424.68 ex VAT)*
Contact *Johnson's Photopia 01782 753355 www.ricoh-cameras.co.uk*
Good Points *Superb macro mode. Good display. Low price.*
Bad Points *Not much storage. No optical viewfinder.*
Conclusion *The one to buy for macro shots.*

Sanyo VPC-Z400

This is the very latest camera in Sanyo's range. Its metallic silver finish lends it a similarly hefty feel to the Canon A5 but it's a bit larger and less elegant. Also, like the A5, the metal is only skin deep; there's a plastic shell underneath. The Sanyo was the easiest camera to pull out of the box and start using. Most of the controls are labelled with text rather than cryptic icons and the number of controls has been kept to a minimum. Next to the LCD monitor is a big slider switch to turn the display on or off, so no stabbing at buttons here. And, at the other side of the monitor is a novel feature, a 'solar panel' slider. This is not a solar panel in the usual sense: sliding it down flips open a small flap at the top of the LCD, allowing ambient light to illuminate the display and saving the battery drain of a normal backlight. It works well outdoors. Adjusting this camera's settings via the monitor is far easier than many in this group test: all is done via a four-way, thumb-operated rocker switch. The 1.3 megapixel CCD gives a maximum image resolution of 1280 x 960 and the quality is very good. We were particularly impressed with the 34-102mm lens's macro capabilities, putting it in second

PCW DETAILS

★★★★

Price *£599 (£509.79 ex VAT)*
Contact *Sanyo 01923 246363*
www.sanyo.co.uk
Good Points *Very easy to use. Good quality. Good macro ability.*
Bad Points *A little chunky. Rather expensive.*
Conclusion *A good choice if ease of use is a primary concern.*

Table of features

Manufacturer	Agfa	Canon	Canon	Casio	Kodak
Model	ePhoto 1680	PowerShot A5	PowerShot Pro 70	QV-7000SX	DC-210 Plus
Price (inc VAT)	£703.83	£645.08	£1,173.83	£499.99	£399.99
Phone	0181 231 5511	0121 666 6262	0121 666 6262	0181 450 9131	0800 281487
URL	www.agfa.co.uk	www.canon.co.uk	www.canon.co.uk	www.casio.co.uk	www.kodak.co.uk
Focal length (equivalent)	38-114mm	28-70mm	28-70mm	32-64mm	29-58mm
Digital zoom	2X	✗	✗	4X	✗
Macro mode minimum focus	20cm	17cm	12cm	10cm	20cm
Number of CCD pixels	1.22 million	810,000	1.6 million	1.32 million	1.01 million
Max picture resolution	1600 x 1200	1024 x 768	1536 x 1024	1280 x 960	1152 x 864
Other resolutions	1280 x 960, 640 x 480	512 x 384	768 x 512	640 x 480	640 x 480
Memory type	SmartMedia	Compact Flash	Compact Flash	Compact Flash	Compact Flash
Standard external memory	4Mb	8Mb	15Mb	8Mb	8Mb
Max images on memory	6 at 1600 x 1200, 12 at 1280 x 960, 48 at 640 x 480	8 in CCD RAW, 44 high quality high res, 236 standard quality low res	7 in CCD RAW, 39 high quality high res, 181 standard quality low res	14 max quality high res, 33 min quality high res, 55 low res	16 high quality, 24 better, 36 good
Native file format	JPEG	JPEG	JPEG or proprietary CRW	JPEG	JPEG or Flashpix
AC adaptor/rechargeable batteries	✗ / ✓	✓ / ✓	✓ / ✓	✗ / ✗	✓ / ✗

Manufacturer	Minolta	Olympus	Olympus	Ricoh	Sanyo
Model	Dimage EX Zoom	C-900 Zoom	C-1400XL	RDC-4200	VPC-Z400
Price (inc VAT)	£1,175	£649.99	£849.99	£499	£599
Phone	01908 200400	0171 253 0513	0171 253 0513	01782 753355	01923 246363
URL	www.minolta.co.uk	www.olympus.co.uk/	www.olympus.co.uk/	www.ricoh-cameras.co.uk	www.sanyo.co.uk
Focal length (equivalent)	38-115mm	35-105mm	36-110mm	35-105mm	34-102mm
Digital zoom	✗	2X	✗	2X	2X
Macro mode minimum focus	35cm	30cm	30cm	8cm	20cm
Number of CCD pixels	1.45 million	1.31 million	1.41 million	1.22 million	1.31 million
Max picture resolution	1344 x 1008	1280 x 960	1280 x 1024	1280 x 960	1280 x 960
Other resolutions	640 x 480	640 x 480	640 x 512	640 x 480	640 x 480
Memory type	Compact Flash	SmartMedia	SmartMedia	SmartMedia	Compact Flash
Standard external memory	16Mb (4+4+8)	4Mb	8Mb	4Mb	4Mb
Max images on memory	10 superfine, 80 standard, 320 quarter size min. quality	1 non-compression mode, 9 super high- 18 high-quality 60 SQ low res	8 super high quality, 24 high quality, 49 standard quality low res	1 uncompressed, 6 superfine, 23 economy high res, 70 economy low res	8 high res, high quality, 15 high res, med quality, 41 low res, med quality
Native file format	JPEG	JPEG	JPEG	JPEG (TIF uncompressed)	JPEG
AC adaptor/rechargeable batteries	✓ / ✓	✗ / ✗	✗ / ✓	✗ / ✓	✗ / ✗

Agfa **ePhoto 1680**


High res


Medium res


High res


Medium res


Macro

Canon **PowerShot A5 Zoom**


High res


Medium res


High res


Medium res


Macro

Canon **PowerShot Pro 70**


High res


Medium res


High res


Medium res


Macro

Casio **QV-7000 SX**


High res

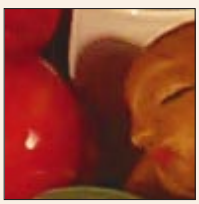

Medium res

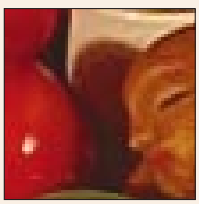

High res


Medium res


Macro

Kodak **DC-210 Plus**


High res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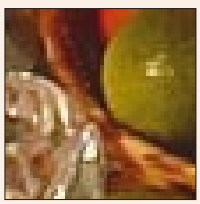
High res


Medium res


Macro

Minolta **Dîmage EX Zoom 1500**


High res


Medium res


High res


Medium res


Macro

Olympus **C-1400XL**


High res

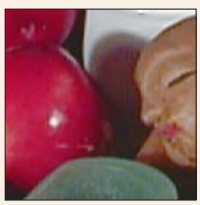

Medium res


High res


Medium res


Macro

Olympus **C-900 Zoom**


High res


Medium res


High res


Medium res


Macro

Ricoh **RDC-4200**


High res


Medium res


High res


Medium res


Macro

Sanyo **VPC-Z400**


High res


Medium res


High res


Medium res


Macro

Editor's **Choice**

There's no doubt that things are developing fast on the digital camera front, but it's clear that you're not going to want to throw away your trusty 35mm film camera just yet. A film camera still gives far better colour reproduction and massively increased resolution over the best digital unit here, for less than half the cost of the cheapest. Nevertheless, some of the results are mightily impressive and there's no doubt that with the massive increase in the use of the web, a digital camera is the fastest way to get your photos online for the whole world to see.

It's encouraging to see that none of the cameras in this test produced less than good quality. Most of them have interesting features not found on any of the others so it pays to take a long hard look at their specifications to see which one might suit you. But there have to be some winners. As far as absolute quality goes, it is clear which camera comes up trumps.

Our Editor's Choice is the Canon PowerShot Pro 70 which provides amazingly good, natural-looking pictures and enough facilities to keep any SLR user happy. Additionally, its dual Compact Flash slots make for extended periods without having to download. It's not too surprising that the PowerShot Pro 70 wins on quality, given that it costs more than £1,000.

The real trick is getting high quality at a low price. For the best price-performance ratio, the **Olympus C-900 Zoom** and the **Ricoh RDC-4200** are **Highly Commended**. Although it's not the easiest to use, once you get the hang of it, the Olympus provides excellent pictures in a range of circumstances. It's also very neatly styled, the LCD is high quality, and at £650 it's not going to bankrupt you. The Ricoh receives an award by virtue of its low price and superb macro mode: it managed to completely fill the frame with an amazingly small area of our test setup. If you're looking for a camera to photograph your jewellery and other small valuables for insurance purposes, this is the one to go for.

How we did the tests

To be able to test the performance of the cameras on a level playing field, a controlled environment with constant lighting is needed. So, for the major part of our tests, we set up a still life scene in a studio, using professional tungsten lamps for illumination.

We set up each camera on a tripod in the same position as the last and used the zoom facility (which all these cameras possessed) to accurately frame the shot using guide marks set up at each corner of the still life. We then took three shots: one was taken at the maximum resolution and quality of which each camera was capable; and then again with the lights turned off, which meant the cameras were forced to increase the gain on their CCD arrays, showing up any problems with 'noise'. For the third, we turned the lights back on and took a shot at the default, normal quality, mode of each camera. In all cases, the flash units were turned off to keep the lighting and shadows constant and enable us to directly compare the results for each camera. We then resized each of the images in Photoshop to A4 size and took one-inch square sections of the high and medium resolution images to reproduce here.

To test macro photography abilities, we set up another still life scene and took a shot with each camera set to maximum telephoto, positioned at the minimum focusing distance according to the camera's specification. In judging the results, we concentrated on how small an area each camera captured, and whether or not the results were in focus. We resized the macro shots to an inch high, so what you see is what we got. In addition, we took each camera outside and took an outdoor shot of the same subject (London's Soho Square) from the same position, to aid us in assessing the all-round abilities of the cameras.

When viewing our results, bear in mind that in the interests of keeping things equal, the shots were taken using the standard automatic exposure and whitepoint settings, as they'd be most often used in practice. All the cameras featured in this test have adjustable whitepoint and manual exposure modes, so it's possible to tweak the settings to achieve the desired results.

Photo **flash**

Adele Dyer's snapshot view of tomorrow's new products not yet on the shelves, or only just out.

Fujifilm MX-2700

Fujifilm has numerous new cameras. The MX-2700 [*pictured*] has a 2.3 million pixel CCD that provides a resolution of 1800 x 1200 and has a 2.5X digital zoom. The MX-600 Zoom has a top resolution of 1280 x 1024 image from a 1.5 million pixel CCD. It comes with 12Mb of SmartMedia and has a 3X Fujinon zoom lens. The DS-330 has a wide range of features and a high-quality 1.4 million pixel CCD. **Prices Fujifilm MX-2700, under £700 (£595.74 ex VAT); Fujifilm MX-600Zoom, £549.99 (£468.08 ex VAT); Fujifilm DS-330, £1404.13 (£1195 ex VAT) Contact Fujifilm 0171 586 5900 www.fujifilm.co.uk**

Kodak DC-240

Kodak has a whole raft of new cameras but most are refreshes of existing models, with faster power-up times and faster image processing. One completely new camera is the DC-240. With its 1.3 megapixel CCD, it has a top resolution of 1280 x 960 and an 8Mb CompactFlash.

Price £499.99 (£425.52 ex VAT)
Contact Kodak 0800 281487 www.kodak.co.uk

Epson Photo PC 750 Z

Epson's latest digital camera uses an interpolation technique to give a top resolution of 1600 x 1200 pixels, from a 1.25 million pixel CCD sensor. It has a 3X optical zoom lens, a 2X digital zoom and a power-saving LCD panel which uses daylight to provide the backlight.

Price £727.33 (£619 ex VAT)
Contact Epson 0800 220546 www.epson.co.uk

Nikon Coolpix 950 and 700

Nikon has not just one but two new models featuring 2.11 million pixel CCDs. Both the Coolpix 950 and the Coolpix 700 have a maximum resolution of 1600 x 1200. The former has an optical zoom equivalent to a 38-115mm lens on a 35mm camera, while the latter has an auto-focus lens equivalent to a 38mm lens on a 35mm camera with a five-step digital zoom.

Price to be announced
Contact Nikon 0800 230220 www.nikon.co.uk

Konica Q-M200

This two million pixel camera gives a resolution of 1600 x 1200. Unlike some of the other two-megapixel cameras it does not have an optical zoom; the lens is equivalent to a 38mm lens on a 35mm camera. It comes with an 8Mb CompactFlash card.

Price to be announced
Contact Konica 0181 751 6121
www.konica.co.uk

Olympus Camedia C-2000 Zoom

Another two-megapixel camera, this time with a 2.1 million pixel CCD, giving a true resolution of 1600 x 1200 pixels. It has 3X optical zoom and 2.5X digital zoom, and comes with an 8Mb SmartMedia card which will store between one and122 images depending on resolution and compression rate. **Price £749.99 (£638.29 ex VAT)**
Contact Olympus 0171 253 0513 www.olympus.co.uk/indexE.html

Quantum mechanics, one of the most unfathomable areas of science, is coming to the desktop.

Weird science

▲ THE OPEN QUBIT PROJECT EXISTS TO MOBILISE EVERYONE WITH AN INTEREST IN QUANTUM COMPUTING

It's been more than a decade since David Deutsch of Oxford University proved that it's possible to build a computer based on quantum mechanics. Such a machine would be a supercomputer beyond our wildest dreams, performing an unimaginable number of calculations in the blink of an eye. Now, a consortium of amateur enthusiasts is trying to create a software simulation of a quantum computer. Their Open Source program will be freely available, enabling you to experiment with quantum computation on your desktop.

Quantum mechanics is weird. In fact, it's about as weird as you can get and still stay within the realms of science. As Nobel-prizewinning physicist Neils Bohr once said, anyone who is not shocked by quantum theory does not understand it.

Like a conventional computer, a quantum computer works by manipulating data in the form of bits. In a conventional computer, a bit is represented by a circuit whose state, such as its voltage, encodes either a 0 or a 1 — there's no in-between. But in a quantum computer, a bit is represented by an individual particle, like an electron, and things are very different indeed.

Suppose you adopt the convention that an electron spinning clockwise represents a 0, and spinning anticlockwise represents a 1. So at any time, it would be reasonable to assume that the particle represents a 0 or a 1. Wrong! That's only true when you actually measure its spin. Before you take a measurement, the particle is in a strange indeterminate state, called a 'superposition'. In some unfathomable sense, the particle is spinning both clockwise and anticlockwise at the same time. It sounds ludicrous, but experiments have proved that's what happens. The relevance to computing is that a bit in the quantum world, a 'qubit', can be a 0 and a 1 simultaneously. And that's where the fun starts.

The amazing power of the quantum computer stems from the fact that if you have a collection of qubits — a register — in which each qubit is in an indeterminate state, then the register effectively represents all its possible numbers at once. If you then perform a single computation on the register, the computation works on each of the possible numbers simultaneously. David Deutsch explains this in terms of parallel universes: although we see only the single register in our universe, it actually exists in many other universes too, one for each of its possible states. By operating on the register in our universe, we kick off computations in all the other unseen universes, and then magically retrieve the answer. I did say it was weird!

Until now, research into quantum computing has been confined to experts in the field: the mathematics is fearsome, and few physicists have access to the specialised equipment necessary to conduct experiments. But Yan Pritzker is a young US computer enthusiast who wants to change all that. He's organised the OpenQubit project <www.openqubit.org> to mobilise everyone interested in quantum computing. There are already over 200 people signed up, and anyone with an interest in the topic is welcome.

The relevance to computing is that a bit in the quantum world can be a 0 and a 1 simultaneously — AND THAT'S WHERE THE FUN STARTS

OpenQubit's first project, being run as a collaborative effort across the web, is to produce a C++ simulation of a quantum computer which will run on a conventional machine. Once the simulation program is complete, it will be possible to research how to write programs to run on a real quantum machine.

It's an exciting field. No-one knows whether the quantum computer will become a workable machine. In a recent lively debate in the 'News for Nerds' webzine, SlashDot <slashdot.org> all shades of opinion were on display, from 'this is cool!' to 'stop living in lala-land with leprechauns and fairies'. One thing's for sure: if a quantum computer is ever built, we'll get the best of all possible worlds.

TOBY HOWARD

The HAVi standard is a way to control consumer electronic devices via a single interface.

Home front

We have seen intelligent fridges and even internet surfing microwaves, but there's a brighter future for intelligent devices in the home. A consortium of eight consumer electronics companies have got together to come up with a standard that will provide the backbone of a home network.

In its present form, HAVi (home audio/visual interoperability) allows you to connect a variety of consumer electronic devices using a common hardware protocol and common software middleware. HAVi works with mostly digital audio/visual devices, such as digital TVs and digital VCRs, set-top boxs, cable modems and digital camcorders. It will also be integrated into up-coming devices such as video-phones and internet-phones. In other words, HAVi makes it easy to create the ultimate home entertainment system without a tangled web of wires, and the entire network can be controlled through a single interface. So you could use the TV in your kitchen to program the video in your sitting-room using Electronic Program Guide, or dial up the internet via your cable modem and surf from the comfort of your armchair.

You could use the TV in your kitchen to program the video in your sitting-room, or dial up the internet FROM THE COMFORT OF YOUR ARMCHAIR

The network can take care of its own devices. If a HAVi device is plugged in or out of the network, then the network will detect this and adapt its behaviour accordingly. So if a VCR is unplugged, the network will try to find another VCR on the network and order it to take over the preset recording of programmes, or it will tell the user it cannot find a VCR to carry out the taping. Your PC could also be part of the equation and be used like any other HAVi device, controlling other devices and being *controlled by* other devices when carrying out AV functions.

▼ ONE DAY, ALL HOME ENTERTAINMENT WILL BE ON A NETWORK OPERATED THROUGH A SINGLE INTERFACE

The backbone of this system is built on IEEE 1394. Content and control data can be mixed on the same channel, and 1394 does not need one controlling device but can distribute control among all the devices on the network. It also allows devices to be hot-plugged – added while the network is up and running – and the devices added will configure themselves, so it's perfect for a home network where the user does not want to get involved in configuration. As it stands at the moment, 1394 can move data at speeds of 100, 200 and 400Mbits/s, with 800Mbits/s coming soon. However, the HAVi consortium is also looking at a wireless connection of devices, again based on 1394.

The software layer is built using an open and standardised Java programming environment. As such it is platform independent so can be used on anything from embedded environments in TVs through to PCs. Java applications then carry out the specific functions of each device. These applications can be device specific, so not all manufacturers of HAVi hardware will have to sell devices with exactly the same functionality. New applications can be downloaded as they become available, further enhancing the functionality of your equipment.

The future for this technology looks bright, especially as the HAVi consortium is busy linking its protocols to other projected and existing protocols. A bridge to JINI is being written, so you will be able to access your home network from a JINI network in your office.

Similarly a bridge is being built to HomeAPI, a rival to HAVi that creates a home network for entertainment devices. Using this, HAVi will be able to control security and energy devices: you will be able to set the burglar alarm and turn the heating up from any device in the house with an appropriate interface.

ADELE DYER

hands on contents

This month's *Hands On* sees the second in our ten-part series on **millennium bug** issues covering possibly the largest concerned audience: **Windows** users can breath a sigh of relief as Tim Nott confirms that the most directly affected areas are compliant and there are only a few straggling issues to take care of. And, to complement the inclusion of **Quicken SE 6** on our cover CD, we have Alex Singleton's two-part workshop. Nik Rawlinson continues his *Hands On* presence with part two of the excellent **web authoring** workshop. This time, the humble web page is addressed as to its content and style. There's a **new look** to our *Internet* section, with something for both surfers and servers to get their teeth into. In addition, there's the launch of a new **discussion forum** on the internet with an open invitation for all you readers to keep Nigel Whitfield on his toes. As always, the contents of our *Hands On* columns are really down to you, the reader, so please feel free to send me your comments and suggestions or you can contact our contributors directly.

IAN ROBSON, HANDS ON EDITOR
IAN_ROBSON@VNU.CO.UK

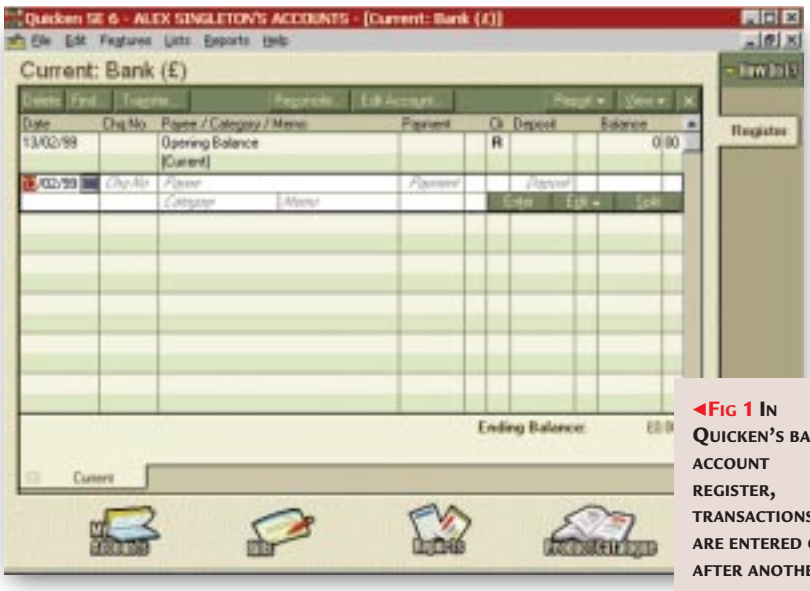
PCW Hands On on CD-ROM

Now it's easy to find that *Hands On* tip, trick, advice or review again – there's a whole year's worth of columns on our monthly *PCW* CD-ROM. So if that handy hint is on the tip of your tongue, don't sit and sweat; the answer is at your fingertips.

Money matters

In the first of a two-part series, Alex Singleton explains how to use Quicken SE 6.

Luddites will say that using a PC to look after your personal finances is unnecessary, over-complicated and time consuming. But, if you need to fill out self-assessment forms, avoid becoming overdrawn or want to know where your money's going, a PC is invaluable. This two-part workshop looks at Quicken SE 6, a fully-working version of which is on our cover CD.

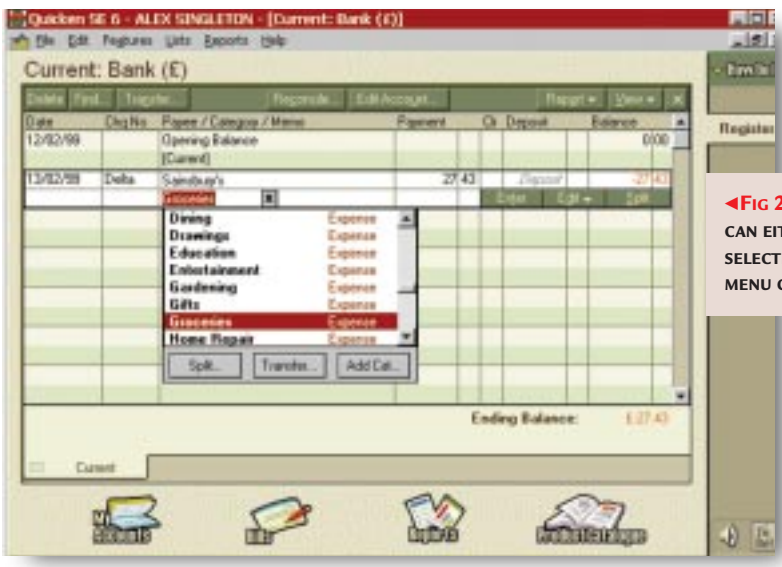


◂FIG 1 IN QUICKEN'S BANK ACCOUNT REGISTER, TRANSACTIONS ARE ENTERED ONE AFTER ANOTHER

Getting started

The first time you run Quicken it asks some questions about yourself and for what you will be using it. In this month's tutorial I'm assuming that you are using Quicken to look after your personal finances and so will not be tracking VAT — I will cover the use of Quicken for small businesses next month. Once you have answered the questions you will see something resembling an almost blank bank statement which Quicken calls a 'register' [Fig 1]. Along the bottom of Quicken's window are four icons which make up the 'Activity Bar'. To enter details of your purchases or income, type each of these 'transactions' one after another into the register.

In the first field, type the date of the transaction. For example, the date you paid a cheque into your account or when you used your Switch card. Tab moves you on to the next field; 'Chq No'. If you're entering details of a cheque you've written, enter the cheque number. If not, select from the menu (below the field) the type of transaction you're entering. For example, if it's a Switch card payment select Switch, or if it's a deposit select Deposit. Do not, however, enter credit card payments or anything relating to another bank account (this is explained later). If it is an outgoing payment, enter the amount in the Payment field, otherwise press Tab to enter the amount in the Deposit field.



◂FIG 2 CATEGORIES CAN EITHER BE SELECTED FROM A MENU OR TYPED IN

Now for the Category field. What makes Quicken so useful is that it can produce reports and graphs showing what sort of items you have been spending money on. But to do this, each transaction needs to be allocated a category — e.g. food, software, leisure. The same applies to income if you earn money from more than one source.

Quicken has several dozen pre-defined categories and you can select these from a menu [Fig 2] which appears automatically when the cursor is in the Category field. Alternatively, you can create your own by typing its name and pressing Tab to go to the next column.

Selecting a category for a transaction is all very well but it doesn't always make clear what the transaction represents. For example, if you buy a copy of Windows 98 you might want to categorise it more precisely than just 'software'. So, in the next field you have the option to type a note to remind yourself what exactly it was you bought. Pressing return while in this field saves the transaction and moves the cursor to the next line.

Reconciling

If you type entries as you go along, rather than just copying them off your statement, reconciling can be useful.

When the bank statement comes there will be extra items on your statement, such as interest. Reconciling will help you to pick up mistakes made when entering transactions into Quicken.

To reconcile, move the mouse over My Accounts on the Activity Bar and select 'Reconcile an Account'. You will be asked for the start and end dates of the bank statement, and interest rate and bank charges.

Next, you will be presented with a list of transactions you have entered and should tick off all those which appear on your bank statement [Fig 3]. If you find that you have missed an entry or have made a mistake click on New or Edit respectively to make amends and temporarily go back to the register. To get back to reconciling from the register, click on 'Return to Reconcile'. Once the difference between the bank statement and Quicken is zero, click Finished. This will return you to the register which will display the letter R beside every reconciled entry.

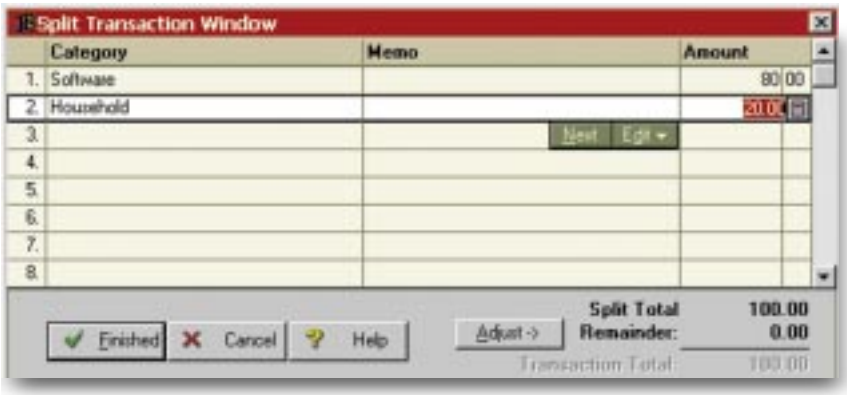
▲Fig 3 Reconciling a bank account

Splitting categories

So far we've assumed that all your transactions fit into a single category. But what if you spend £100 at John Lewis on two disparate items, such as a piece of software and a teapot?

What you need to do is 'split' the category. Start entering a new transaction and when you get to the category field don't enter anything. Instead, click on the 'Split' button, to open the Split Transaction Window [Fig 4]. On the first line enter the category for the software and in the amount field type in the price, say £80. On the second line, type in the category for the teapot and its amount, say £20, then click Finished.

▼Fig 4 Splitting a transaction's category



Oddly enough, the same window can be used for tracking how much the taxman is taking from you if you are paid on a PAYE basis. This is particularly useful if you are only employed for part of a financial year and are eligible to claim back some of the tax your employer has paid. To do this, type in a transaction with the date and your employer's name in the payee field. Then click on 'Split'. On the first line, type in the category 'Gross pay' and use Tab to move to the Amount column. Quicken may ask if you want to create a new category — answer 'yes'. Under Amount, enter your gross pay as shown on your payslip. On subsequent lines, type in all the deductions listed on your payslip, including Income Tax and National Insurance. Pension scheme deductions should also be entered here.

Creating new accounts

So far we've been dealing with a single bank account but how do you add an additional bank account, such as a credit card account?

Move the mouse over the leftmost icon on the Activity Bar. A menu will automatically appear from which you should select 'Create a New Account'. In the window which comes up, select Credit Card. A register will appear, representing the credit card account, into which you can type credit card purchases. At the foot of the screen, above the Activity Bar, are tabs representing all the accounts Quicken knows about. Click on these to switch between them.

What happens when your credit card statement comes through the post? Firstly, you ought to reconcile your credit card account in the same way as your current account. Then you will need to enter how you have paid off your credit card, which may either be the full amount or a proportion.

- If you pay it from a bank account which isn't dealt with in Quicken, just type it into your credit card register as an ordinary payment.
- If you pay by cheque from your current account, go into the current account register and enter it as a cheque.

The only difference is the category: select 'Transfer to/from... [Credit card]' which will be at the very bottom of the category menu. When you go back into the credit card register, the credit card balance will be reduced by the amount you have just entered.

Next month, I'll be looking at how Quicken deals with VAT-registered firms, how to set up regular payments and how to produce reports. And, on the cover CD, you'll find Intuit's excellent multimedia tutorials for Quicken 6.

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In the frame

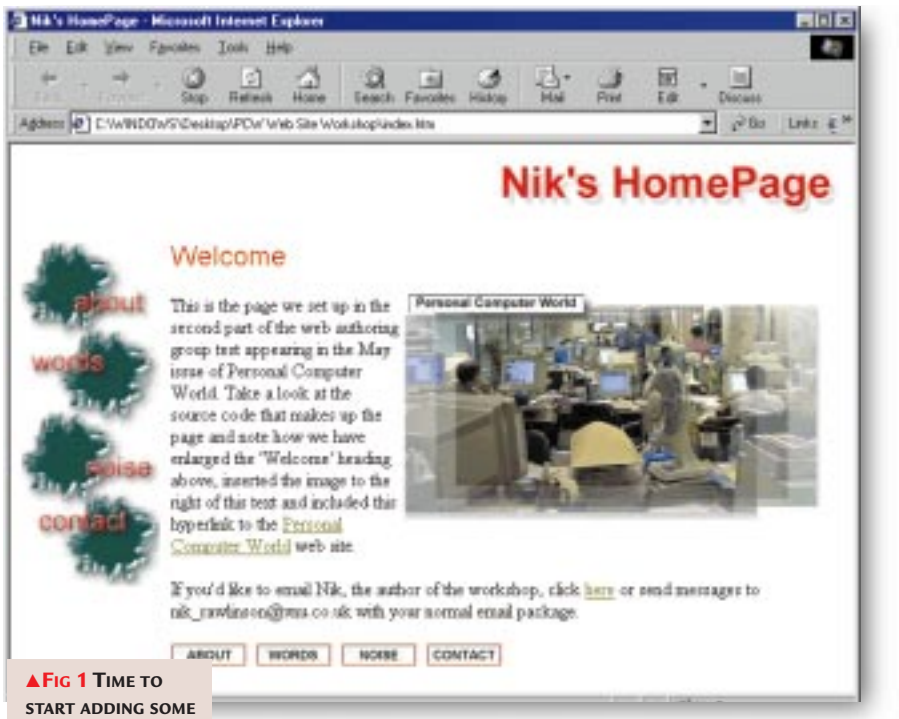
Nik Rawlinson shows you how to fill the content frame of your web page.

In the March *Workshop*, we built the initial structure of our web homepage, defining three frames that would house the individual pages of our site. To recap, a border frame above and a menu frame to the left will contain constant page elements that will not change, giving each of our pages a unified feel. Keeping the menu bar permanently in view will also facilitate easy navigation. In effect, we started with the hardest part first, as frames are notoriously fiddly to set up and it's easy to write code that looks fine in your editor but actually does nothing.

Here, we'll begin to fill the 'contentframe', the large frame that sits below the banner and to the right of the menu. As with the first installation, all the files in the site are contained on this month's cover CD.

First, let's look back at a single line from the menu. This is an imagemap in which certain areas of the picture are defined as hot spots which link to other pages. If you open the source code for the imagemap you'll see that when a user clicks with a rectangle defined by the 'Area Shape=Rect Coords' tag the relevant page is directed into the 'contentframe' with the 'target' command, so we don't need to concern ourselves with pointing any further pages in any particular direction and can concentrate solely on the content.

A sample page, 'welcome.htm' [Fig 1], is on our cover CD. It's not going to win any awards but was written to demonstrate a number of text formatting codes available to the HTML author. It is the first page that will be displayed in the 'contentframe', being specified as such in the 'index.htm' file. Rather than reproducing it here in detail, we'll just look at the most important lines.



▲ **Fig 1** Time to start adding some meat to the skeleton of our pages defined in the March issue workshop

Fonts

Your site could be viewed on any number of platforms, from PCs and Macs to PDAs. Because of this there is a chance that by specifying a particular font you will make your page inaccessible to visitors using a particular platform. Most likely their browser will revert to its default font, which could destroy your carefully worked out formatting.

For this reason it's good practice to specify font groupings rather than a specific font. When a browser reads a page it will implement the first font of a grouping it has installed and ignore the remainder of the line, so instead of specifying only the Arial font, use the line

```
<font face="Arial, Helvetica, sans-serif">
```

or, rather than Times New Roman, use

```
<font face="Times New Roman, Times, serif">
```

As you have specified your font tag there is no reason to define it again before entering text — instead, simply add further attributes.

Let's change the size. There are two ways of doing this. We can either add or subtract incremental values. For example:

```
<font face="Times New Roman, Times, serif" size=+2>
```

or specify a pre-defined size between 1 and 7;

```
<font face="Times New Roman, Times, serif" size=7>
```

Now, let's change the colour. If you are using a simple colour like red, blue or black, you can define it by name:

```
<font face="Times New Roman, Times, serif" size=7 color= black>
```

Better practice, though, is to use the hexadecimal equivalent to ensure that the tone achieved is exactly what you are after. Another benefit of using a hexadecimal rather than named value is that it allows you to exactly match a page background colour with that of an image. Many graphics packages contain a web-safe palette of colours defined by their hexadecimal value. By using the same values on your pages it is possible to place a non-transparent graphic onto a coloured background without the edges being visible.

The code for black is #000000. Those who know a little about hex code will be able to work out that being at the

[FIG 2] Specifying font groupings

```
<p><font face="Arial, Helvetica, sans-serif" size=+2 color="#FF0000">Welcome</font></p>
```

opposite end of the scale, white could be nothing but #FFFFFF. Experiment with the values in between to see the effect that changing a single alphanumeric can have (hint: for red try #FF0000, or try #0000CC for blue), or alternatively have a peek at a site which *Hands On Internet* columnist Nigel Whitfield mentioned in the March issue: www.lynda.com/hexv.html.

So, let's not clash with what we already have and we'll opt for a sans serif red font for our heading. Notice that every opening tag is closed at the end of the line and and define the beginning and end of our paragraph [Fig 2]. By defining it as a paragraph it will have a blank line inserted below. The tag defines the point at which the font attributes selected stop applying to text on the page. By closing the font tag in this way we have instructed the browser to return to the default font style. On a PC this will most likely be 12pt Times New Roman.

The original designers of HTML included a number of font shortcuts, or specific headings tags. Ranging from <H1> the largest, to <H6> the smallest they provide an easy way of changing the size of your text while retaining the current font face and colour.

Images

Images are more or less an essential part of any site. Like text, they can be added 'as is', while supplementary attributes can define the specific way in which a browser will handle them:

```
<img src="../images/picture
.jpg">
```

The above line tells the browser to display the image called picture.jpg which can be found in the images directory. Using the same directory navigation structure employed by DOS, the "../" tells the browser that this directory is found one level up from the HTML file we are currently reading.

If we wanted, we could leave it at that but our picture would simply be dropped onto the page on the next available line. Adding further parameters will allow us to specify exactly where and how it should appear.

The first thing to specify should be the size, measured in pixels. Most graphics packages will tell you this, so it's merely a matter of transposing the dimensions to the image attribute line.

Although this is not strictly necessary since text on a page, which will usually arrive before any images, will move around to accommodate the pictures, it is good practice to specify the image size. This means that should the browser be unable to download the image it will instead display a blank placeholder [Fig 3] of the size defined to retain any page formatting. If no size is specified, a small broken link icon will appear and page formatting will be lost.

Images are often used as links and so it is good practice to get into the habit of specifying whether or not you want a border. Leaving out the border attribute will by default bound the image with a box of whichever colour you have chosen for links on that page. Specifying 'border=0' will prevent this, and images will be presented 'as is'.

[FIG 4] Adding a picture

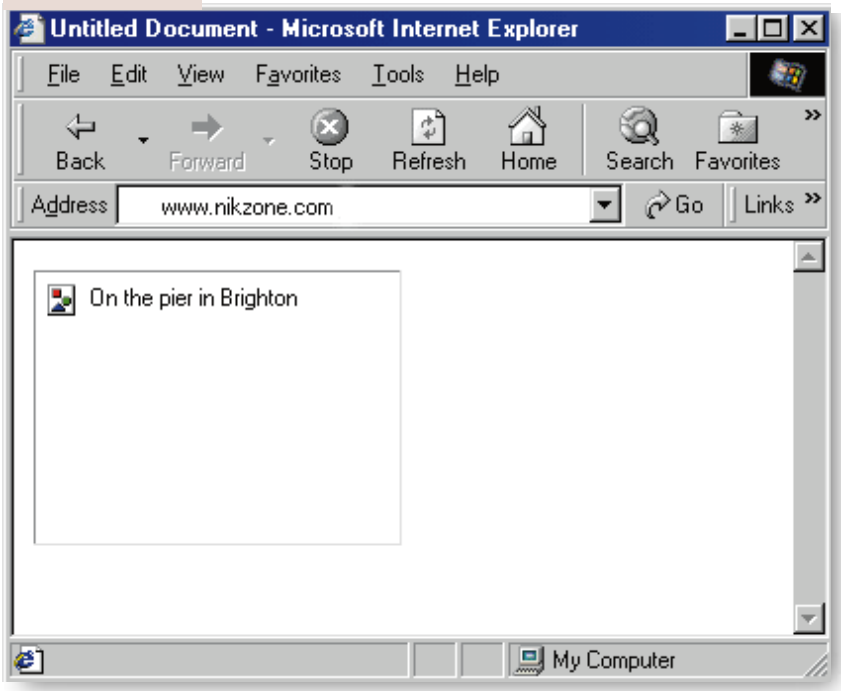
```
<img src="../images/picture.jpg" height=100 width=150↙
 border=0 align=right alt="Nik and Paul on holiday last↙
 year">
```

(↙ Code string continues)

It is a good idea to provide a short description of the image subject matter. This is done by using the 'alt' tag [Fig 4] and enables users of text-only browsers, who would otherwise be unable to view the image, to follow what is happening on the page. It is also useful for the sight impaired who may be using a voice recognition system that can read 'alt' tag contents. So, let's put it all together and add a picture to our site. We'll imagine it's going to be dropped into the middle of a long block of text so we'll also specify its alignment. This can be left, center (US spelling) or right. See Fig 4. Note that it is not necessary to place commas between each attribute.

Links

Next, we're going to add some links. We dealt with one of the principle types of



▼FIG 3 THIS BROWSER HAS BEEN SET TO IGNORE IMAGES BUT THE <ALT> TAG LEAVES IT ACCESSIBLE WITH THIS PLACEHOLDER

[FIG 5] Text with an image tag

```
<a href="about.htm"><img src="../images/about.jpg" height=20 width=50 border=0 align=↙
center alt="about"></a>
```

(↙ Code string continues)

link in the first part of this workshop (March issue); the direct link to a page. This was hidden within our imagemap menu, so take a second look at the code to identify the hotspots.

Placing a standalone link on a page is far simpler. Technically, we do not need to link this 'welcome' page directly to any of the other pages on the site because the imagemap will take care of it, so we'll add links for those users with older browsers which cannot cope with frames. When we've finished, we'll amend the file 'index.htm' that defines our frameset to point to this page when it is read by such a browser.

A sample page, welcome.htm, is on our cover CD

The tag for a standard link is 'href', as in the example:

```
<a href="about.htm">
```

As we are not straying outside the HTML directory which includes the 'welcome.htm' page we are currently constructing, we are able to specify just the filename and not the location. We will follow this tag with the physical clickable link and close the line with the terminator tag . A clickable link is usually an image or a line of text, as in this example:

```
<a href="about.htm">click here for the about page</a>
```

Representing the link as an image is simply a matter of combining a link element with the image tags described above.

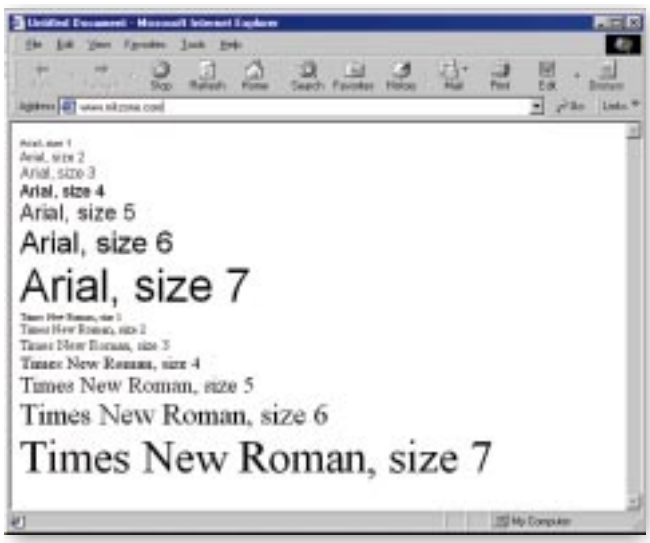
We'll imagine that we have designed a small 'about' button in a graphics package. It is 50 pixels wide and 20 pixels high so it's quite small. To drop it onto the page and make it function as a link we replace the plain text in our example above with an image tag, as in Fig 5.

Note that we have added the word 'about' to the alt tag. When adding an image as a button in this way, an 'alt' tag is even more important than in the instance of the simple illustration on a page (described above) as it ensures that users can still navigate your site even if for some reason they are unable to download the images.

The second most common form of link is the mailto link, enabling users to click and launch an associated email package. The email address specified in the link will be dropped in the 'To' field of the package. It works in much the same way as a standard link in that the physical clickable element can be either text or an image (a picture of an envelope, say) and it must be terminated by the tag. See Fig 6.

[FIG 6] The mailto link

```
<a href="mailto:nik_rawlinson@vnu.co.uk">click here to email me</a>
```



◂HTML TAGS INCLUDE SEVEN PRE-SET FONT SIZES FOR QUICK TEXT FORMATTING

Now that we have inserted links into our welcome page, we'll make it accessible to viewers without frames-compliant browsers. Open the file 'index.htm' found in the HTML directory and replace the line that reads: 'This page uses frames and requires a compatible browser which yours, I'm afraid, is not' with;

```
This page uses frames that your browser cannot display. To access the site without frames, click <a href="html/welcome.htm">here</a>.
```

We are of course only covering the very basics of web authoring here but when it comes to designing your own pages you should have the tools you need to get started. By far the best way of learning is to try it out for yourself and have a look at other sites out there on the net to see how their authors have tackled similar problems to those you will face.

In the meantime, remember this maxim: in web design, less is most often more. Animated graphics and colourful pictures are great but they should be used in moderation. Put too many on your page and your users will probably give up on you as they tire of waiting for them to download. Do not be afraid to leave areas of white space. Far from looking like you have left something out, they can actually draw the reader's attention to the points that matter — the words on your pages.

Next month, in the final part of this workshop, we'll look at tables and forms.

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Be prepared

Windows users, worry not — Tim Nott assesses Microsoft's year 2000 readiness.

If you lie awake at night worrying that Windows may go belly-up at the end of the year, taking your settings, applications and data with it — relax and get some sleep. This will not happen, or to be more statistically correct stands no greater chance of happening at midnight on 31st December than at any other time. Microsoft has declared that all its current English operating systems are year 2000 compliant, but with minor issues.

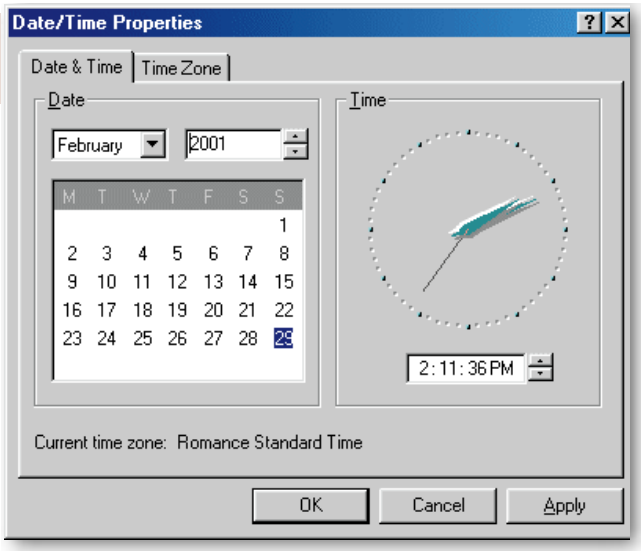
So first, what does Microsoft mean by 'compliant'? And second, what are these 'minor issues'? How minor are they and what can you do about them? The answer to the first question, to quote Microsoft's Y2K FAQ, is as follows:

'A Year 2000 compliant product from Microsoft will not produce errors processing date data in connection with the year change from December 31, 1999 to January 1, 2000 when used with accurate date data in accordance with its documentation and the recommendations and exceptions set forth in the Microsoft Year 2000 Product Guide, provided all other products (e.g. other software, firmware and hardware) used with it properly exchange date data with the Microsoft product. A Year 2000 Compliant product from Microsoft will recognize the Year 2000 as a leap year.'

As for the minor issues, Microsoft owns up to the following in Windows 98. There is a possibility that an incorrect system date might result if a PC is booting at exactly the time the year changes. But as the time-frame is less than a second, this is very unlikely.

There's a bug in the Time/Date Control Panel component which can allow February 29th to display in non-leap years but this is purely a display problem — this date won't appear in applications or the file system. The Regional Settings Date panel also has a problem in that two-digit dates may display incorrectly.

A leap in the wrong direction



Then there's a problem with the phone dialler log showing incorrect two-digit dates and a similar glitch with two-digit credit card expiry dates in MS Wallet. The Java Virtual Machine (versions 1.1.1 to 1.1.5 of the Sun Microsystems Java Development Kit) may also have problems with two-digit dates, and the /D (date) switch in DOS XCOPY handles two-digit dates incorrectly.

Dates in the Custom Properties of Word or WordPad documents assume two-digit dates to be 20th century (and lose a day in the Far East time zones) and programs such as the System Information tool, which use the COleDateTime function, may create incorrectly dated files.

The Y2K Product Analyzer will check all Microsoft products

In fact I found further problems while trying out the first of these to produce the screenshot above, pressing Cancel set the Windows clock back five years, which is rather more serious.

All these issues, Microsoft claims, are rectified by downloading the Year 2000 Update for Windows 98, either by using the Windows Update facility or connecting directly to the update web site. The patch is also available on CD from Microsoft Connection.

Windows 95 users are not so lucky, in that there are more problems but fewer fixes. For example, because of the way MS-DOS handles dates as offset from 1980, certain utilities such as the MS-DOS DATE command, File Manager (WINFILE.EXE) and Find File will return non-numeric dates. For instance, 20/03/2003 will display as 20/03/C3. Updated versions of COMMAND.COM and WINFILE.EXE are available from the Microsoft Web site so you'll need to search for Win95Y2k.exe.

Microsoft has also announced the Y2K Product Analyzer. This will check all Microsoft products on a user's PC for Y2K compliance and advise of suitable upgrades. Although this was not yet available at the time of writing, it should be freely downloadable by the time you read this. For corporate networks, the System Management Server 2.0, although not free, offers similar functionality. For those who prefer a third-party solution, Norton 2000 claims to audit applications, data files and hardware advising of potential problems.

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Microsoft Connection 0345 002000
Windows Update windowsupdate.microsoft.com/
Further Y2K information www.microsoft.com/technet/year2k/
Norton2000 £37.95 (£32.30 ex VAT) from Symantec 0171 616 5600 rigel.symantec.com/region/uk/

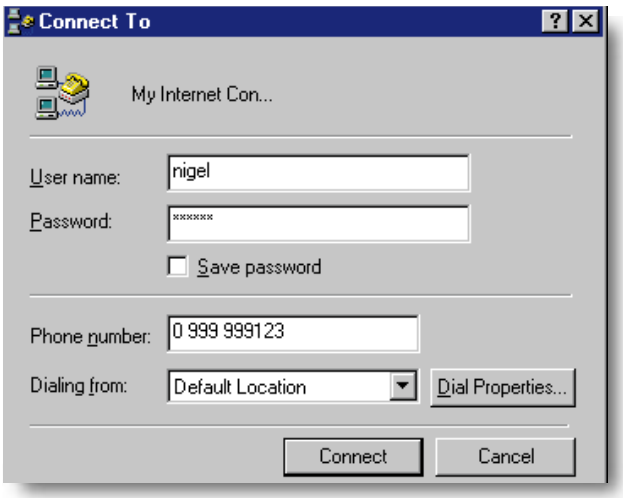
Community centre

Nigel Whitfield looks beyond the web at how you can gain from personal participation.

Generally, when people talk about the net, for many of them it's simply the world wide web and perhaps email, together with the spam they receive in their mailbox. Experienced hands will know that there's much more to the internet than just the glossy multimedia bits, others may be missing out on more than they imagined.

The discussion forums on the internet are actually one of the most useful things it offers. They're not populated exclusively by the sad and the lonely as a recent late night caller to a radio station phone-in suggested — did anyone else spot the irony in this? You'll find all sorts of people talking about a wide variety of topics in the discussion groups of Usenet, on IRC channels and via email. When you hear about this in the media it's mostly the odd or the saintly: people who marry after chatting online, or someone across the other side of the world who alerts the emergency services when a regular chat partner doesn't respond.

There's more mundane stuff, too: people sharing their hints and tips, exchanging information and support. There are HIV-positive sufferers swapping information about the side effects of drugs, survivors of abuse, OS/2 users and people like the *PCW* reader who touchingly wrote to tell us how contacts on the net have probably helped save their child's life.



◂Fig 2 You can save your internet password by logging into Windows with a valid name and password

If you can't find a community that feels right for you amongst the many thousands out there, you can create one yourself. Whether it's a real-time chat on IRC, a discussion on Usenet, or something more immediate via email, why not make your own space? Invite friends, or others with common interests, or talk about it on a web page and wait for people to come and join in.

You might want a social group, or some sort of support forum, or perhaps somewhere to exchange technical information between co-workers or with the net at large, or maybe it's just a convenient way to organise all your friends when you want a night out together. Each of the different types of forum you can create has different rules, and some, like IRC or Usenet, will need appropriate programs on your computer. The simplest way to make a community of your own is to use email.

Mailing lists are something we've covered before here, and while some people think they're cumbersome and obsolete, I'd disagree: what could be simpler than providing people with a URL where they can take part, with a single address that distributes a message to all within minutes. Of course, there can be drawbacks and you're likely to have to undertake more administrative work than with other types of forum but if you want to get going quickly and easily, they can't be beaten.

If you don't want to create a mailing list, there are plenty around that might well cover some of the topics in which you're interested. Mailing list servers like one1ist.com <www.onelist.com> [Fig 1] provide a searchable directory of the lists they provide and, if you visit a search engine like Yahoo, you'll turn up plenty of mailing lists on a whole range of topics.

◂Fig 1 Sites such as One1ist allow you to create a discussion forum of your own, quickly and easily

But if you want to create a list of your own, what do you do? You can create a simple list in some email programs, though you'll usually have to process subscriptions and removals yourself, which can be a nuisance for a large list. Or you can download software to your PC, which will give you a lot of control at the cost of a large phone bill if you want people to be able to have timely discussions. Or, you can use one of the professional list hosting services on the internet.

Some commercial ISPs, such as Direct Connection <www.dircon.net> will host a list for you although the busier it becomes the more you'll have to pay. If you want to experiment, however, you

Questions & answers

Q I am having problems with a form on my site. I am using the action mailto:user@somesite.com and the method 'post'. When I try to submit the form, my computer launches my turnpike email program but does not enter any of the information into the form. If I use the method 'get', the same happens but this time the information is included but after the address in the address box.

A ***Unfortunately, you're not likely to get anywhere using the mailto action on your form. It works differently on different browsers — on many, it simply doesn't work at all. To process forms reliably, regardless of which web browser people are using, you need a script on your web server to submit the data. This is probably one of the most commonly asked questions, and I'll come back to it in more detail next month with full details of how to do this with some of the most popular internet providers. In the meantime, you need to contact the person hosting your web site and ask them what scripts they have available for you to use.***

Q When I connect to my ISP I have to enter my account password at the 'connect to' screen [Fig 2]. The screen contains a 'save password' box which I assume, when active, allows the password to be saved for further connections thus removing the need to continue to type it in. However, the save password box never seems to become active. How can I make the box active and save having to keep typing in my ISP user password?

A ***To make the Save Password box active, you need to be logged onto Windows with a valid user name and password or to have disabled the passwords when you log into Windows. Delete the Password List files (for example nigel.pwl) from your Windows directories if you can't remember the passwords you used. Entering no user name or password for Windows will automatically disable the request at startup and you'll still be able to save your internet password.***

Q On a web site button bar, I'm using a sort of oval shape in a rectangle. The background of the image is black, like my web page, so it looks like a normal button but the hyperlink box surrounds the button with a blue rectangle. How can I get rid of them?

A ***This is a simple problem to fix. You need to edit the HTML and add BORDER=0 to the HTML code for the image. For example:***

```
<A HREF="http://
www.mysite.com/"><
IMG SRC="gifs/
button1.gif" BORDER
=0></A>
```

Depending on the web editor you're using, you may be able to set the border attribute by right clicking on the image and selecting its properties. Incidentally, if you wanted a thicker border you could use a higher number and the colour will be the same as the link colour specified for the whole page.

can start out for nothing using a free list service such as One1ist, mentioned above.

It is surprisingly simple to create a list on One1ist; you need to fill in a registration form, giving a few details about yourself, then you can decide what type of list you want — its name, whether anyone can post or, if you have to approve messages, what age group it's suitable for and what language should be used. Then click a button and you have a brand new discussion forum, waiting for people to be added.

A list for PCW readers

I've set up a list called pcw-internet, where readers of this column can exchange information with each other. It took around five minutes, and all you need to do to join is send an email to pcw-internet-subscribe@onelist.com, or visit www.onelist.com/subscribe.cgi/pcw-internet.

However, creating the list is only half the work — unless you have a list of people to add to it already. Fortunately, One1ist has a lot of useful information to tell you how to promote your list but even if you don't use their service it's worth looking at. There is, of course, no such thing as a free lunch and you'll see three line ads tacked on to the bottom of messages sent via your list. You can avoid those for around US$5 per month.

If you are still unsure about the benefits of online communities such as this, why not dip a toe in the water by joining someone else's list — even our *PCW* one if you like — to see how easy it can be to participate. If you still confine most of your net usage to looking at web sites and sending personal emails, you will find it a surprisingly simple step into a wider and more interactive internet world.

▲ A MAILING LIST REQUIRES SOME WORK TO MANAGE BUT WITH A MODERN WEB-BASED SYSTEM, IT'S EASIER THAN YOU THINK

PCW internet list

☛ **To join other readers** of this column in discussions and see first hand how a mailing list works, send an email to pcw-internet-subscribe@onelist.com, or visit www.onelist.com/subscribe.cgi/pcw-internet.

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The Update update

Tim Nott reveals other aspects of the Windows 98 Update tool and turns his attention to automation.

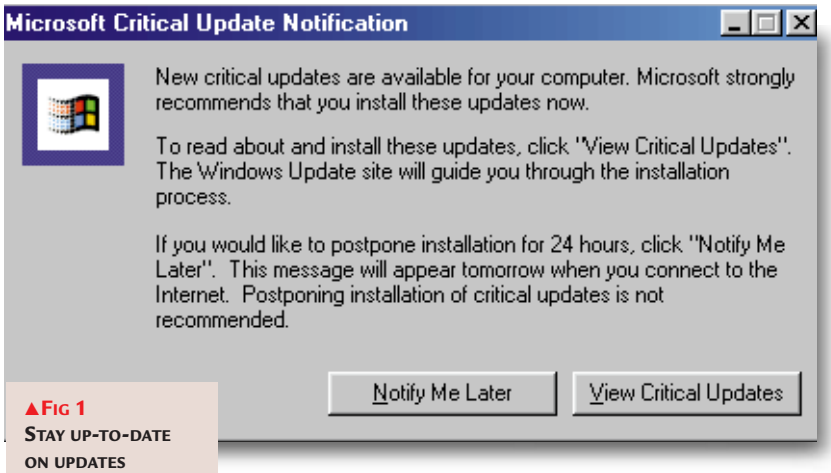
Recently, I wrote in glowing terms about the Windows 98 Update tool *(February issue)*. Since then, there have been a couple of developments. First, despite what I said about having to use a third-party utility to save the update files to disk rather than just apply them to the PC in use, reader Graham Mayor has a simpler way:

'It is possible to recover the files from Windows/Temporary Internet Files with Explorer. Select the folder, sort on date/time and pick out the relevant *.exe, *.cab and/or *.zip files, then copy them to another folder.'

Peter Geddes, however, states that the files are saved in the folder MSDOWNLOAD.TMP. Mileages seem to vary, as having just downloaded the Critical Update Notification utility I could find no trace of it in the latter but did eventually track it down to a sub-folder of Temporary Internet Files.

Second, you can now be informed automatically when relevant updates become available. To enable this, go to windowsupdate.microsoft.com and download the Windows Critical Update Notification. To quote from the instructions: 'When you install Critical Update Notification, you give Windows Update permission to scan your computer. The scan which occurs in the background while you are using the internet determines if the available update is appropriate for your system.

Task Scheduler controls the scanning schedule so you'll see a task for Critical Update Notification among your other scheduled tasks. The scanning schedule is preset and Microsoft recommends that you do not modify the settings. You won't be notified of every scan, the scans won't interfere with your internet computing and none of the information gathered is sent over the internet.' This feature is fairly overbearing, though. The default interval in Task Scheduler is five minutes and the message [Fig 1] is somewhat insistent. Still, it's only a 24Kb download and you can uninstall it from Control Panel Add/Remove should it get too irritating.



▲FIG 1
STAY UP-TO-DATE ON UPDATES

Keeping to the script

One thing that Windows has never addressed well is automation. DOS has the fairly primitive processing of a list of commands in batch (.BAT) files, and Windows 3.x has the Recorder which creates non-editable scripts of keystrokes and mouse actions. Office users have the full panoply of VBA, or WordBasic in earlier versions of Word, but Windows 95 has nothing.

Enter Windows 98 and the Windows Scripting Host. Windows 98 users may have noticed a folder under Windows named Samples\Wsh which contain a number of files carrying the .VBS and .JS extensions. If you do not have these you will need to install the Windows Scripting Host from Control Panel, Add/Remove, Windows Setup, Accessories.

Windows has never addressed automation very well

You might have noticed that this column has been strangely silent on this topic. This is because I have been searching for an 'idiot's guide to Windows scripting'. As this search has been largely unsuccessful I'm having to write my own, which at least has the advantage of being written for idiots by one of their own. Visual Basic and Java Scripts are not, in themselves, new; they've been available to HTML programmers for some time. What is new with Windows 98 is the standard provision of the Windows Scripting Host, though this is also available for NT and as a download for Windows 95.

The Scripting Host provides an interpreter for Java or VB scripts running directly from the PC, rather than being embedded in an HTML page. These scripts are plain text files and the best

HACK WATCH

One update which wasn't on the windowsupdate site *(see main text)* at the time of writing rectifies a security loophole in Forms 2.0 which gets installed by Office 97, Outlook 98, Project 98 and Visual Basic 5. The loophole was discovered by the magnificently-named Spaniard, Juan Carlos Garcia Cuartango.

The risk is that a hacker could 'use the Forms 2.0 Control to read text on a user's Clipboard when that user visits a web site or opens an HTML email created by the hacker.' You can get further details, and download a patch to rectify this, from officeupdate.microsoft.com/downloaddetails/fm2paste.htm.

While we're in a security-conscious mood, there's a further patch that addresses a vulnerability in Word 97. See this month's *Hands On Word Processing* (p256) for the full story.

way to get the feel of what they can do is to double-click on one of the sample VBS files and see what happens. Then right-click Edit the file to see what's making this happen. The sample scripts include adding and removing Registry keys, doing things with Excel (if you have it), creating shortcuts and connecting to a network. This is obviously a rather powerful, if under-documented, feature.

For reasons of pure ignorance I'm going to pass rapidly over Java script but if you've done any VBA programming, you shouldn't find the VB script language too unfamiliar. What you don't get, however, is an all-singing, all-dancing editor like that in Office 97. You're stuck with the distinctly unentertaining Notepad.

So, we're going to build a VB script which provides another way of getting at that old Windows puzzle of a printable file listing [Fig 2]. Bear in mind that this is the blind leading the blind so if you know more than I do about the subject, please don't laugh. The code is in the *Hands On Windows* section of this month's *PCW* CD-ROM as FLIST.VBS.

How does it work? The first three lines [Fig 2] declare the variables we will be using, which is good programming manners. The next line creates an 'object' which we'll use later to find the path to the desktop.

The Function on the following line, creates more objects to hold a folder and its files, and creates a list of the latter with a carriage return between each. The script then prompts for the target folder — sorry, no browsing — then assigns the result of the previously-defined function applied to the target folder to the variable 'filelisting'. The variable 'desktoppath' is then assigned to the actual location of the desktop (which may not be C:\Windows\Desktop) using the WSHshell object created earlier.

Finally, the 'Creatfile' subroutine is called which creates a text file on the desktop, writes a one-line heading showing the folder name followed by the list held by the 'filelisting' variable. No frills, error handling or file details but it gives an idea of what can be done [Fig 3].

[FIG 2] **Another way to get a printable file listing**

This script prompts for a folder path and creates a list of its files on the Desktop:

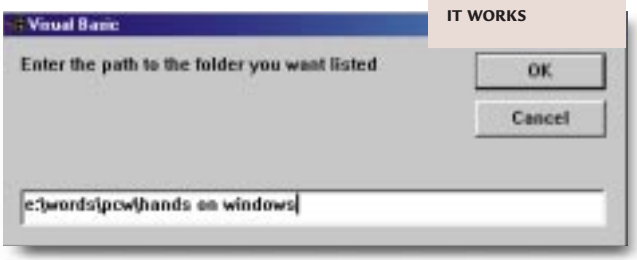
```
Dim myobject, targetfolder, allfiles, eachfile
Dim filelisting, desktoppath, WSHshell
Dim mylist, crlf, myobject1, mytextfile
Set WSHshell = WScript.CreateObject("WScript.Shell")

Function ShowFileList(folderspec)
  crlf = chr(13) & chr(10)
  Set myobject= CreateObject("Scripting.FileSystemObject")
  Set targetfolder = myobject.GetFolder(folderspec)
  Set allfiles = targetfolder.Files
  For Each eachfile in allfiles
    mylist = mylist & eachfile.name
    mylist = mylist &  crlf
  Next
  ShowFileList = mylist
End Function

whatdir=InputBox("Enter the path to the folder you want
listed")
filelisting=ShowFileList(whatdir)
desktoppath = WSHShell.SpecialFolders("Desktop")
Call Createfile

Sub Createfile
  Set myobject1 = CreateObject("Scripting.FileSystemObject")
  Set mytextfile = myobject1.CreateTextFile(desktoppath &↙
 "\flist.txt", True)
  mytextfile.WriteLine("List of files in " & whatdir)
  mytextfile.Write(filelisting)
  mytextfile.Close
End Sub
```

(Key: ↙ Code string continues)



▼FIG 3 NO BELLS AND WHISTLES, NO BROWSING, BUT IT WORKS

■ Department of obscure tips

Henry Bevan and other readers came up with a useful pointer concerning the tip about letting IE4 expand web addresses *(February column)*. It involves a Registry edit so the usual disclaimers apply, but if you go to HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Internet Explorer\Main\UrlTemplate, you can edit the prefixes and suffixes and the order in which they are tried. The '%s' stands for what you've typed, so editing an entry to 'www.%s.co.uk' will add UK web sites to the list.

Here's one that is even more useful, concerning the ghost that makes unwanted dial-up calls to the internet. I've already mentioned two suspects: RealPlayer G2 Beta *(March column)*, and Lotus SmartCentre *(see p256 in this issue)*.

Reader Alex Nichol claims that Windows can manage this all by itself without third-party help. He writes: 'It involves a registry setting. Look under HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\OLE. In the right pane will be two lines: EnableDCOM = Y and EnableRemoteConnect = N. The trouble arises when the latter gets set to Y. I think it is part of Microsoft's assumption that everyone is on a fast LAN and wants instant connection to it at boot...' or, indeed, that everyone has free local calls to their ISP.

Questions & answers

Q What is a RAM drive? On the net, I've seen things to do with them but I don't have an icon for one in the My Computer folder.

TOBY MCDONNELL

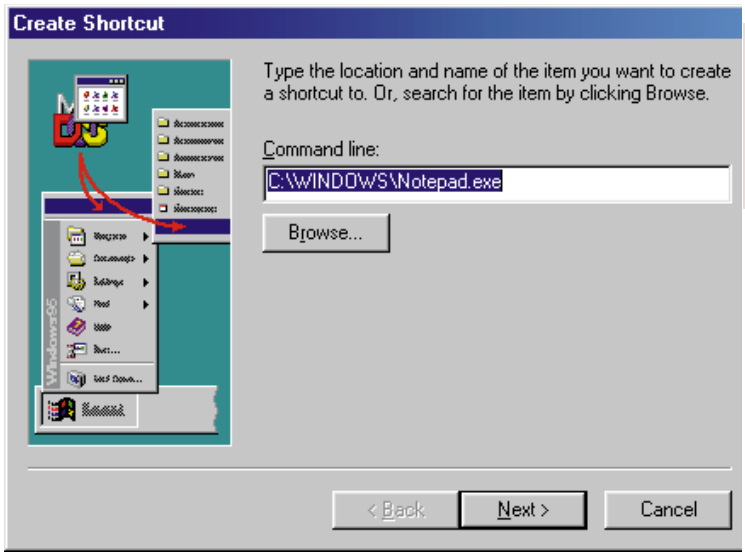
a *A RAM drive is an area of memory (Random Access Memory) that is used as if it were a disk drive. Access is much faster than a normal disk but it's a much more expensive form of storage and is lost when you switch off the PC.*

Windows has a much better way of speeding up your PC, by using memory as disk. It is called cacheing. If, say, you load a large application, then close it, then load it again, you'll find it's much faster the second time as it is still 'cached' in memory. The RAM drive is, however, used by the Windows 98 emergency recovery disk. This contains a whole load of utilities which are zipped — that is, compressed — in order to fit onto a floppy, and which are unzipped onto a RAM drive for use. That way they will work even on a PC whose hard disk has not been formatted.

Q I have lost my shortcut wizard — by this I mean that when I right click on the desktop and go to New, Shortcut, I just receive a new file called 'New shortcut'. When the properties are examined it is shown to be a 0Kb file. Then, if I add '.lnk' to the file name it becomes a shortcut and can be set up as such, but where on earth is the wizard?

ROD LANE

a *This is a long-running mystery but I have at last found an answer [Fig 4] on the Microsoft web site. It appears that installing Internet Explorer 4 can damage a key in the registry. So, to repair this, you should first backup the registry and then launch Regedit. Go to HKEY_CLASSES_ROOT \.lnk\ShellNew\Command. If you have the Windows Desktop Update component installed, then this should have a value of RunDLL32 AppWiz.Cpl, NewLinkHere %2. If not, then the value should be RunDLL32 AppWiz.Cpl,NewLinkHere %1.*



◀FIG 4 THE AMAZING, DISAPPEARING SHORTCUT WIZARD

Q My Windows 95 caption buttons show a diagonal pencil for minimise, a pen nib for maximise and a square instead of a cross for close. The scroll bar arrows are also wrong and the check boxes are indecipherable. Please help!

CHAS GRUNDY

a *This sounds as if your Marlett font has gone AWOL. First, you'll need to reinstall it from the Windows 95 CD. From a command prompt, type (assuming D: is your CD-ROM drive letter):*

```
EXTRACT /A D:\WIN95
_02.CAB MARLETT.TTF
/L C:\WINDOWS\FONTS.
```

If this gives you a 'Bad command or file name' message then you need to copy EXTRACT.EXE from the Windows 95 folder on the CD to C:\WINDOWS\COMMAND. Note that Windows 98 users can just double-click on Win98\WIN98_47.CAB then double-click on MARLETT.TTF to extract it. After you've extracted the file to the Windows\Fonts folder, set its attributes by typing this line at a command prompt:

```
ATTRIB +S +H C:\
WINDOWS\FONTS\
MARLETT.TTF.
```

If the problem persists after replacing the Marlett.ttf file try deleting the Ttfcache file in the Windows folder. It will be rebuilt at the next boot.

If I add '.lnk' it becomes a shortcut and can be set up as such, but where's the wizard?

Q I was pleased to read your tip about thumbnails in Windows 98/IE4 as I have been waiting years for Microsoft to incorporate this into Explorer. My delight was diminished, though, when I noticed that a folder I had opted to view as thumbnails had acquired a 'thumbnails .db' file. On a folder with 11 JPEG files which Explorer reports as totalling 121Kb, the thumbnails .db file is 322kb! Has Microsoft signed a pact with hard disk makers?

CHRIS VENESS

a *I do not think that the conspiracy theory applies here. What is happening is that Windows creates 120-pixel square 24-bit colour thumbnails, seemingly using a similar compression method to the original.*

My trials show that ten thumbnails of JPEGs totalling 390Kb produce a 132Kb thumbnail file, or around a third of the originals. If the original files are smaller than 120 pixels square, then the thumbnail file could well exceed the total size of the originals. Converting the same files to the TIF format, however, where they total 9Mb, produces a 432Kb thumbnail file — a twentieth of the originals.

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Key points

Roger Gann unlocks some of the secrets of your keyboard.

Boldly going where last month's column feared to tread, I'm now going to show you how you can pull some interesting stunts with your keyboard. Some of these tricks entail a modicum of programming but if you managed to customise your prompts using ESC commands and good old ANSI.SYS having read last month's column, then this exercise should pose no real problems for you.

I'll start by using ANSI.SYS to remap keys on your keyboard. Not all the keys are used under DOS and the technique I describe below enables you to assign really useful commands to what would otherwise be dead keys.

Customising your keyboard

Using ANSI.SYS' keyboard remapping facility it's easy to assign DOS commands to function keys. Note that you have to add a /X switch to the ANSI.SYS line in CONFIG.SYS in order to activate this feature:

```
DEVICE=C:\DOS\ANSI.SYS /X
```

and don't forget to reboot to make this change effective.

Right, having done that, here's how to map your F10 key to display a directory listing sorted by name and in wide format. Add this line to AUTOEXEC.BAT:

```
ECHO ←[0;68;"DIR /O:N /W↙
 /P";13p
```

(↙ Code string continues)

The general sequence for keyboard reassignment is

```
ESC[CODE;STRING; p
```

— CODE is the keycode for a particular key and STRING is either the ASCII code for a single character or a literal string contained in quotation marks.

Here's what my little remapping instructions mean. The left-pointing arrow in the command is the Escape character. The '0;68 is the keycode for F10 — you have to look them up in the DOS help — and the DIR command to be attached to F10 is contained within the quotes.

Note also the addition of a '13' before the final, lowercase p. This is the ASCII equivalent of a <CR> and saves you the bother of having to hit the Return key after the F10 key.

Don't know how to input that crazy ESC character on-screen? Well those with short memories won't remember that I gave the low-down on this mysterious trick a month ago. Using MS-DOS EDIT, you can generate the elusive ESC character by pressing CTRL-P and then hitting the ESC key [Fig 1]. On the screen you'll see it represented as a left-pointing arrow.

Die-hard EDLIN users have to employ a different trick. In EDLIN, you press CTRL-V and then the left bracket [. However, this is potentially confusing because the good old left bracket already features heavily in ANSI escape codes and it can look like you've got too many brackets in your command string.

It's easy to assign DOS commands to function keys

I do not think it is actually possible to generate an ESC character from the command prompt and it can only be created in text files. For this reason I do not believe you can reassign keys on-the-fly using, for instance, the TYPE command. As we saw in last month's column it is, however, possible to use the PROMPT command as a workaround, which will enable you to summon the ESC character from the command line using one of its metacharacters; $E. So try this at the DOS prompt:

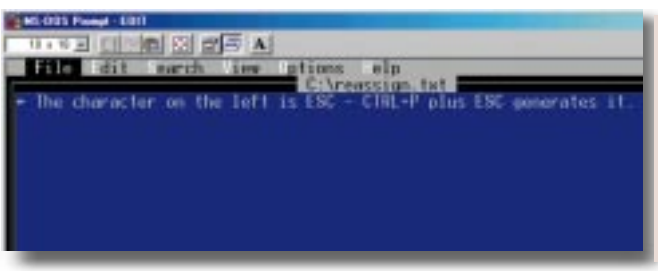
```
PROMPT $E[0;59;"DIR /O /P$_"p
```

Note that the 'p' at the end of the line must be lowercase. This will, incidentally, destroy your existing prompt (i.e. C:\>) so restore the normal command prompt by typing PROMPT PG.

You will now have a simple, sorted directory every time you hit the F1 key. Check out ANSI.SYS' online help for other key scan codes. Also, be careful not to use function keys that DOS uses such as F3, F8 or F9. If you've turned off command echoing with ECHO OFF, you must turn it back on by placing the command ECHO ON before these PROMPT statements in AUTOEXEC.BAT, otherwise they won't work.

One of the problems with ANSI.SYS is that once key reassignments are made, they are difficult to remove. Suppose, for example, that you have assigned the double quote to the single quote, eliminating the need to use the Shift key. If you later want to restore the single quote key to its original meaning, your only recourse is to make an additional assignment, defining the single quote back to itself.

Since ANSI.SYS does not remove the old reassignment from the buffer, you have that much less room for new key definitions. Note also that when



◀FIG 1 GETTING THE ESC CHARACTER INTO A BATCH FILE IS LESS EASY THAN IT MIGHT AT FIRST APPEAR. YOU HAVE TO HIT CTRL+P AND THEN THE ESC KEY

you load a major DOS application it will most likely initialise the keyboard back to its default state, meaning that when you quit that app, it will probably have zapped your clever key reassignments.

Keyboard acceleration

While we're on the subject of keyboards, did you know that you can accelerate your keyboard? Ever since MS-DOS 4.0, the MODE command has been able to reprogram most keyboards [Fig 2] to increase their typematic rate (the rate at which a character repeats when a key is held down).

MODE also lets you control the keyboard's delay interval, the length of time between when a key is pressed and typematic repeat begins. This command:

```
MODE CON: RATE=32 DELAY=2
```

maximises the typematic rate while leaving the delay set to its 0.5-sec default.

The speed freaks amongst you might be more interested in

```
MODE CON: RATE=32 DELAY=1
```

which maximises the typematic rate and minimises the delay interval, producing the fastest possible typematic operation. Experiment with different keyboard settings until you find one you like, then add it to your AUTOEXEC.BAT file.

Controlling NumLock

Ever since the BIOS of the IBM PS/2 defaulted to Num Lock=On, many users have wanted a way to disable Num Lock at bootup. While most modern BIOS setup screens let you specify Num Lock's default condition at bootup, many older ones do not. Microsoft solved the problem in DOS 6.0. If you're running it, you can disable Num Lock by adding the following line to your CONFIG.SYS file:

```
NUMLOCK=OFF
```

If you haven't installed DOS 6.n, here's how to create a tiny COM file to switch NumLock off.

First, fire up EDIT and enter these commands:

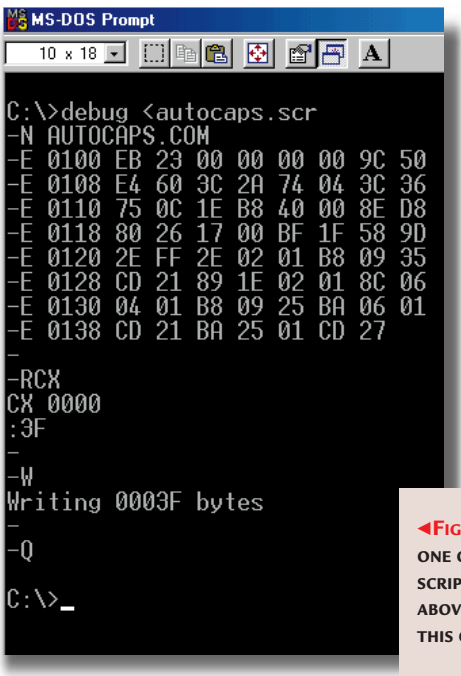
```
N NUMOFF.COM
E 0100 B8 40 00 8E D8 80 26 17
E 0108 00 DF C3

RCX
0B

W

Q
```

Note the three extra returns between the last four lines. Save it as NUMLOCK.SCR. Then type this at the DOS prompt:

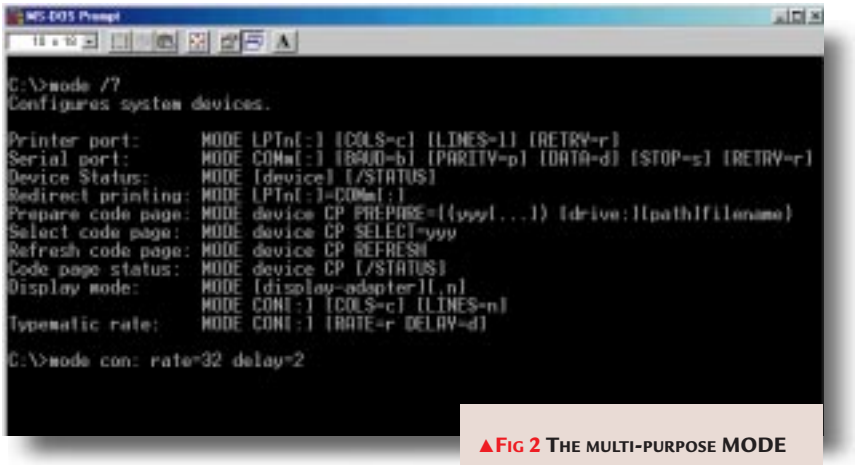
```
DEBUG <NUMLOCK.SCR <CR>
```

What we have done is to create a little script file which we are redirecting into DEBUG. There is nothing to stop you simply loading DEBUG and manually typing each instruction, but simply redirecting a text file into DEBUG does exactly the same thing and is more convenient, particularly when you have more than a few lines to input.

This script file will automatically create the minuscule NUMOFF.COM, which you should find in the same directory as DEBUG. Add a line, which calls NUMOFF to your AUTOEXEC.BAT startup file so that it executes each time you boot up, and that pesky NUMLOCK LED is quenched.



◄FIG 3 WHEN YOU RUN ONE OF THE DEBUG SCRIPTS I HAVE LISTED ABOVE, YOU SHOULD SEE THIS ON THE SCREEN



▲FIG 2 THE MULTI-PURPOSE MODE COMMAND ALLOWS YOU TO CONFIGURE PLENTY OF OTHER SETTINGS, TOO. ENTER MODE/? TO GET BRIEF HELP

Toggle CapsLock

You can perform a similar trick with the CapsLock key. Unlike a typewriter, pressing Shift while CapsLock is on does not turn it off. AUTOCAPS.COM [Fig 3] lets your keyboard work just like a typewriter's.

☛ This is the script file:

```
N AUTOCAPS.COM
E 0100 EB 23 00 00 00 00 9C 50
E 0108 E4 60 3C 2A 74 04 3C 36
E 0110 75 0C 1E B8 40 00 8E D8
E 0118 80 26 17 00 BF 1F 58 9D
E 0120 2E FF 2E 02 01 B8 09 35
E 0128 CD 21 89 1E 02 01 8C 06
E 0130 04 01 B8 09 25 BA 06 01
E 0138 CD 21 BA 25 01 CD 27

RCX
3F

W

Q
```

Once again, you will notice the absence of an extra carriage return between the RCX and 3F. Create AUTOCAPS.COM by typing the following line:

```
DEBUG <AUTOCAPS.SCR <CR>
```

☛ **Next month,** I will have more Prompt fun and games for you.

PCW CONTACTS

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Getting your backup

Andrew Ward tackles backing up and remote administration on your network.

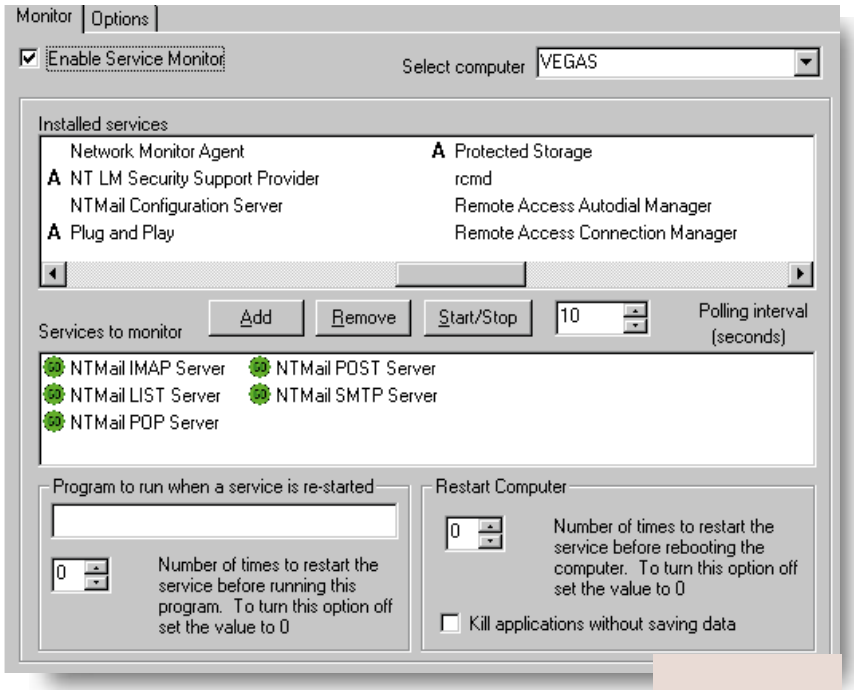
In the March issue column, I wrote about the challenge of administering Windows NT systems remotely, and the various tools which would allow you to run a console session across the network in order to check on the status of a failed service and restart it if necessary. Of course, there are heavyweight management tools available to achieve the same thing, such as NetIQ's AppManager Suite 3, but there's also a cute little tool called Service Monitor which will do the job, too.

What Service Monitor does [Fig 1] is to poll Windows NT services at regular intervals and then take action should anything have failed. The most likely candidate for failure, of course, is Microsoft Internet Information Server, and without Service Monitor it might be some time before you become aware that IIS has failed.

When Service Monitor detects a failed service, it can restart it and/or take other actions such as issuing an email notification and running any program you specify. Usually, you will want the service restarted.

On a per-service basis you can specify the polling interval that Service Monitor uses. In cases where there is something more seriously wrong, though, restarting the service might not be adequate and potentially the system could become stuck in a loop, continually restarting itself. Therefore, Service Monitor allows you to specify the maximum number of times it is allowed to restart a service before it should run another program and/or reboot the system entirely.

When rebooting, you can specify whether or not data loss is allowed. If you try to preserve data and shut programs down in an orderly fashion, a hung task would prevent the system ever restarting. In those circumstances, data loss might be preferable. Service Monitor does not automatically monitor all services; just those you specify.



▲ **Fig 1 Setting up Service Monitor to keep tabs on NTMail services**

Service Monitor has only recently been acquired by Vinca, whereas previously it was shareware. This is the same company which markets a standby server solution for Windows NT so as to achieve high availability.

Service Monitor can be downloaded for evaluation or purchased from www.vinca.com/util/smon.html. At the time of writing there is a special offer and Service Monitor is only $99, but by the time you read this it may have gone up to its full price of $299. I hope, too, that by that time it will have received a makeover from Vinca.

When rebooting, you can specify whether or not data loss is allowed

ServerMagic

In previous columns I've written about the challenge of upgrading a hard drive on a Windows NT system. Although there are plenty of ways to copy over the operating system and registry in order to preserve all settings, they are all a bit of a fiddle. For NetWare systems, administrators have been able to use ServerMagic from PowerQuest to do this sort of thing fairly painlessly. Now, with version 2.0, ServerMagic is at last available in a Windows NT version.

ServerMagic allows you to do all sorts of wonderful things with partitions, such as resize them [Fig 2] but the feature that allows you to upgrade a hard drive is the ability to copy a partition entirely. Note that if you are copying the Windows NT partition then this operation, like most others, won't take place immediately because files will be in use: you'll have to reboot the system, and the copy will take place when it restarts.

Other things you can do are create, move and resize partitions — all operations that would otherwise involve long, tedious processes — and another use of the copy partition feature is to back up or restore data more quickly than you could with a file-based copy program.

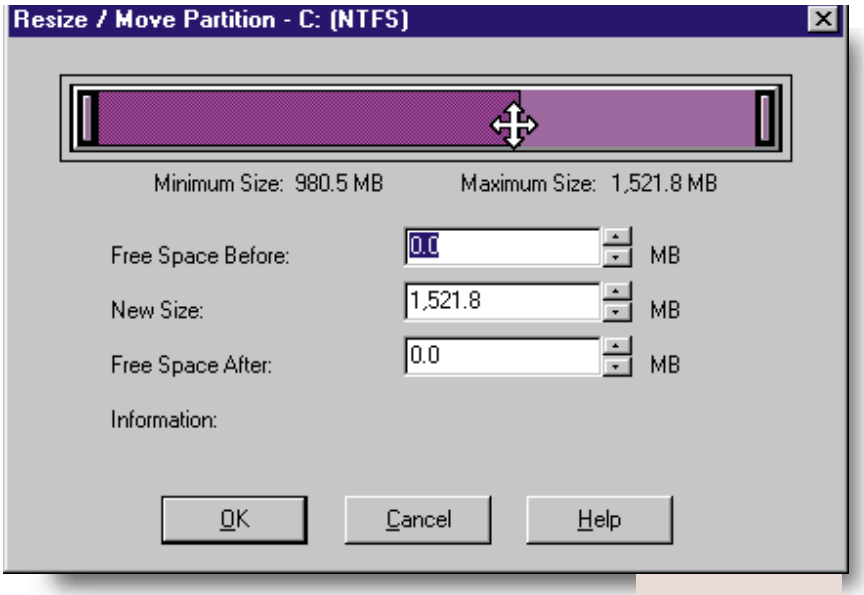
It will also let you create rescue diskettes from which to boot and run ServerMagic in an emergency. The rescue disk contains a copy of DOS — actually, Caldera OpenDOS — and a DOS version

of ServerMagic. It still works with NTFS partitions, though.

Using the rescue disk is actually the easiest way to carry out a hard drive replacement. You achieve this as follows: first of all, backup the existing hard drive but then turn off the power and install the new drive as the primary, with the old one being repositioned as the secondary drive; then, simply boot from the rescue disk and copy the partition(s) over and resize them if desired; turn off, remove the old drive, and reboot.

There is a catch, though. It would be just as useful to do all these things on a workstation as it is on a server but, somewhat unusually for a non-Microsoft product, ServerMagic actually does require Windows NT Server. It just refuses to install on a system loaded with Workstation.

ServerMagic costs $495 list price and you can download it from www.powerquest.com and although it states that this applies to US residents only, it still works. Or, from the Software Warehouse at www.software-warehouse.co.uk it's £309.95, which works out at about the same price.



▲FIG 2 RESIZING A PARTITION WITH SERVERMAGIC

■ Roaming around

Ryszard Sommefeldt has written in to ask for a guide to roaming profiles, so here it is. But before I go on, I've said it before and I'll say it again: about the best way to administer a network of Windows NT workstations is to use Novell Directory Services running on NetWare 4.1, along with NDS for NT [Fig 3] and Z.E.N.works. In particular, Z.E.N.works solves the problem of roaming users by splitting out the data relevant to the user, the PC and the organisation, and maintaining it all in the appropriate places: specifically, user data is stored on the network so you can log in from anywhere.

However, if your network is not big enough to make NDS worthwhile, or if you are involved in a job-creation scheme and do not want to cut down on the management work, you will be stuck with the NT equivalent, which means roaming profiles.

Usually, profiles are stored in a directory on the local PC, which by default is %SYSTEMROOM%\profiles. In today's NT environment, your NT workstation profile contains far more than just a few desktop settings. It will have your IE4 history folder, application-specific data such as Outlook signature files, your personal Send To settings, recently-used documents and maybe even your Temporary Internet Files folder (unless you've moved it). It also stores all user-specific registry settings.

Log on at a different PC, and you have lost all that. So, unless you are chained to a desk, you need some way of storing this information on the network, so wherever you log on, all your personal settings are to hand.

To set up roaming profiles, the administrator must first of all decide on a network share where they'll be stored [Fig 4]. Clearly, it helps if this share is available from anywhere that people might want to log on. If you want to hide it from the browse list, append a $ to the

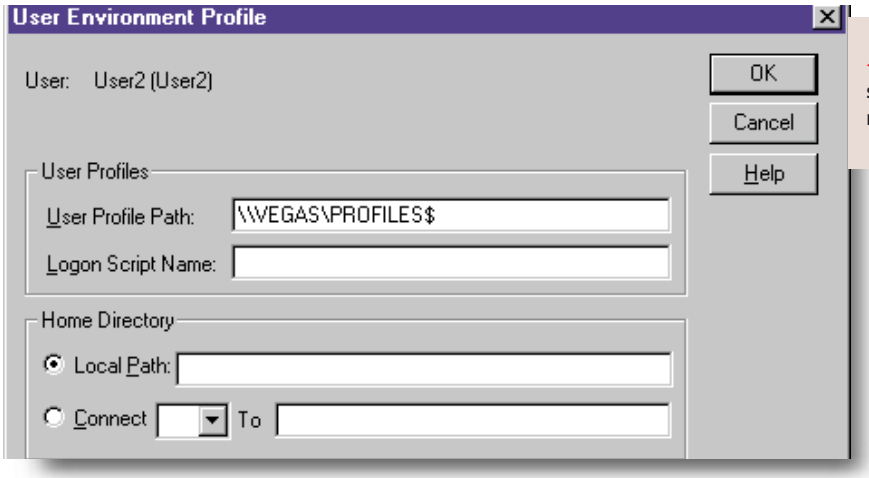
QUICK TIPS

☛ **Here's a tip** for those using the built-in NTBACKUP software to backup onto tape. Generally, if you run into limitations with this product, it's time to go out and buy a grown-up third-party tape backup solution like Seagate Backup Exec. But there are one or two registry tweaks which can overcome some of drawbacks of NTBACKUP. In particular, there's one which solves the 30-second wait which NTBACKUP suffers every time it hits an open file.

Run the registry editor and go to: HKEY_CURRENT_USER\Software\Microsoft\Ntbackup\User Interface. Find Skip Open Files and set it to 1. Then, open files will be skipped altogether. Alternatively, you could change the value for Wait Time.

☛ **A bigger splash** Following my item *Making A Splash* (February issue), reader Justin Hyde notes that if you want to change the Windows NT splash screen, then instead of renaming your own file to WINNT256.BMP or whatever, you can tweak the registry to specify the file you want loaded. Those who prefer to avoid playing with the registry; don't read what follows!

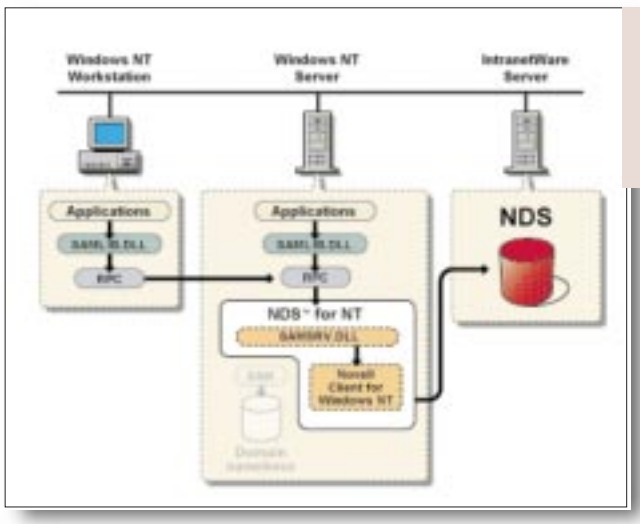
Navigate to the key HKEY_USERS\.DEFAULT\Control Panel\Desktop and change the wallpaper value to the name of your new splash-screen file (note the full stop preceding 'DEFAULT'). You can also change the screensaver when no-one is logged on — effectively in the same sort of way.



◂Fig 4 Specifying a share where the user profile is stored

end of the share name so you have a directory, PROFILES, and a share name, PROFILES$. When you set up user accounts with the User Manager, click on the Profile button and specify the UNC path to the PROFILES$ share in the User Profile Path box.

That all sounds pretty easy, doesn't it? But if your users have not previously been using roaming profiles, they will already have local profiles set up. Windows NT takes care of this: the next time the user logs on, the local profile will be copied to the path for the roaming profile — actually, the copy takes place when they log off again. And Windows NT will always maintain two copies, the local copy and the network copy, in case the network profile should become unavailable. This gives you a measure of fault tolerance, although if you cannot get to the profile across the network it is unlikely you will be able to access user data, either.



◂Fig 3 One way of solving user profile problems is to use Novell NDS for NT

If you are using roaming profiles, remember what I warned you of last month: the phantom router problem. All shortcuts, such as icons on the desktop, must be either relative (i.e. local) or point to a server that is always going to be available wherever the user chooses to log on, without bringing up an ISDN line to China. Since users themselves can create desktop icons (if that is what you allow), this restriction is not easy to enforce. Also remember to store the roaming profile on a server on the LAN, rather than across the WAN link.

By now, you will have spotted another weakness in this scheme. If all 2,000 users at work log in from my PC at one point or another I will have 2,000 local profiles copied to my hard drive. My profile is 195Mb, so if everyone's is that big, not only would they be waiting for ages each time they were to log on to a new machine but I would also need a 390Gb hard drive, which is somewhat impractical.

Of course, if you are reading this in a few years' time, I dare say your watch will have a larger hard drive than that! Anyway, to overcome this go to the System Control Panel, select the User Profiles tab and then delete away. Mandatory profiles do not suffer from this problem because a local copy is not stored.

Booting

One of the questions people frequently ask is about booting from removable media such as CD-ROMs, floppies and Iomega drives like Jaz and Zip. Specifically, reader Alan Smith wants to know how to make a bootable CD-ROM with a Windows NT image, to be used in emergencies to access a system where the operating system has been trashed.

There is an easy option, which is simply to install a second (minimal) copy of NT onto the hard drive. Put it into a different directory like WINNT.spare, or something like that. You may need to change the BOOT.INI folder, since NT will usually make the most recent installation the default. So, do this the nice way via the System Control Panel and the Startup/Shutdown tab, rather than by editing the file directly. But if you want nice names for your entries, like 'normal startup' and 'emergency spare', you'll have to lift the read-only attribute from BOOT.INI and edit it manually — ideally, back it up first. Then, if you have a problem with your standard NT you can boot from the spare copy.

If you want to make a bootable Jaz or Zip disk, you can use a similar procedure: install a new copy of Windows NT onto a disk using the winnt32.exe installation program. Again, you will need to change BOOT.INI afterwards so that your default startup drive is the normal one.

Neither of these procedures will help you if the basic boot information on the hard drive is mangled. To overcome that you'll need to make an emergency spare rescue diskette. To do this, format a floppy from within Windows NT, which puts a boot sector on it, and then copy over NTLDR, NTDETECT.COM and BOOT.INI. This floppy will only work on a system with an IDE drive, or a SCSI drive if you have a controller with a BIOS.

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Going global

Mark Whitehorn shows you how to put the worldwide web on your handheld.

A couple of months ago I touched on connecting to the internet using a PDA and covered the basics: namely that you need a PDA, a modem, a phone line (or mobile phone) and an account with an Internet Service Provider (ISP). Now we'll have a look at the process in more detail. *(This will put last month's OPL tutorial on hold for now — sorry about that).*

The underlying mechanism is more or less the same no matter what PDA you are using so the theory part, below, is equally applicable to Psion practitioners, WinCE wanderers and Pilot pilots.

▲ FIG 1 THE CONTROL PANEL

Theory and background

In the days of Windows 3.1, connecting to an ISP was conceptually simple. You ran a program supplied by the ISP on your PC and that operated the modem and dialled in. The ISP's machine ran a piece of software which could communicate with the software running on your machine and everything was hunky-dory — except in practice it was often neither hunky nor dory because it could all be a real pain to set up but at least it was conceptually simple.

Under the more recent versions of Windows, the situation is quite different. Essentially, your PC uses TCP/IP to talk to the machine at the ISP-end of the connection. TCP/IP is the standard protocol which allows machines to communicate with each other on the net. So, when you establish a TCP/IP connection to an ISP, your machine is not simply talking to the ISP machine. It becomes, in a broader sense, connected to the internet.

Your PDA can be attached to the internet via an ISP

Is this distinction important? Yes, because it means, for instance, that if your PC were also running as a web server other machines on the internet would be able to 'see' your machine. In turn this would mean that they could see the web pages which were being supported on your web server without even having to know about your ISP — in practice, ISPs often run firewalls to stop this sort of thing, but you get the idea.

For all this to function correctly your PC needs to be given a number that uniquely identifies it on the internet. Such a number is called an IP (Internet Protocol) address. This number is made up of four values between 0 and 255, separated by dots (for instance, 124.56.78.9).

A specific IP address may be given to you by the ISP when your account is first set up, or it may be dynamically allocated to your machine each time you dial in. This means that every time you connect you may get a different number. But that doesn't usually matter as long as the number you are given isn't being used anywhere else in the world at the same time. As an aside, only (256 x 256 x 256 x 256 =) 4,294,967,296 machines can be connected to the internet simultaneously — a worryingly small number isn't it?

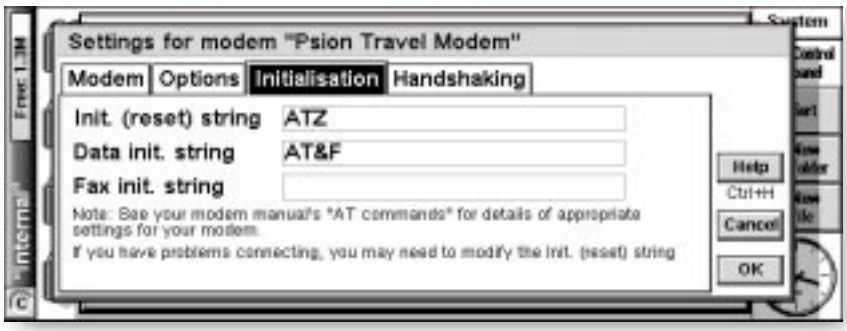
Now don't get me wrong. I'm not suggesting that you want to run a web server on your PC (or even on your PDA!). However, the fact that your PC and the ISP's machine use TCP/IP is important because it means that the communication is actually divorced from the need to run the ISP's software on your PC.

For example, I have a CompuServe account and an IBM laptop running Windows NT. To browse the internet I fire up a program called dialup networking on the PC which has been configured with the phone number to dial, the modem details and so on. This connects to CompuServe for me. Then, without ever having to fire up the CompuServe software on the laptop, I can use NetScape or Internet Explorer to browse the web.

In order to perform this magic my laptop needs to be running a TCP/IP stack. Any software on the laptop which wants to communicate with the internet (be it Internet Explorer or the CompuServe client itself) talks to the TCP/IP stack which in turn talks to the ISP and hence to the internet.

OK, we are nearly through the theory so the only bit left is mail. I can read mail sent to me at CompuServe by using the CompuServe software on my laptop.

▼ FIG 2 CHOOSING A MODEM



◂FIG 3 SETTING THE INITIALISATION STRING FOR THE PSION TRAVEL MODEM

However, if CompuServe also supports SMTP (Simple Mail Transfer Protocol) and POP3, then I can use a program like Microsoft Outlook to send and read mail; again without recourse to the CompuServe software on the laptop.

It is (hopefully) obvious why this is all relevant to PDAs. Although ISPs provide client software to run under Windows they don't provide the same software for PDAs. But given a TCP/IP stack that is written for your particular PDA's operating system, your PDA can become attached to the internet via an ISP. Then, given a browser for the PDA you can surf the web. And, given a mail client and support for SMTP and POP3, you should be able to send and read mail.

Choosing an ISP

It should be clear from all this that you need to choose your ISP with some care. First, you need to make sure that any one you select supports TCP/IP connections, SMTP and POP3. Second, you need to make sure that they are 'sympathetic' to connections coming in from PDAs.

In theory, this shouldn't make any difference and if you are totally confident about your abilities to drive the relevant software on your PDA, this won't matter. In practice, if you think that you might like some support in the initial stages of setting up a connection, then this is vital. Imagine the following conversation:

You: 'Hello, I can't seem to get my connection working'.

Helpline: 'OK, we'll start by checking your settings. Open up "Dialup Networking" and...'

You: 'I'm not using dialup networking.'

Helpline: 'Ah, that's the problem. Go to the Start menu and...'

You: 'No no, wait. I'm not using Windows, I'm using a Psion.'

Helpline: 'What's a Scion?'

At that point, you might as well give up.

I'm not suggesting that all ISPs have an obligation to know about every machine that might be used to connect to their service but it is my painful experience that some are more open to non-Windows machines than others.

The best ISP I have found is Demon Internet. I don't mean to suggest that others know nothing about PDAs, nor that Demon will guarantee to provide helpline people who know about every possible PDA. Nevertheless, of the ISPs I have tried, Demon was undoubtedly the most helpful and sympathetic to the idea that there are, in fact, operating systems other than Windows out there in the big, wide world.

Connecting a Psion 5

OK, let's get down to the practical bit. I'm going to describe the connection of a Psion 5 to Demon Internet. As outlined above, Psion supplies the TCP/IP stack, browser and POP3 mail client that you will need. These are available on the PsiWin 2.2 CD-ROM.

◂FIG 5 TELLING THE PSION ABOUT YOUR ISP; IN THIS CASE, DEMON

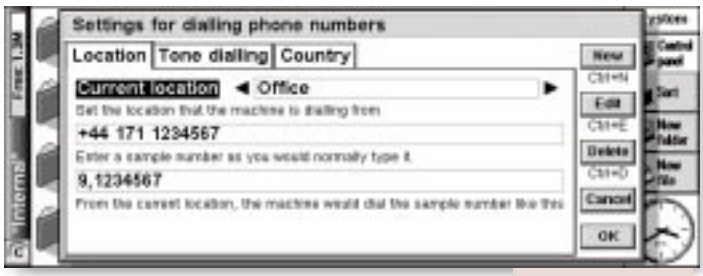
So, from the CD-ROM, you simply follow instructions to install the software and the relevant files should be shunted down to your Psion 5. Once this has been done, you should find that a couple of icons have appeared on the extras bar.

Now, before you can do the exciting bit (connecting to the net) you are going to have to do the boring bit. This means providing the Psion with three types of information:

- about your modem
- about your dialling preferences
- about your ISP.

About your modem

From the system screen, fire up the control panel and select Modems [Fig 1]. If your modem is listed (e.g. Psion Dacom Modem) simply select that. If it isn't, select New and enter the appropriate details [Fig 2] — don't you just love instructions like that? When I read something like that my brain screams 'What *are* these "appropriate" details? I'm reading this article precisely *because* I don't know the details!'



▲FIG 4 DIALLING PREFERENCES

The thing is, there are lots of modems out there and so I cannot cover them all. Anyway, you will need to know such things as:

- the speed at which the modem will run
- the way in which it is connected (IR or serial port)
- initialisation strings.

If you are reading this thinking 'I hate this man! What is an initialisation string?' — well, it is a string of characters sent to the modem to reset it. Typically it might be ATZ or even AT&F [Fig 3].

You should find all of this detail in the documentation which comes with the modem. If not, don't contact Psion or Demon, contact the supplier of the modem. If you are unsure about all this,

▲FIG 6 (TOP) CONFIRMING THAT ALL IS WELL BEFORE DIALLING

FIG 7 (ABOVE) WEB BROWSING

go to New in Modems/Control Panel now and have a look at the data you will need to supply. Write a list and make sure you have it available before you even begin trying to connect — this should help to relieve potential stress!

When you have got all the information and have at last set up your modem, select OK and get back to the Control Panel. Then select Modem again and make sure that your unit is set as the Current Modem — in other words, make sure that your Psion is actually aware that you want to use this particular modem.

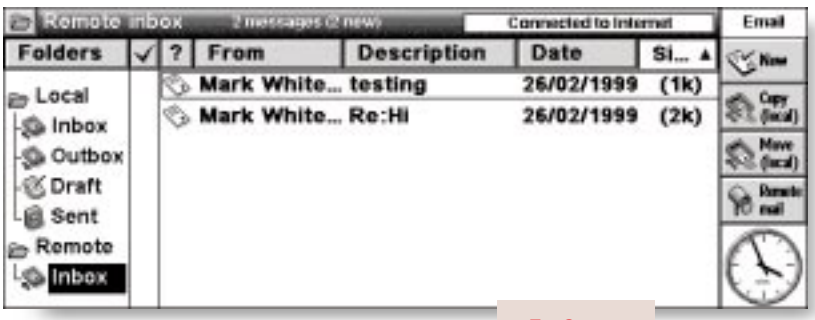
About your dialling preferences

Go to control Panel/Dialing [Fig 1]. Here, you will be able to set your preferences for dialling. Typically, if you dial in from an Office, you need to add a 9 to any number that you need to dial, so as to get an outside line.

If you are a user of a mobile telephone, you typically have to dial numbers more explicitly, so the Psion offers you three distinct default 'locations': Home, Office and Mobile, where you can set up these preferences.

Note that this tab is not asking you for the number you will use to dial your ISP, it is simply asking about how you typically dial numbers from these different locations. So, if you end up with numbers such as 9, 1234567 in the boxes, that's fine [Fig 4].

In the Tone Dialling tab you can usually accept the defaults. But in the Country tab you must set your country, which for most readers will be the United Kingdom. When all is set, choose OK.



▲FIG 8 YOU CAN EMAIL FROM A PSION, TOO

About your ISP

Select Control Panel/Internet. If you are connecting to Demon, Select New. Select Standard Settings and press OK. Note that some of the following entries will have to be replaced with those appropriate to your chosen ISP.

1 In the Service tab [Fig 5] enter a Service name ('Demon' seems appropriate) and choose:

- Connection Type — dialup
- Use 'smart' dialling
- Standard dialup number; +44 845 2120666 (note the 'demonic' choice of dialup number by Demon).

2 In the Account Tab: the Username should be the Domain name that Demon supplies to you, not in fact, the user name they give you. And Password is whatever password you have agreed with Demon.

3 Go to the Addresses tab and deselect 'Get IP address from server'. Enter the IP address you get from Demon. Deselect 'Get DNS address from server'. The Primary DNS address is 158.152.1.58 and the secondary DNS address is 158.152.1.43.

4 In the Login tab select 'Use Login script':

- Port settings — 8 data bits, no parity, 1 stop bit
- Deselect 'display window'

5 Finally, in Advanced, deselect 'Enable PPP extensions' and select 'Allow plain text authentication'. Then press the Done button.

Phew! If you are not used to it, all this may seem like a lot of work but remember that there are lots of modems, countries and ISPs out there. All you have done is to tell your Psion which modem, country and ISP you have decided to inhabit and use. Now, if all is well, you should be able to connect!

To test it out, fire up the browser and type in any web address that you know. I chose www.demon.net but it could be anything and does not have to be the address of your ISP. A dialogue will open up where you can change your location if necessary. See Fig 6.

Once all looks well, click OK and with any luck you will be browsing [Fig 7]. Fire up the email client and you can be messaging as well [Fig 8].

PCW CONTACTS

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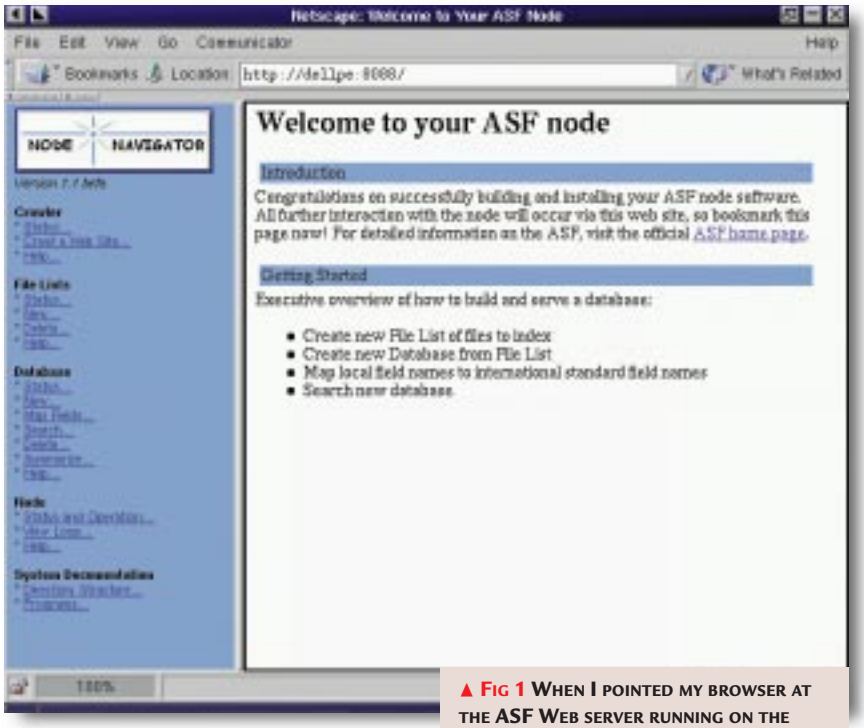
Casting the net

A web interface can be used for text search and retrieval — Chris Bidmead finds a free text database system for Unix.

Earlier this week the hard drive in one of my older servers took a dive, bringing down with it the Topic text retrieval database that is a key component of my writing activities. Thanks to the regular exercise I give my trusty HP SureStore DAT tape device nothing was lost but it set me thinking.

Verity's Topic is a product I've been using in one form or another for the best part of a decade. Designed around client-server architecture from the outset, it was one of the first text retrieval packages to migrate to web technology.

Irrespective of operating system or hardware you can query the text base from any machine on the network which is capable of running a web browser and get the results back in the form of web pages. So, you get complete freedom to choose your favourite workstation OS, independent of the software running Topic on the server. This was a key part of my migration to UNIX. Since then, the idea of using a web interface for text retrieval has become commonplace.



▲ FIG 1 WHEN I POINTED MY BROWSER AT THE ASF WEB SERVER RUNNING ON THE OTHER END OF MY NETWORK AND ENTERED MY USER NAME AND PASSWORD I CAME UP WITH THIS PROFESSIONAL-LOOKING SCREEN. THROUGH THIS, THE ADMINISTRATOR CONTROLS THE ENTIRE OPERATION OF THE DATABASE.

A number of free and commercial products offer search and retrieval through a browser, often using at the back end a standard web server connected to a set of small purpose-written programs through the CGI (common gateway interface) web server programming standard.

I'm running a Cobalt Qube 2700 Linux-based server on this system and the little blue box comes with an index and search engine called glimpse <glimpse.cs.arizona.edu> ready installed in conjunction with some CGI magic for rendering web pages. At the Arizona site you'll also find links to Harvest and WebGlimpse, which are similar systems based on the glimpse engine. A different approach is ht/Dig at www.htdig.org.

You can build it into a complete working system

The web search and retrieval mechanisms which come with the Qube are great on an intranet for storing HTML pages you know you'll need to refer to again, or want to publish to colleagues. But as far as I can make out they lack a key feature I've come to depend on with Topic and that is the ability to search on fields within a document.

For example, I find it very useful to be able to look up all relevant documents by a particular author over a particular range of dates. So Author and Date are fields which I establish in all my Topic documents, as well as Source and Title.

Topic runs on various flavours of UNIX but I have the Windows NT version dating back to the days when this column covered both these operating systems but since this is now resolutely the UNIX column I thought I'd scour the web to see what was on offer in the way of a free UNIX text database system.

The two faces of ASF

My quest brought me to something called ASF <asf.gils.net>. The initials stand for 'Advanced Search Facility' and I

A UK LINUX RESOURCE

I hadn't heard of Digital Networks UK until I stumbled on its ad banner on the slashdot.org website. Its own website at www.dnuk.com seems to be offering an excellent price on software. Official S.u.S.E. Linux 5.3, for example, is £20 (ex VAT and delivery) and hardware is available, too. If you're looking for a ready-made dual boot Windows/Linux system for fun and games, check out the company's PlayStar workstation, currently on offer for around £850 (inc VAT and delivery to the UK mainland). There's an interactive web page for you to juggle with the feature options and check out the resulting prices. The firm's Linux co-ordinator, Lee Chisnal, is on 0161 3398555.

◂Fig 2 An easy way of filling the database is to use the Web crawler that comes as part of the package. This can copy entire websites into your ASF system for indexing

was initially put off by the reams of information retrieval theory describing the system.

I waded through discussions about centroids and geospatial metadata until I twigged that ASF is at least two different things. On the one hand it's a comprehensive architecture for the implementation of a potentially vast collection of interlinked subject gateways — wow! On the other hand, it is a relatively small bundle of free software tools which have been assembled as a kind of 'proof of concept'. But this get-you-started kit also happens to be a truly practical software package [Figs 1&2]. And, yes, ASF does know how to handle fields, and is flexible about how it finds them inside documents.

The key component of the kit is Isearch, a set of tools for indexing and querying a collection of data files from the command line. Another component handles CGI interaction between Isearch and the web browser, Apache, which makes up the third key part of ASF.

The whole lot is ready tarballed as a 2.7Mb download. Now, I know from your emails that the fact that the distribution is source and you have to compile it yourself is going to strike many of you as bad news, but take my word for

LINUX FOR STARTERS

Reader John Horton sent me an interesting email but my reply was bounced back by the postmaster at his domain. I wrote back to the postmaster and was told that John had left the company, so I'm printing my reply here in the hope that he gets to read it, and because it covers some subjects which come up in much of the correspondence I receive.

John wrote: 'I've just installed Linux on my P200 PC at home, alongside Windows 95. I am fairly technically minded and used to DOS so I thought I would give Linux a whirl to see what all the hype was about. It would be a nice idea if you could start a section which includes all the basics. For instance, I see on the internet many pieces of software to download but have no idea how to install them.'

I think it's probably worth spending time getting to know the system you're running before you add more software. There are several quite different installation methods, depending on how the software is packaged. The most common ones are:

☛ **rpm** the RedHat Package Manager. A utility called rpm — or glint or xrpm if you're running under X — checks the dependencies (are the requisite libraries installed?), installs the software in the correct directories and runs any installation scripts that may be needed. These rpm packages are generally called <something>.rpm. See www.rpm.org.

☛ **Tarballs** are files and directories compressed into a single file. They may contain only source code *(see below)* or ready-to-run executables. Tarballs don't carry out dependency checks and need to be unpacked in the correct directories, or at least you need to know where to put the files manually. These files have a .tgz or .tar.gz extension.

☛ **Source code** may or may not come from a tarball and needs to be compiled for your system before you can use it. Often this is easier than it sounds, thanks to a config utility that reads your system and makes the required adjustments to the 'make file' (the config file which defines how the compilation runs). Small utilities designed to run across many UNIX platforms are often successfully distributed in this way.

John's email continued: 'Have you any ideas as to a good, ideally free web browser, word processor, etc? Also, I am aware of Gnome and Wine and would like to know more, especially about the latter. Any chance of a beginner's guide?'

☛ **Netscape** is available without charge, as is WordPerfect 8. You might like to check out the applications available at sal.kachinatech.com.

☛ **Gnome and Wine** are on my rather long list of things to write about. But in the meantime, why not cut out the middle man and head straight for www.gnome.org and www.winehq.com ?

it, the process could hardly be simpler. Provided you're running Linux or Solaris — the source can be ported easily to other UNIX platforms, but some twiddling is required — all you need to do once the tarball has been unwrapped is type 'make linux' or 'make solaris' and you're done.

All right, maybe it's not that simple as you'll need to make sure you have the appropriate development tools installed on your system. I had the GNU C compiler, gcc, already in place on the SuSE 5.3 system on my Dell PowerEdge but the string of errors I got in response to 'make linux' alerted me to the fact that I was missing the necessary C++ libraries.

I returned to the package selection menu in YaST, the SuSE system management and installation tool, and pulled in gpp and libgpp from the SuSE distribution CD-ROM. I don't know much about these but YaST describes them as 'The GNU C++ compiler and library' so they sounded right. Next time I ran 'make linux' there were a few warnings but no errors.

The top level 'make' which you trigger when you do this runs down the directory trees and fixes up the makefiles that control how each of the separate tools in the bundle are compiled.

Whoever is responsible for putting the bundle together has done an excellent job. Once you have the binaries you simply follow the instructions in the README file. This tells you first to run the bin/asf_setup script, which asks a few questions about user names, passwords and directory locations, and then to run bin/start_main_servers which launches Apache and the search engine.

Now the demo system is ready for use. When you access it from a browser it comes up looking like a fully-fledged professional piece of software, which it is. You can go on from there to build it into a complete working system — or even a 'subject gateway'!

IS IT LITESTEP OR AFTERSTEP?

MANY THANKS TO READER CARL ROBSON CARL@SKRAGGY.FREESERVE.CO.UK FOR SENDING ME WHAT LOOKS VERY LIKE THE AFTERSTEP DESKTOP I USE ON SEVERAL OF MY LINUX MACHINES. THE TWIST IS THAT THIS IS THE LITESTEP DESKTOP SHELL, RUNNING ON WINDOWS <LITESTEP.NET>. WELL, CARL, UNIX IT AIN'T — BUT IT'S A LITE STEP IN THE RIGHT DIRECTION...

■ The Open Source 1999 Conference

Earlier this year I attended the Open Source 1999 Conference at the Commonwealth Institute in London. This is a gathering of some 400 technical and managerial delegates hosted by a company called NetProject <www.netproject.com>.

NetProject is run by Eddie Bleasdale, a name which has a mellow resonance for anybody old enough to remember the early days of UNIX here in the UK. Bleasdale was the first European manufacturer of UNIX hardware back in the early eighties and in a lot of ways the Linux phenomenon is a rerun of that early excitement.

You will need to make sure you have the appropriate development tools

The keynote speaker of this year's conference was Eric S. Raymond. He is the Open Source guru whose considerable contribution to free software ranges from arcane technical documents such as *The Hitchhiker's Guide to X386/XFree86 Video Timing,* to the now classic Open Source position paper *The Cathedral and the Bazaar,* and along the way takes in practical programming efforts such as the ubiquitous fetchmail email collecting utility.

Undoubtedly, Raymond was the star of the conference with his exegesis of his latest paper *Homesteading the Noosphere*, which pursues a not always coherent analogy between the ownership of software and the Lockean theory of land tenure (you can read it yourself at www.tuxedo.org/~esr/writings/).

The noosphere is the sphere of human consciousness and mental activity in regard to its influence on the biosphere and in relation to evolution. Eric Raymond's noospheric aerobatics were perfectly complemented by two very down-to-earth lectures by Mike Bahahan of the IT consultancy and training company GBdirect <www.gbdirect.co.uk> who addressed the practical uses of Linux and free software in the context of business.

During a beer break at the end of the conference I also managed to catch up with Alan Cox, the kernel guru generally regarded as Linus Torvalds' representative on earth. You can see what Alan is doing at the moment by visiting the web pages at www.linux.org.uk/diary.

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Do it with the dialer

Comfort for Warp users frustrated by Microsoft: your trusty DOIP can do it. Terence Green on ISPs and modems.

I was mildly amused to read in the coverage of the Microsoft *vs* DoJ (US Dept of Justice) battle that Bill Gates had complained, by email, of the problems caused to Microsoft arising from rampant virtual device drivers. This email exchange with senior vice-president Paul Maritz discussed how to stop Intel from shipping software that would compete with a Windows component. Gates says Microsoft doesn't want another problem like the VxD one. Warp users, all too familiar with the use of VxDs to lock out Warp, should have no difficulty spotting the irony in this.

It was not headline news when Warp was being sidelined but Microsoft's habit of making small software changes to inhibit competitors hit headline news recently. Documents were published in which a Microsoft employee suggested making proprietary changes to internet protocols in order to combat the open source movement currently riding the Linux wave.

This touched a nerve because I've been trying to dump NETBEUI and run an all-TCP/IP network but I've been hitting detail problems which prevent Warp from easily connecting to Windows in the absence of NETBEUI. Nevertheless, it looks as if it can be done and I hope to explain how in next month's column.

The practical effect of Microsoft's tweaks becomes apparent if you're running OS/2 in an organisation which moves over to Windows networking. Warp has excellent networking but your organisation will probably make you drop Warp as 'it doesn't network with Windows'. This isn't true, but tracking down the details has not proved easy.

ISP for free

Freeserve, the free ISP from Dixon's, is another area in which you don't need Windows, although they say you do. Ostensibly, you need Microsoft Internet Explorer 4 to sign up, after which you can use any browser. But you can easily sign up and use Freeserve with Warp's Dial Other Internet Provider dialer [Fig 1] and an OS/2 web browser.

I came across the clue to this on the UK OS/2 User Group mailing list. If you want to find out what the OS/2 UG has been up to lately, their new web page is at www.warp.in-uk.net [Fig 2].

▲FIG 1 USE DIAL OTHER INTERNET PROVIDER TO GET ONLINE WITH FREESERVE

To register an account on Freeserve you must access the Sign-up page [Fig 3]. So, fire up your trusty DOIP, select 'Add Entry' and fill in only the details below — any more is superfluous. You don't even need 'Your Domain Name' although DOIP won't save the entry if you leave it blank.

- On page one. 'Login Info':

Login ID	freeservesignup
Password	signup
Phone Number	08450796699
Connection type	PPP

- On page two. 'Connect info':

Domain Nameserver	194.152.64.68
Your Domain Name	freeserve.co.uk

- Leave page three (Server info) blank, and on page four, fill in your modem details.
- Save the new entry and hit the Dial button to connect. Use Netscape Communicator or Web Explorer to open the sign-up page at https://signup.freeserve.net/ and follow the registration procedure.

If you have a problem accessing the sign-up page, double-check that you have entered the URL correctly. It's a secure connection, hence 'https' rather than 'http'. You won't be allowed to load any page other than the sign-up page — you'll see a DNS failure.

Once you have completed the registration process you are offered the option to 'Finish'. This applies to Windows users. When you select Finish, Freeserve sends a Windows configuration file down to your computer. Save the file if you like. It's text and can't do OS/2 any harm but note that it lists your details, including your password, in clear text.

After you hang up you must edit the DOIP entry to replace the sign-up Login ID and password with your new Freeserve user name and password. You have to be careful here. Your Login ID is the fully-qualified Freeserve host name. If you were to chose, say, 'dogbert@coolcat.freeserve.co.uk' as your Freeserve user name, your Login ID would be 'coolcat.freeserve.co.uk'. You also need to use the full user name when you set up email [Fig 4].

▼FIG 2 THE OS/2 USER GROUP AT ITS NEW WEB SITE

A TOP TIP FOR DOIP AND V.90 MODEMS

Reader Chris Potts wants to buy a new modem but wonders whether it would work with Dial Other Internet Provider, which by now has an outdated modem list. He also wanted to know if there was any difference between internal and external modems.

Almost any modem other than a Winmodem will work with DOIP. Winmodems have to run software on Windows so they're useless for Warp. If you have an external modem simply attach it to COM1 or COM2 and away you go.

If you have an internal modem you'll most likely set it as COM3 so as not to clash with the existing COM1 and COM2 serial ports on the PC. This involves a bit of extra work as you probably want to retain the use of COM1 (for a mouse, say). You must change the default IRQ and I/O Port settings for COM3 to prevent a conflict with COM1 which uses IRQ4 and Port 3F8.

When you set up your internal modem as COM3, make sure it is set to something like IRQ5 and I/O Port 3E8.

You will also find that DOIP knows nothing of COM3 because OS/2 by default only sets up COM1 and COM2. Add support for COM3 by adding a line to the CONFIG .SYS. Here's how to do it:

- Find the line in CONFIG.SYS which reads

```
device = x:\os2\boot\com.sys
```

(where 'x' = the OS/2 boot drive).

- Now edit it to read

```
device = x:\os2\boot\com.sys (3,3E8,5)
```

This tells OS/2 that COM3 is on I/O Port 3E8 and IRQ5.

You won't find a recent modem in the DOIP modem list, and I don't know how to update it, but that's not a problem. Simply use the generic Hayes entry.

You may need to edit the Dialing strings if the modem doesn't connect properly. Start by changing it to a simple AT&F which sets the modem back to its factory configuration. If you want to tinker further you'll need to look up the AT commands in the modem's handbook.

For example, if you use Netscape you would normally use 'coolcat' as your user name but you need to enter 'coolcat.freeserve.co.uk' as your Mail Server User name under Mail Server in the Preferences dialogue.

The Incoming Mail Server name is 'pop.freeserve.net'. When you open Messenger and 'Get Msg' the dialogue that asks for your password should read 'coolcat. freeserve.co.uk@pop.freeserve.net'. The other servers are straightforward. The outgoing mail server is smtp.freeserve.net and the news server is news.freeserve.net. If you want to use the proxy server it is www-cache.freeserve.net.

◀FIG 4 YOU CAN USE NETSCAPE MESSENGER TO COLLECT EMAIL FROM FREESERVE

Warp can't see my CD!

Reader Carl Robson has asked me whether it is necessary to install Fix Packs in sequential order. The answer is no. They are cumulative and you need only the latest to pick up all fixes to date.

Carl also wanted to know whether it was possible to create the Fix Pack floppy diskettes on a Windows system because his CD-ROM drive isn't recognised by Warp 3. This cannot be done because the program which creates the floppies from the Fix Pack images is an OS/2 program.

There is a solution to the CD-ROM recognition problem, though. Download IDEDASD.EXE from the 'IDE-ATAPI CD-ROM Support' link on the OS/2 Device Driver Pak On-Line at service.software.ibm.com/os2ddpak/html/miscellb/os_2warp/index.htm.

Extract the files into a temporary directory or onto a diskette by running IDEDASD .EXE and follow the instructions to update an existing installation. You can also update a set of Warp installation diskettes if you have not yet installed it. This update applies to all versions of Warp.

Carl offered up the URL for 'The 13th Floor', a site which links OS/2 applications against the equivalent Windows item. This useful site includes shareware and freeware as well as commercial applications. He noted that it offered a way to network Warp 3 with Dial Other Internet Provider and a network card. The site is at www.tstonramp.com/~freiheit/os2apps.shtm.

◀FIG 3 USING NETSCAPE COMMUNICATOR 4.04 FOR OS/2 TO SIGN UP WITH FREESERVE

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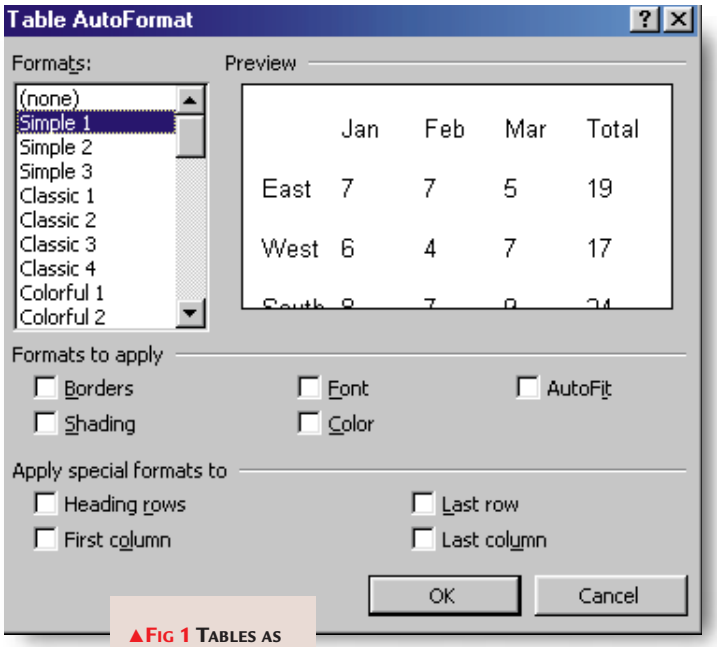
Patch-work

SR-2 is sorted but don't relax — you need a security patch, too, warns Tim Nott.

Since the launch of Word 97, two years ago, several patches and improvements have been made available. First came a 'real' file converter to Word 6/7 format (the original actually created RTF documents). This, and several other Office-wide enhancements and fixes, were later encapsulated in Service Release 1 available as a free download. Late last year, Service Release 2 (SR-2) appeared. This is an Office-wide patch but it addresses 52 problems in Word alone.

To put it mildly, the release of SR-2 has been beset with teething troubles, especially for UK users. It has been available as a free download since last November but it is rather large at 23Mb. Furthermore, it must be installed on top of SR-1, itself a hefty 7Mb.



▲ FIG 1 TABLES AS THEY USED TO BE

Although the patch was also issued on CD-ROM, Microsoft admits that there have been availability problems in the UK. Now, happily, all is resolved. You can get the patch on a CD-ROM which also includes SR-1 free of charge without proof of purchase from Microsoft Connection. Alternatively, you can get a full Office-with-SR-2 replacement CD. This is also free of charge but you will need to provide proof of purchase.

☛ **Both patches** are in the library of our cover CD-ROM this month.

Having installed these patches, you might well think that you are entitled to sit back and relax. Not so. It has recently come to light that there is a security loophole with Word 97 macros which 'would allow malicious code to be run in a Word 97 document without warning a user. Word 97 will warn users when opening a document that contains macros. However, if that document does not contain macros but is linked to a template that does contain macros, no warning is issued. A hacker could exploit this vulnerability by causing malicious code to be run without warning when a user visits a web site or opens an email.

'The Word 97 Template Security Patch prevents a hacker from exploiting this vulnerability. After installing the patch, users will be warned before they launch a template that contains a macro. Installing the patch will not disable the use of templates or macros on templates.'

You can obtain the patch from officeupdate.microsoft.com/downloaddetails/wd97sp.htm. For yet another security problem that isn't exclusive to Word users, see this month's *Hands On Windows* column (p234).

■ Office 2000 tips

Although at the time of writing, the release date of Office 2000 had still to be announced, there is a large number of users on the preview program, trying out beta 2. Last month we discovered how to turn off the 'Adaptive Menus' and here's the second of a series of 2000 tips.

One of the small but perfectly annoying changes from Word 7 to 97 was the way tables defaulted to having borders around every cell. For most tables and lists I find it unnecessary and ugly. It's not too difficult to get rid of — Table, Table Autoformat..., None — but it is a nuisance to have to do this every time.

The latest beta has an Autoformat button in the Insert Table dialogue. It also has a check box to 'Set as default' and will show the default style as 'none'. Yet despite all this the table still appears with borders.

Anyway, I think I've cracked it. By setting the default Autoformat style to another style such as 'Simple 1' then deselecting all the options, then making this the default, the borders don't appear. Better still, the borderless table becomes the default for the very useful Toolbar Table button whereby you drag out the rows and columns needed in the supplied mini-grid. It's a rather counter-intuitive way of doing things but with luck you should only have to do it once.

■ Not-so-SmartCentre

When I last reviewed Lotus WordPro I was mystified to find that every time I started my PC, and hence Lotus SmartCentre, it would attempt several dial-up connections to the internet. At the time, replies from Lotus support varied from 'a beta problem, now resolved' (it hadn't been) to 'so it does'. At last, reader Sharon Bailey has solved the case and shared this with the members of the Lotus conference on CIX. First came a registry hack gleaned from the Lotus web site. This stopped the unwanted connections but had the unfortunate side-effect of stopping all dial-up connections. 'So,' writes Sharon 'I put the registry back as before, then did a selective uninstall of SmartCentre and then custom reinstalled it making sure I deselected the internet option. All is now wonderful.'

Questions & answers

Q Can I use earlier WordPerfect printer drivers with Corel WordPerfect 7?

MARTIN CARR

A *Corel WordPerfect 7 (and later) doesn't use WordPerfect printer drivers (.prs files) and has finally got round to trusting Windows with the printing, like practically every other application. If you open documents created using WP printer drivers they get reformatted to suit the current active Windows printer.*

Q In the past I have read that if you overflow your single-page Word document by a few lines, there is a way to squeeze them onto the original page, without needing the second.

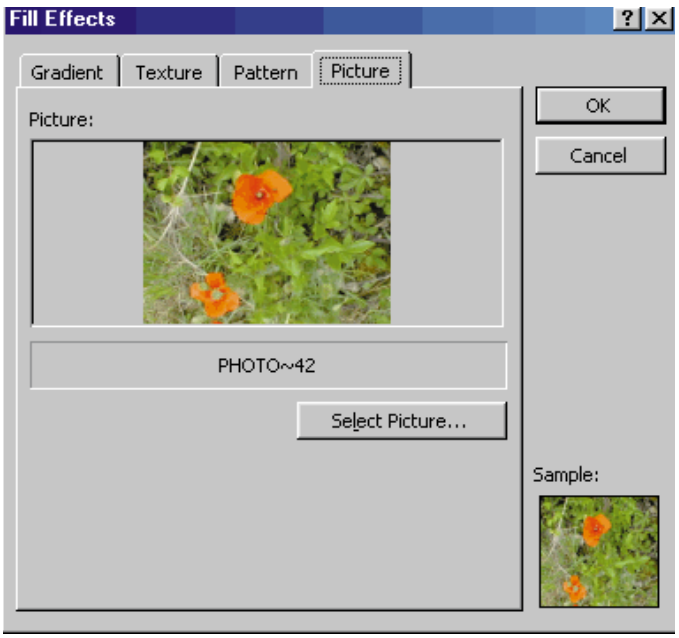
JIM DUNLOP

A *Yes – what you want is the 'Shrink to fit' button, which has been tucked away in the 'Print Preview' screen since Word 6.*

Q How can I get 'transparent' text in Word 97 – so that underlying images show through?

NICK CORMODY

A *I'm not quite sure whether you mean text with a transparent background, i.e. a picture with words on top, or text with an opaque background but transparent characters, i.e. part of the picture is contained inside each letter. So I'll give you both. The first is easy, just insert the picture as normal, then right click, Format Picture, and in the Wrap options choose Behind Text. For the latter, you'll need a WordArt object. The easiest way is to open the drawing toolbar then click on the WordArt button (the tilted A). Assuming you want the text to be normal — though this does work with the shaped and other effects — select the first example from the WordArt gallery then type the text and choose the font. When the WordArt object appears make sure it is still selected and go to Fill Effects. You can get this variously from the WordArt toolbar Format button or right click, Format WordArt. From the Colors and Lines tab, open the Fill/Color palette and choose Fill Effects. Alternatively, you can save a few steps by going straight to the Fill button on the drawing toolbar. Whichever path you choose you will arrive at a dialogue with a Picture tab that will allow you to browse to the bitmap of your choice. Note that Word will stretch the bitmap to fit, so you may want to resize or crop the picture first to minimise distortion.*



▲FIG 2 (ABOVE) FILL IT YOURSELF. TRANSPARENT TEXT...

◀FIG 3... USING WORDART

Q I have a multi-paged mailshot which I want to print on a two-bin printer. The first page is on headed paper and the subsequent ones are on plain. How can I do this *and* collate each letter? I am using Word 97.

ALAN HESLOP

A *The easiest — and possibly the only — way is to place a section break at the foot of the first page. You will then discover that you can specify the paper tray used for each section from the Paper Source tab of Page Setup.*

Q When I use Autotext on my new personal computer at home, Word displays an error message, the essence of this being something or other to do with a fault in MSO97.DLL. It then shuts down and any unsaved changes are lost. I am certain it never used to do this and it does not do it on the computers at work, either. Can you help?

FRANCES SHIRREN

A *This is a 'known issue' with Word 97 and Windows 98 but not Windows 95, which may explain the discrepancies you mention. The Office SR-2 patch will fix it. See opposite for details of how to get hold of this.*

PCW CONTACTS

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Microsoft Connection 0345 002000

Date lines

Stephen Wells tracks down Easter days and deals out date dodges.

Because we have to prepare this column so far in advance I have not yet received mail on the problem mentioned in last month's column, of calculating the date of Easter Sunday. So meanwhile I've dug out some more information myself.

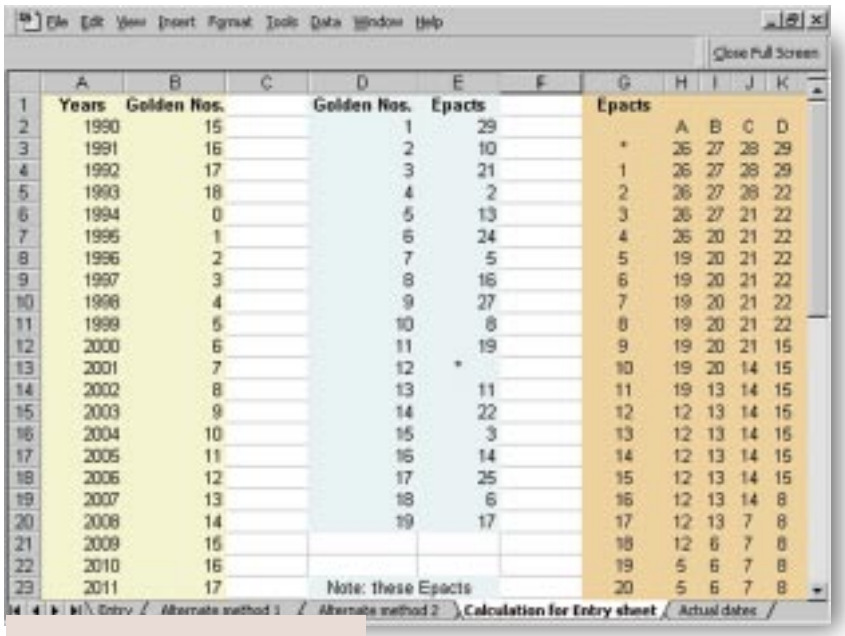
The file Easter.xls on our cover-mounted CD this month can be opened in Excel 5 and above. It contains data from three sources: *Christian, Hebrew and Mahometan Calendars* by W.S.R. Woolhouse, printed in 1864 and kindly provided by my local Diocesan Chancery Office; several algorithms available in leaflets from the Royal Greenwich Observatory; and a list of dates from 1875 to 2124 calculated, but not guaranteed, by M.J. Montes.

If you just want to know the date of Easter Sunday for any year between 1990 and 2019, go to the 'Entry' worksheet, enter the year and the date will be displayed. The sheets, 'Alternate Method 1' and 'Alternate Method 2' illustrate two different algorithms, spelled out step by step. The sheet, 'Actual dates' is the list of 250 years' Easter days. For many years, all these methods agree but unfortunately, not for all.

If you look at the fifth worksheet in Easter.xls, entitled 'Calculation for entry sheet,' you can see the problem (this is the sheet which calculates the answers for the 'Entry' sheet). The various calendars are all a bit of a best-guess, really. They are man's attempts to clock how the world turns. The year 2000, for instance, is supposed to mark 2000 years since Christ's birth. But this date was not guessed at until the 6th Century. Also, the early calendar makers went from BC to AD with no year zero — this was the earliest built-in Y2K bug — because at the time the concept of zero had not been visualised.

The various calendars are man's attempts to clock how the world turns

On the Calculation sheet [Fig 1] you will see panels for 'Epacts', 'Dominical Letters', 'Golden Numbers', and 'Numbers of Direction'. A Dominical letter is used in the Ecclesiastical Calendar to denote the day of the week in a year. The letters A to G (representing the days of the week) are placed opposite Jan 1 through Jan 7, Jan 8 through 12 and so on, throughout the year. The pattern falls back one letter each year and two letters in a leap year. Other adjustments have to be made after a century and a millennium.



	A	B	C	D	E	F	G	H	I	J	K
1	Years	Golden Nos.		Golden Nos.	Epacts		Epacts				
2	1990	15		1	29			A	B	C	D
3	1991	16		2	10		*	26	27	28	29
4	1992	17		3	21		1	26	27	28	29
5	1993	18		4	2		2	26	27	28	22
6	1994	0		5	13		3	26	27	21	22
7	1995	1		6	24		4	26	20	21	22
8	1996	2		7	5		5	19	20	21	22
9	1997	3		8	16		6	19	20	21	22
10	1998	4		9	27		7	19	20	21	22
11	1999	5		10	8		8	19	20	21	22
12	2000	6		11	19		9	19	20	21	15
13	2001	7		12	*		10	19	20	14	15
14	2002	8		13	11		11	19	13	14	15
15	2003	9		14	22		12	12	13	14	15
16	2004	10		15	3		13	12	13	14	15
17	2005	11		16	14		14	12	13	14	15
18	2006	12		17	25		15	12	13	14	15
19	2007	13		18	6		16	12	13	14	8
20	2008	14		19	17		17	12	13	7	8
21	2009	15					18	12	6	7	8
22	2010	16					19	5	6	7	8
23	2011	17		Note: these Epacts			20	5	6	7	8

Entry / Alternate method 1 / Alternate method 2 / Calculation for Entry sheet / Actual dates

▲FIG 1 CALCULATING EASTER DAY WITH ANY CERTAINTY IS NOT EASY AS IT DEPENDS ON WHAT THE MOON IS DOING, BUT THIS WORKBOOK ATTEMPTS TO FIND OUT

- A Golden Number refers to the cycle of the moon over 19 years. The number which any given year occupies in the current cycle is called the Golden Number.
- The Epact is a number which represents the age of the moon on Jan 1 of any given year.
- The Number of Direction is the number of days that Easter Sunday falls later than March 21.

Easter is the first Sunday after the first full moon which happens on, or next after, March 21. If the full moon is on a Sunday, the Easter Day is the Sunday after. So, if we can calculate what the moon is going to be doing (or was doing) on the first day of any year, we can say when Easter will be.

Blind dates

Reader David Kelsey wrote to me with a quick solution to another reader's problem. David notes that if you want to stop Excel from displaying entries as dates you can insert a single quotation mark before the entry.

What this actually does is change the formatting. If you enter 10-15 (referring to an age group of 10- to 15-year-olds) in cell A1 with default formatting, it will display Oct-15. Confusingly, this does not mean Oct 15th but Oct 1st 2015 because Excel's default date format is MMM-YY.

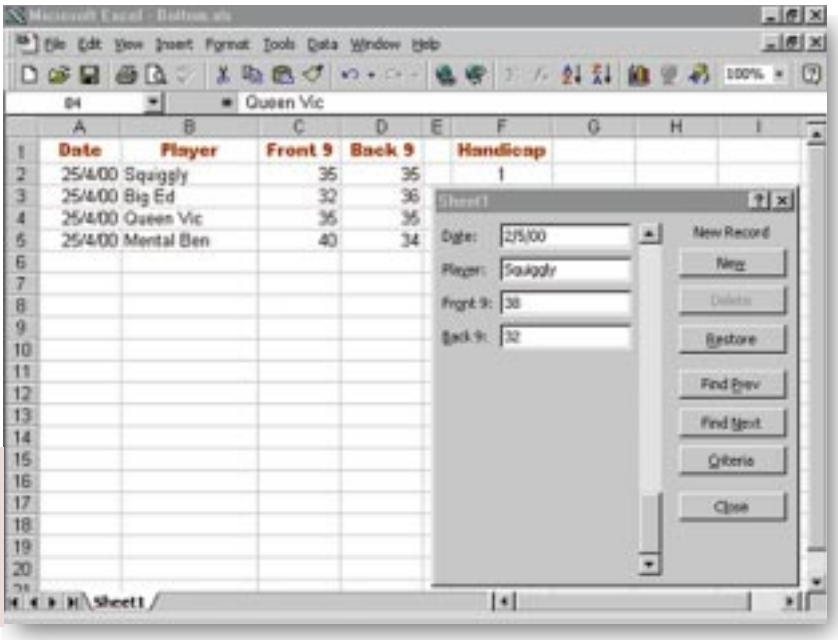
If you enter '10-15 Excel displays it as text but records the number 42278, which is the date number for 1/10/2015. Therefore, if you enter A1+1 into another cell the default General format will display this new value as 42279. But not to worry because you can always tell Excel what you really, really want by custom formatting.

A date with the Romans

A reader who works in the film industry emailed me, asking: 'In a list of credits, I need to show this year (1999) in Roman numerals. Some companies are using the form MIM but the Excel ROMAN function shows it as MCMXCIX. Which is the correct one?'

Actually, the Excel ROMAN function has five forms: ROMAN(1999,0) or ROMAN(1999) is the default and will display your current result. But you can change the 0 to 1, 2, 3 or 4 and get, respectively, the following equally correct results: MLMVLIV, MXMIX, MVMIV, MIM.

However, for next year, all five form numbers will display the year 2000 as MM.



▸FIG 3 A SIMPLE WAY TO JUMP TO THE BOTTOM OF AN EXCEL LIST AND ADD A RECORD IS TO USE THE DATA FORM

ADDED VALUE

Reader, Shane Devenshire has cleaned up an earlier recorded macro of mine. I had used the Tools, Macro, Record facility in Excel and had written about it in last December's column. The macro's purpose is to find the latest value at the foot of a column on one worksheet, and copy it into a specific cell on a second worksheet.

Shane has shortened my code and eliminated the movement of the cursor. His effort doesn't need the screen to redraw and the only thing displayed is the change of value in the required cell. Shane's new improved version is shown below:

```
Sub Balance()
    Sheets("July").Range("X1").End(xlDown).Copy
    Sheets("Victoria").Range("Y69").PasteSpecial Paste:=xlValues
End Sub
```

You're unlikely to want to go to the bottom of column X on the July sheet and enter the value in cell Y69 on the Victoria sheet but you can replace those four example entries to suit your needs.

Double date

Two of the most useful keys in Excel are the Control and Shift keys. I frequently use them myself to extend obvious options. For example, I often need to quickly enter today's date into two different Excel ranges.

Let's say I need to enter it into A1 to A30 and D31 to D60. I highlight A1:A30 then hold Ctrl while I highlight D31:D60; then press Ctrl+; (semicolon) to produce today's date. Finally, I press Ctrl+Enter to enter the date in all the selected cells. If you try this and A1 to A30 are blank when you start, and there is an entry in A31, you can quickly select A1 to A30 by pointing to the bottom of cell A1 then, holding Shift+Ctrl, double-click. Conversely, if there are already entries in A1:A30 which you wish to replace with the date, and cell A31 is blank, you can use this shortcut for highlighting the range.

Data Form dodge

When reader Philip Whiting says that he wants to jump to the first blank row immediately beneath an Excel list, I believe him. Particularly so when he is kind enough to send a macro which does the job [Fig 2].

However, if the objective is to add a record to the list, one of the fastest ways to do so is via Excel's Data Form [Fig 3]. Take a simple golf scorecard giving the date of the game, the names of the players and their scores, going out and coming back. An empty column can provide a break between the list and a handicap column which can be completed in blocks using cut and paste.

There is no need to define the database nor create range names. You can just click anywhere in the list and choose Data, Form. The displayed dialogue box, shown in Fig 3, will show the first record in the list. Just click New and enter a new result. Then press Enter. Excel will find the next blank row, enter the new record in it, and offer you a blank entry form to add another result. When you have finished making entries, press Close — it's simple.

[FIG 2]

Making the jump

```
Sub Freerow()
Selection.End(xlDown).Select
ActiveCell.Offset(1, 0).Range("A1").Select
End Sub
```

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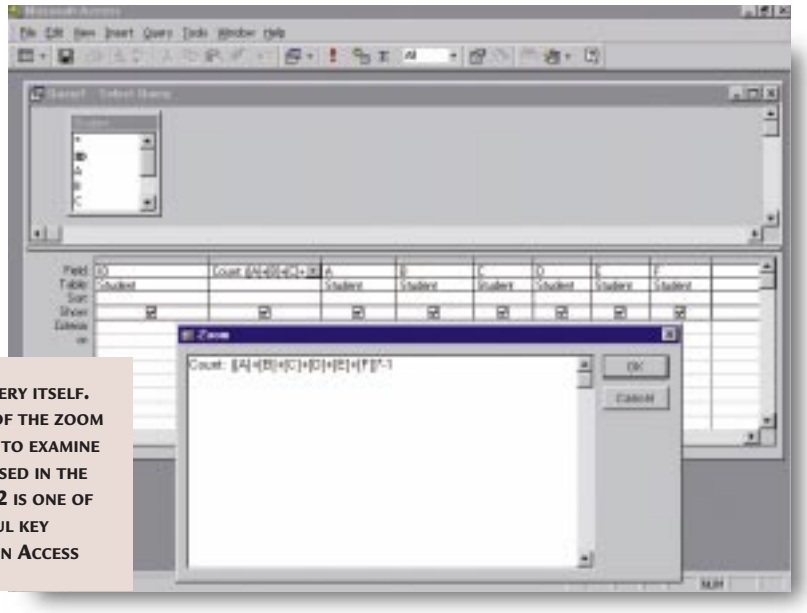
Off the shelf

Even small firms benefit from data warehousing. Mark Whitehorn explains.

Apologies — in the February column I wrote about data warehouses and promised more to follow. However, other database issues have distracted me in the interim. But no matter, here now is more on the subject of data warehouses. But first, I will quickly re-cap.

A data warehouse is an online, non-operational, de-normalised database (*That's a really intelligible definition, Whitehorn — Ed*). OK, these definitions may help:

- **Online** — users have immediate access to the database, as is normal for most databases.
- **Non-operational** — no-one is adding to, or altering the data in this database. Note the crucial difference in meaning between 'online' and 'operational'. People sometimes mix these two up and take 'online' to mean that the data can be altered by users.
- **De-normalised** — we typically normalise data in an operational database to ensure data integrity as users add and alter data. Since the data warehouse is non-operational you can optimise the structure for querying rather than update — but read on...



▶ FIG 1 THE QUERY ITSELF. NOTE THE USE OF THE ZOOM BOX (SHIFT F2) TO EXAMINE THE FORMULA USED IN THE QUERY. SHIFT F2 IS ONE OF THE MOST USEFUL KEY COMBINATIONS IN ACCESS

Users do not alter the data in a data warehouse. Instead, the data exists solely so that people can run queries against it. These queries are typically not seeking specific records within the data but are broad questions which are attempting to identify trends within it.

A data warehouse does not have to be a complex, expensive project

The data warehouse is a copy of the data in an operational database. Typically the information in a data warehouse is refreshed from the operational database at regular intervals of, say, once a week.

A data warehouse used to be the preserve of big companies, and data warehouse projects have become inextricably linked with complexity, expense and failure — there is an oft-quoted factoid that 70 percent of data warehouse projects fail. This may or may not be true, but the following scenario seems common.

Suppose a large company decides it needs a data warehouse. It has a huge volume of data, so the project is complex from the start. It requires big, expensive bits of hardware and software. The project is clearly going to be pricey so committees are put in place to set targets, monitor progress and ensure the success of the project. Sadly, this whole bureaucratic mechanism, designed to ensure success, can gum up the whole development in a morass of reports and meetings, stifling both innovation and progress. Eventually the project loses momentum and ends up dead in the water and the committees become nothing more than devices to reduce individual accountability.

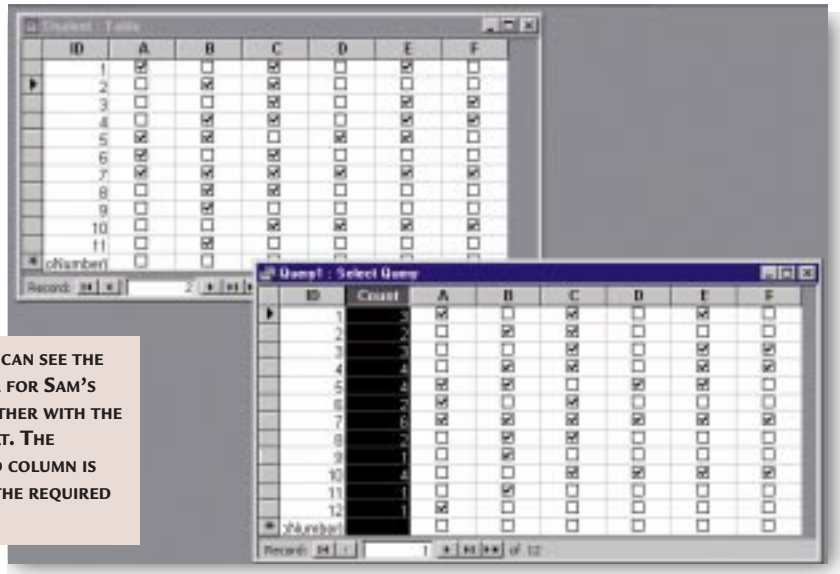
What has all this got to do with data warehouses and you? Well, hardware and software costs have plummeted. Small- to medium-sized companies have less data but in this competitive world no less a need to analyse trends. Creating an online, non-operational copy of your data on a separate machine is no longer expensive. If you simply do this and leave the structure exactly as it was in the operational database (i.e. normalised) you can, crucially, still separate the functions of updating the information from that of running large, complex queries against it. In other words, a data warehouse doesn't have to start out as a complex, expensive project. You can start simply. If it turns out to be useful and people begin to demand more functionality you can then look at the cost advantages of making the data warehouse more complex, which usually involves restructuring the data.

Even then, this restructuring doesn't have to be complex at first. For example, you have a database that stores details of all the orders that have been placed with your company over the past five years. The sort of queries that run against the data warehouse are rarely specific. For instance, 'Show me exactly what Fred Smith ordered on the 23/11/1995'. Instead, they often deal with summarised information such as 'How has the value of the average order varied with time?'

Suppose that your data warehouse is refreshed each weekend from the operational data. Once the copy has been made, you could run a series of

queries in the data warehouse which generate summaries of the information therein, and write the results to new tables within the data warehouse. Your users can then run queries against these summary tables, getting their answers more rapidly. Of course, deciding exactly what summary tables will be the most useful requires both skill and consultation with your users. However, this can be an iterative process while the data warehouse is already proving useful.

Clearly there is more to data warehousing than this and whole books have been written on the subject but this brings us very neatly to...



▶ FIG 2 YOU CAN SEE THE SAMPLE DATA FOR SAM'S TABLE, TOGETHER WITH THE QUERY RESULT. THE HIGHLIGHTED COLUMN IS DISPLAYING THE REQUIRED TOTAL

■ ...Counting the 'yes' men

Reader Sam Browne wants to know how to count the number of 'Yes' responses given by students.

Each response from the student is stored as one row in a table. Sam goes on to point out: 'There are six yes/no fields in the main student table, which represent six different selection criteria — let's call them A, B, C, D, E, F — and each record can have any combination. I want to include a simple calculation in a query which totals the number of criteria for each record.'

The following lines of SQL should do the trick:

```
SELECT Student.ID, ([A]+[B]↙
+[C]+[D]+[E]+[F])*-1 AS↙
 Count, Student.A, Student.↙
B, Student.C, Student.D,↙
 Student.E, Student.F
FROM Student;
```

(↙ Code string continues)

This essentially gives the instruction to total the values in A, B, C, D, E and F, then multiply the result by minus one and put the answer into a column called Count. Then show me the original columns, as well. See Figs 1&2.

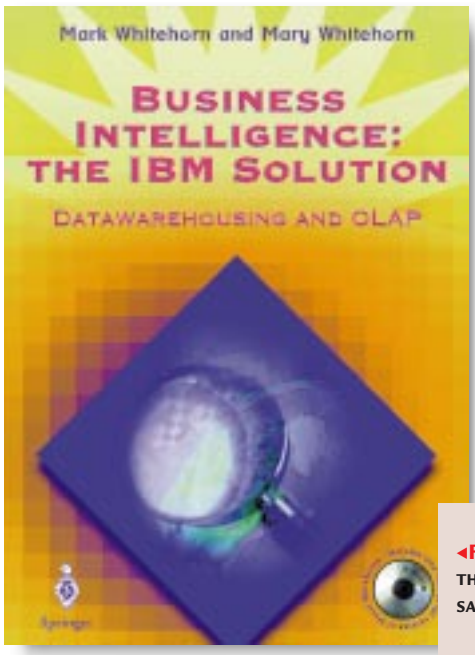
It relies on the fact that Access stores a 'Yes' as the value minus one, and a 'No' as a zero. Thus the query simply adds up the numbers and finally multiplies by minus one to make the count positive.

• *The sample database is on this month's cover-mounted CD-ROM.*

■ Books

For the past year, *Personal Computer World* has been kind enough to offer a special deal on the book which Bill Marklyn — the original development manager of Access — and I wrote about the relational model. This book is published by Springer and we were delighted to discover that it had become their best selling book in the UK during 1998.

Bill and I are currently working on two other books: one about using Access and the other about those areas of databases which fall outside the relational model, yet still need to be explained. Essentially this is a sequel (or, indeed, a SQL?) to the previous book *Inside Relational Databases* and will probably be called *Outside Relational Databases*. A tentative selection of topics includes data warehousing, OLAP, OLTP, client server, three-tier databases, row-level locking versus page locking, transaction control... and so the list goes on.



◀ FIG 3 MORE ON THIS SUBJECT BY THE SAME AUTHOR

And that is where you can help. We would be grateful for suggestions about topic areas which the readers of *PCW* would like to see covered. If you have any ideas, please email them to the usual address with the subject heading 'Book Suggestions'. Springer has offered five copies of the relational database book which will go to the five most useful/exhaustive/sensible suggestions — and the judges' decision is final!

In my spare time I am working on two more books with the other M.Whitehorn (my wife, Mary). One book is on upsizing from Access to SQL Server and driving SQL Server generally, while the other is about SQL Server for OLAP. In case this makes us sound Microsoft biased, we have also previously published two books on IBM's database and data warehousing products, one of which is shown here [Fig 3].

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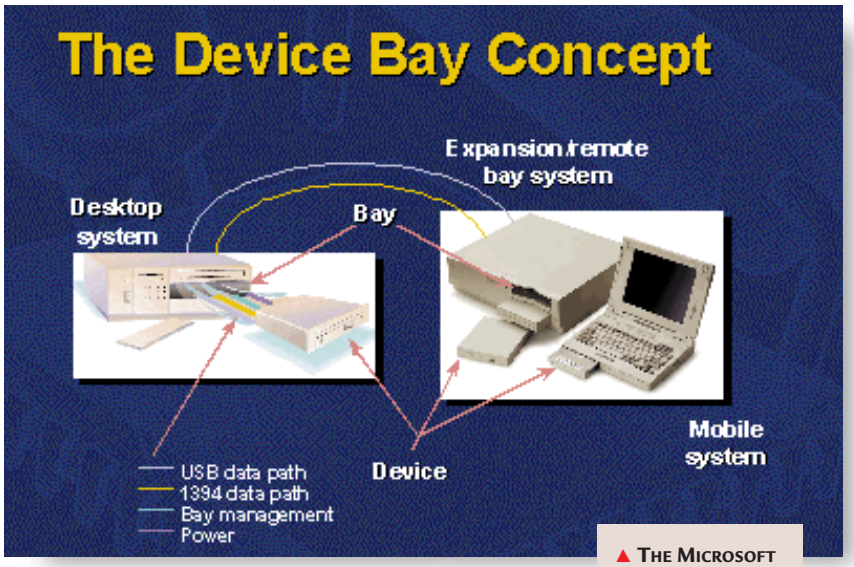
Device Bay-watch

Will Device Bay make child's play of connecting up your peripherals? Roger Gann dips his toe into the water.



▲ THE MICROSOFT HARDWARE DEVELOPERS WEB SITE <WWW.MICROSOFT.COM/HWDEV> HAS COPIOUS AMOUNTS OF INFORMATION

I've touched on Device Bay in a previous column and my exposure to USB and IEEE 1394 in the March issue reminded me to revisit the topic and find out what's been happening since.

To recap, Device Bay is a new hardware form factor/interface that involves both USB and 1394. Developed jointly by Compaq, Intel and Microsoft, it's similar in concept to PC Cards and will bring to the desktop the simplicity which mobile users have enjoyed with attaching peripherals to their notebooks.

At its most basic a Device Bay consists of a connector slot in one of three standard form factors, including two small enough for notebook computers. The back of each slot will contain connectors for both USB and IEEE 1394 — a Device Bay peripheral can use either bus to provide hot-swappable operation.

In essence, with Device Bay, you never again need to take the lid off a PC; to install a new peripheral you simply slide it in to an empty Device Bay. If it were a low-speed device, it would use the USB bus. If it were a high-speed device, it would use the 1394 bus. Plug-and-Play would then take care of the driver installation. Typical uses of Device Bay are for additional hard drives, DVD-ROM drives, backup and removable media devices, and so on.

These changes should bring expandability to the outside of the case: future PCs will let you add almost any new capability without opening the case; no unscrewing, restarting or rebooting need occur. And 'hot swappability' means you will be able to simply plug these devices into their slots and they will work without rebooting.

There are three sizes of Device Bay: DB13, DB20, and DB32. They are 13 x 130 x 141.5mm, 20 x 130 x 141.5mm and 32 x 146 x 78mm respectively. The largest, DB32, is for desktops. DB20 was designed both for laptops and desktops. DB20 bays can be located at the back of desktop computers for devices that require cables, such as modems and network cards. And, DB13 is designed for laptops and can be used in desktop PCs as well.

Although initially developed for the consumer market, corporate users are also attracted to Device Bay. It allows a computer with a failed hard disk to be functional in minutes rather than hours, though IT managers may view with alarm the ease with which a PC on their network can be totally reconfigured.

Systems which previously required a CD-ROM drive for software installation now require only an empty Device Bay slot. When the drive is needed, it can be quickly inserted, used and removed again. The reduced cost for service and upgrade of PCs will significantly decrease the total cost of ownership and improve the ownership 'experience' for all customers. All peripherals in use today can be designed to utilise one of these interfaces, with three exceptions: because of bus bandwidth limitations, memory, CPUs and video cards must still be attached to the motherboard. Device Bay will be supported by Intel chipsets and future versions of Windows 2000.

◄THE MAIN DEVICE BAY WEB SITE AT WWW.DEVICE-BAY.ORG CONTAINS MUCH USEFUL INFORMATION. UNFORTUNATELY, MOST OF IT SEEMS DESTINED TO REMAIN JUST 'SLIDEWARE'

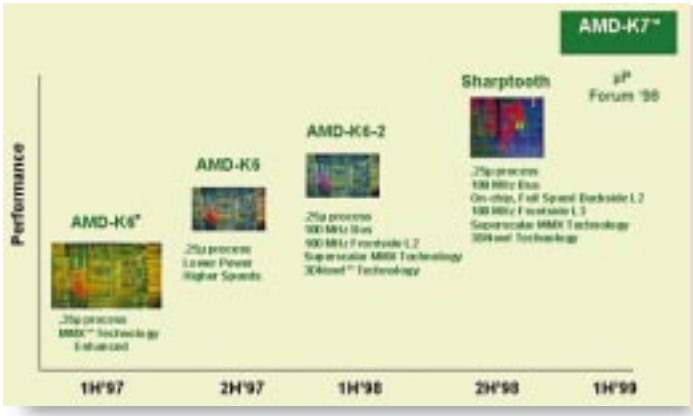
The specification includes some nifty features like software-controlled physical interlock which can prevent sudden removal of a device at a bad time. Its architecture also supports the inclusion of a software agent which can manage the system resources as they are allocated to devices. All in all, Device Bay offers many advantages to the corporate and consumer end-user. Even manufacturers benefit — think how easy it will be to put a built-to-order PC together using Device Bay. It also allows newer technologies to be incorporated more rapidly, reducing design lead-times in the process.

Device Bay is eyed with scepticism by notebook manufacturers. Standardisation is a concept with which desktop PC makers are comfortable, but notebook makers are not. They are far more interested in trying to dissipate heat from their products and reduce their weight.

Peripheral manufacturers are equally wary. The standard calls on manufacturers of optical and magnetic drives, as well as makers of audio and communications peripherals, to redesign their products at considerable cost in order to use a USB or 1394 connector interface.

At the moment, remaining price-competitive is more of a consideration than a new form factor. Last year, drive makers complained that adhering to the Device Bay specification would involve redesigning/ruggedising their drives to lessen additional vibration and operating shock. And adding a 1394 interface is something drive makers are reluctant to do now that Ultra DMA/66, a lower-cost ATA alternative, is available. At the moment, the 66Mbps throughput offered by that standard will suffice for a couple of years. Only after that will 1394 begin to appeal to hard disk makers.

Another thing holding back Device Bay is the question mark hovering over 1394-B. This is a compelling variation of the 1394 interface that will potentially offer throughputs of 800Mbps and 1.6Gbps. Sadly 1394-B, has yet to be standardised, let alone developed into a product. In the meantime, Adaptec, one of the few manufacturers making 1394 interface cards, seems to be losing interest in 1394, so don't hold your breath.



◄ **Some say that the AMD Roadmap is really going places, while Intel appears to be going nowhere in 1999**

It may rival sliced bread but like so many 'great ideas' in the world of PCs Device Bay has been a long time coming and today it seems no closer to fruition. Its projected 1998 debut has come and gone. The omens for the putative standard are none too good, either. An earlier attempt to provide a standardised interface for removable storage peripherals, Exabyte's Eagle Nest (based on IDE), was not launched over here and was dropped last year in the US despite a promising start. Available in both internal and external versions, the $100 Eagle Nest host bay allowed hot-swapping of 'nest-ready' drives including Zip, Travan tape, LS-120 and hard drives. It nevertheless died a death.

Slot 1 RIP?

The launch of the Pentium III confirmed Intel's adherence to the Slot 1 architecture but it is gradually becoming apparent that this divergence from the 'traditional' CPU architecture may eventually turn out to be a dead-end and no more than a temporary aberration.

With Device Bay, you never again need to take the lid off a PC

Strange as it may seem, there's a strong likelihood that Intel will return to using the Pin Grid Array (PGA) form factor that the vast majority of CPU makers employ. While Intel's mainstream processors continue to use Slot 1 the 'three dwarves', as Intel's CPU rivals are quaintly termed, continue to use the classic Pentium Socket 7 ZIF Socket for their processors. Despite Intel's direst predictions, this has not unduly hindered processor speeds and the fastest CPUs compete directly with Intel's finest silicon: Super 7 motherboards run the popular AMD K6-2 3DNow! at 400MHz with a Front Side Bus running at exactly the same speed (100MHz) as the latest Pentium II and Pentium III motherboards. Slot 1 is still a relatively expensive solution however, and in a bid to compete with AMD and Cyrix on price, Intel recently performed a U-turn in processor architecture and reverted to a low-cost socket technology, Socket 370, for its latest Celeron releases.

There is speculation in the US press that Intel may eventually abandon Slot 1 when it shifts to an 0.18µm process later this year with the release of the 600 or 667MHz Pentium III — it could never release a processor with the mark of the beast, 666MHz, etched on it!

The advanced process will make it easier to incorporate the L2 cache on-chip, something that AMD has adopted with its release of the K6-III. Intel has previously cited the prohibitive cost of putting the L2 cache on-chip as the reason for switching from the Pentium Pro/Socket 8, to the Pentium II/Slot 1, which has the L2 cache off-chip. Apparently, incorporating the high-speed cache on the same die as the CPU was a little too hit and miss back then. Sometimes the cache would work and the CPU not, or vice versa, meaning that this particular chip, although '50 percent OK', was still destined for the bin. Placing the chip on a daughtercard, although imposing a performance penalty, avoided costly production errors such as these. However, the adoption of the 0.18µm process may see Intel turning full circle and using the Socket 370 architecture or something similar for all future processors.

AMD bounces back

Intel seems to have had more than its share of the spotlight in recent months, what with the launch of the Pentium III

processor formerly known as Katmai. Its arch rival, AMD, seems to be at long last getting its act together and the latest version of the K6 and the upcoming K7 look likely to give Intel a hard time over the next year or so.

First in the queue is the high-end complement to the successful K6-2 CPU — the K6-III (a.k.a. Sharptooth). The K6-III will be similar to the K6-2 but with 256Kb of L2 cache integrated into the chip itself running at the same speed as the processor, *à la* Pentium Pro and Celeron/Mendocino. This should significantly accelerate systems built around the K6-III, since slow (i.e. 66-100MHz) cache speeds have always been the bane of Socket 7 architecture chips.

For the first time it will allow AMD's K6-III to compete head to head with Intel Pentium II processors. Most users will find that the 400MHz K6-III will have the edge on 450MHz Pentium II. Don't forget that the majority of Super 7 motherboards will also have L2 cache on the motherboard. With the K6-III, this SRAM isn't ignored but is employed as a kind of 'Level 3' cache!

Games written to the 3DNow! standard will give the K6-III the edge over the PII by a small margin. However, games that don't support 3DNow! instructions will lag due to the weaker K6 floating point unit. The Pentium III's gaming potential has yet to be evaluated but with its enhanced 'Streaming SIMD Extensions' (a kind of MMX Mk II) this looks to be the dog's danglies. Even so, don't expect a mass migration of games to the new standard. The enormous installed base of K6-2 users will dwarf the small number of Pentium III early adopters. And, because it is Intel's premier processor, it will be priced at a premium.

The K6-III will initially be made on a 0.25µm process (with a die-size of 135mm^2), and will be shifted to a 0.18µm process some time in the second or third quarter of this year. It will then run at 500MHz, still using a Super 7 motherboard running a 100MHz FSB and eventually going to 600MHz at the turn of the century. Socket7 platforms will thus be faster or at least as quickly as the fastest Slot 1 platforms, for the first time in history. As upgrade paths go, the humble Super 7 motherboard looks likely to be a good bet. So, if you are planning to upgrade your system with a K6-III and your motherboard currently supports AMD K6-2 processors, you can use a K6-III processor straight away.

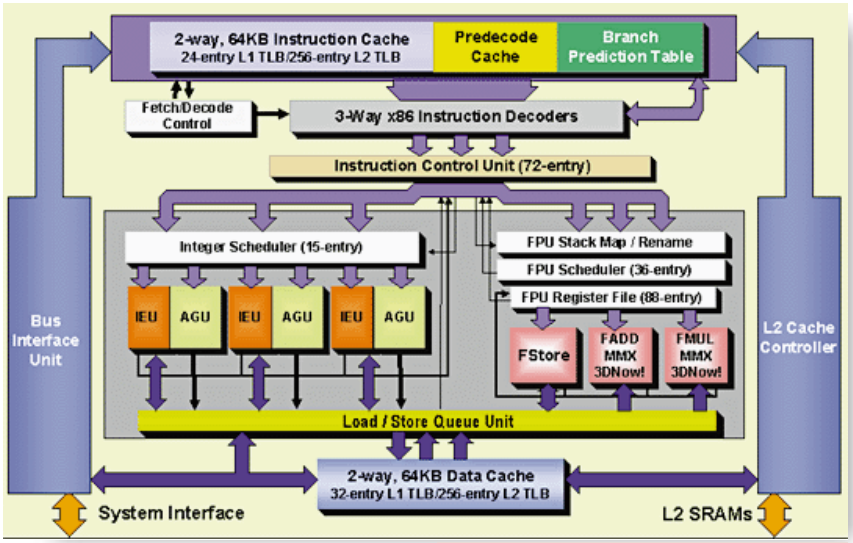
• *We take a look at the K6-III 450MHz in our Reviews section, starting on page 76.*

Then there's the K7, which AMD formally announced at the Microprocessor Forum 98. From what's been said so far, it seems clear that the K7 will almost certainly compete head to head with the Pentium III. Although this CPU will physically fit a Slot 1 connector it won't be electrically compatible with it because AMD is shunning Intel's P6 GTL+ bus protocol in favour of Digital's Alpha bus protocol, EV-6. As a result, it has designated its version of Slot 1 as 'Slot A'.

The upcoming K7 looks likely to give Intel a hard time over the next year or so

EV-6 can run at 200MHz and higher, twice that of Slot 1/GTL+. As a result the K7 will be the first CPU to take advantage of high (1.6Gbps) bandwidth memory architectures such as Direct Rambus. To put it another way, Pentium III cannot make full use of the bandwidth offered by Direct RDRAM.

Due to its high clock speed, K7 will have 128Kb of Level 1 cache (64Kb data and 64Kb instruction cache). And it will come with a backside L2 cache. Initial versions will feature 512Kb but AMD is also planning K7 versions with no less than 2Mb up to 8Mb, using an additional external tag RAM as Intel does in the case of P6 CPUs. The L2-cache speed will range from one third to full CPU speed and it is planned to use normal as well as double data rate (DDR) SRAMs for this L2 cache. It will initially run at 500MHz but, like the Alpha, there's plenty of scope for higher clock speeds further down the road.



▲ IF THE ANALYSTS ARE TO BE BELIEVED, THE PENTIUM III WILL TAKE A PASTING WHEN THE K7 SHIPS LATER THIS YEAR. ITS CACHE AND FP PERFORMANCE WILL BE GREATLY IMPROVED

There's even better news on the floating point front. So far, AMD processors have been plagued by relatively poor floating point performance. But no longer. The K7 will feature a trio of out-of-order, fully parallel FPU pipelines. As a result, the K7 will for the first time offer much better FP performance than Intel's finest.

Finally, AMD has stated that the K7 will feature chipsets which support Symmetric Multi-Processing (SMP). The K7 will thus be the first non-Intel x86 chip to be able to use more than one processor in a system. This will be significant in the workstation and server market, especially if the K7 can deliver the performance AMD is promising.

For once it seems like the CPU boot is on the other silicon foot for a change. This year has the makings of a bad 1999 for Intel.

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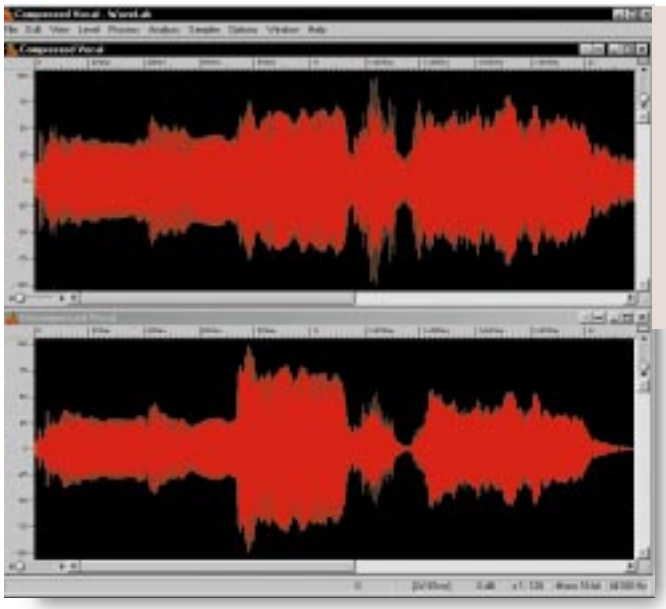
Create a good compression

Steven Helstrip explains the creative force of the useful compressor tool for smoother tracks.



◀FIG 1 THE WAVEFORM DISPLAYED IN THE LOWER HALF OF THE SCREEN SHOWS THE NATURAL DYNAMIC RANGE OF A VOCAL RECORDING. IN THE UPPER HALF OF THE SCREEN, THE VOCAL HAS BEEN COMPRESSED

Over the past two months we've discussed ways of using EQ to improve the clarity of your mixes. Hopefully by now you've had a chance to try out some of the examples (not to mention those free plug-ins) and are ready to tackle what is probably the second most useful audio processing tool, the compressor.

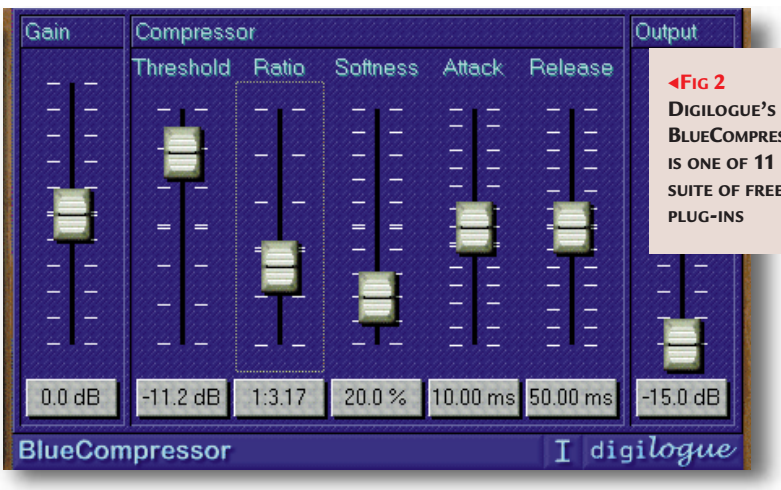
So what do compressors do? In simple terms, when audio is compressed all the loud sections are attenuated, or reduced in level, while the quieter sections are raised in volume. So really, a compressor is like an automatic volume control that keeps an eye on the input gain of a signal and makes the necessary adjustments to output sound on a more even, or constant, level. Fig1 illustrates the effects of compression on a vocal recording. The settings used are quite extreme, but illustrate what goes on.

Compressors are insert-type signal processors. As such, they can be used on individual instruments in a mix, or across the main mix output to smooth out an entire track. Once audio has been compressed it has less dynamic range, which enables you to raise its overall level. In fact, gain make-up controls can be found on the majority of compressor units and plug-ins.

Compressors are not only used to control the overall dynamics of a track, though. They have many creative uses in the studio, virtual or otherwise, and enable you, say, to extend the natural decay of instruments and add punch, or greater impact, to percussive sounds. In a similar way to EQ, if you have a basic grasp of using compression you can greatly improve how your music sounds.

A compressor is like an automatic volume control

Now that we know what they are, let's take a look at how they work. Compressors come into effect when the input signal rises above a set threshold. The amount of compression applied — also called gain reduction — is determined by the ratio setting. With a ratio of 1:1, the sound will remain unchanged because for every 1dB of input level that rises above the threshold, 1dB of level will pass through to the output stage. A setting of 6:1, however, means that for every 6dB of sound which rises above the threshold, the output will only increase by 1dB so the higher the ratio, the stronger the effect.



◀FIG 2 DIGILOGUE'S BLUECOMPRESSOR IS ONE OF 11 IN A SUITE OF FREE PLUG-INS

Attack and release are two more controls which greatly affect how compressors work. Attack determines how quickly the compressor comes into effect once the threshold has been passed. With a setting of, say, 1-3ms the compressor will kick into action almost immediately. When audio is attenuated this quickly it comes across with more punch and sounds crisper. With a setting of around 400ms the effects of compression are more subtle. The release control sets how long it takes for the output to return to its normal level once the input signal has fallen below the threshold.

Depending on the instruments and the type of music with which you are working, compressors can have many different effects. Moreover, each control interacts differently with the others depending on how they are set. Confusing, or what?

E-MU MODULE MANIA SOUNDFONT CDS

E-mu has released five of its professional synthesiser modules in SoundFont format. The collection includes the Planet Phat, Vintage Keys and all three Proteus expanders. Each synth has featured on countless top ten hits over the years and can now be yours for just £25 apiece, or £80 for the lot. Here's a quick run down of what's what.

Proteus I is best suited to pop music and includes a classic selection of pianos, strings, organs, brass and percussion. To give you some idea of their quality, there is 30Mb of instrument samples comprising just 128 presets. In contrast, most PC sound cards have just 2Mb of instruments stored in ROM. **Proteus II** has over 40Mb of orchestral sounds, covering everything from solo flutes and oboes, to marcato and tremolo string sections.

Proteus III is dedicated to world instruments and contains a slightly more obscure set of sounds. Examples of what's in store include gamelan, Irish harps and Asian gongs.

Planet Phat was designed for hip-hop and R&B, providing a wealth of cutting-edge bass, drum and guitar samples.

Vintage Keys is perfect for dance and includes over 220 analogue synths.

☛ **Contact E-Mu** on 0131 6536556 or at www.emu.com. For a wide selection of free SoundFonts go to www.sblive.com.

Hot utilities on our cover CD

Two new utilities have become indispensable to my work so I feel duty bound to tell you about them.

The first is a replacement CD-ROM device driver for Windows 95/98 which enables audio tracks (CD-DA) to be viewed as wave files from the Explorer. For example it enables you to load CD audio tracks straight into Sound Forge or WaveLab for editing, replacing the need for a dedicated audio ripper. The driver should work with any CD drive supported by Windows — I can't vouch for this although I have tested it with three CD drives with great success. The driver (CDFS.VXD) can be found in the handson\software\sound folder on this month's cover CD. To install it, copy it into your Windows\System\IOSubSys directory and reboot. You may want to backup your original CDFS.VXD first, to be on the safe side.

The second utility is Virtual Audio Cable, or VAC for short. This is a driver that enables audio to be routed from one application to another in much the same way that Hubi's LoopBack Device allows you to interconnect MIDI programs. So, for example, you can record the output of a software synth straight into your sequencer or record the output of an effects processor to your sound editor. The driver is multi-client so any number of applications can simultaneously access your sound card. VAC can also be found on this month's cover-mounted CD. Have fun.

▲ **Fig 3** SYNCHROMESH'S KWIKKOMP 3 IS A DODDLE TO USE AND PACKS QUITE A PUNCH

Setting up

There are no right or wrong ways to dial-in your own settings. Neither are there any rules when it comes to deciding what gets compressed and by how much. If the track in question sounds good and cuts through with compression, then you must have set it up right — that's all there is to it.

As a rough guideline, I tend to get started by setting the ratio to around 4:1. Next, I loop a fairly quiet section of the track and lower the threshold until there is just a touch of gain reduction — most compressors have a meter to show reduction levels. Then I adjust the attack time, listening carefully to the effect on the audio. When the compressor is doing its job quickly enough without being too obtrusive, I tweak the release until there's a natural, even-sounding decay.

It is important to A/B the results with the original mix by occasionally by-passing the effect. And by all means, if you find that compression does not help to bring out the best in your music, then don't use it.

☛ **Tip:** Set your compressor before reaching for EQ as compression changes the tonal characteristics of a sound. With any luck, you may not need to use EQ at all.

If you don't have a compressor installed on your PC, there are two free plug-ins available on the internet for VST and DirectX-compatible applications: BlueCompressor [Fig 2] and KwikKomp 3 [Fig 3]. These can be downloaded via the Cubase web ring. Go to www.webring.org/cgi-bin/webring and just type Cubase.

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Ghostly image

Ken McMahon discovers a no-cost way of PostScript printing.

Given the choice between a PostScript and a non-PostScript printer, which would you choose?... OK, everyone who chose the latter see me later. PostScript has many advantages over Windows printers which print a bitmap image, making use of the same Windows GDI that produces the image you see on-screen.

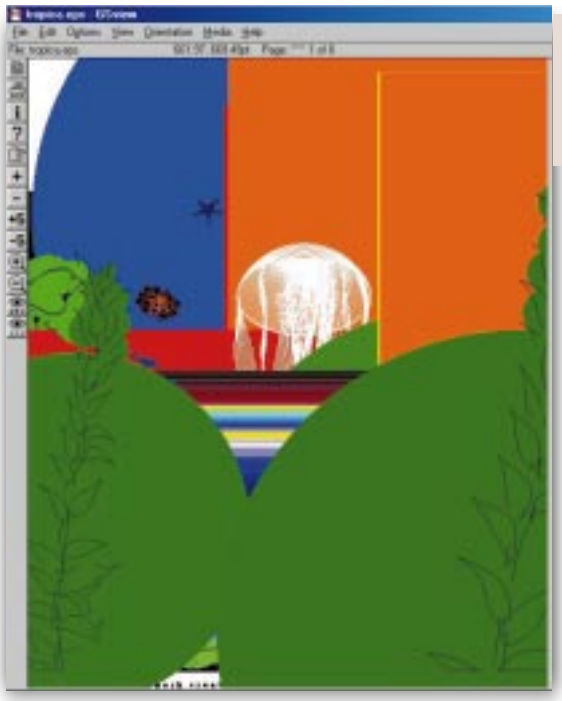
PostScript describes images as mathematical vectors and fills which are not rasterised (converted to dots) until you print them. They are therefore resolution independent — you get the best quality image your printer is capable of delivering.

To print PostScript files you need a PostScript interpreter, often called a raster image processor (rip). Ripping is processor-intensive work and so rips have tended to reside in expensive hardware, either in mono and colour laser printers or as part of a standalone print server in output bureaux. This and the additional cost of licencing PostScript from Adobe has put PostScript printing beyond the reach of many — until now, that is.

The increased power of desktop systems now makes it possible to implement PostScript rips in software and these are available for PCs and Macs. Combine a software PostScript rip with an inexpensive colour inkjet printer and you have a colour proofing system that is a match for professional systems at a fraction of the cost.

If you want a no-cost introduction to PostScript printing via a software rip a good place to start is www.cs.wise.edu/~ghost/aladdin/get550.htm where you will find Aladdin GhostScript 5.5. The developers point out that GhostScript is not shareware but you can download it and use it on a personal licence at no cost. You'll need to download two zip files: GhostScript itself and a previewer called GS view which also acts as an installer. I installed the product without problems. It took around 10Mb of disk space and ran first time without a hitch.

GhostScript differs from most software rips in that it has been developed independently of Adobe, which invented and developed PostScript into its present-day industry standard format. Consequently GhostScript suffers from the kind of occasional glitches you'd expect from a non-standard implementation.



◀FIG 1 GHOSTSCRIPT EXPERIENCES PROBLEMS WITH COMPLICATED POSTSCRIPT

I tried it out by choosing a selection of Illustrator files and printing them via GhostScript as well as in the usual fashion, from Illustrator 8 using the Epson driver. To view and print the files in GSview it's first necessary to save them in eps format although GSView will open and display PostScript files which have been printed to disk, as well as pdf files. For the most part the Illustrator eps files opened and previewed perfectly and for freeware using a non-Adobe interpreter I reckoned this was good progress. Having selected print from the file menu you need to select a GhostScript printer driver (a couple of Epson versions were provided) and then direct the output to the relevant printer queue.

A few seconds later and you can imagine my delight when line after line of textual garbage spewed forth from the Stylus Photo 700 [Fig 1]. Revisiting the print dialogue and swapping to the mswinpr2 driver, as suggested in the help file, did the trick [Fig 2].

I printed a number of Illustrator files and GhostScript handled nearly all of them without complaint. However, I had hoped to see evidence of superior output, particularly with complicated blends,

▶FIG 2 HOW THE PICTURE SHOULD LOOK, BUT PRINTING IT IS ANOTHER ISSUE

Questions & answers

Q Windows 98 is meant to have colour management built in but the pre-built profiles do not match my system (Gateway G6-450 with an Epson Stylus 600 and Plustek scanner). The only profiles appear to be for my printer using specific paper types. There are profiles for some monitors but not the Gateway. Is there a way to create new profiles or modify the existing ones? And what's the best place for profiles on the web?

KISH WOOLMORE

***A** One of the biggest problems with colour management is finding profiles for output devices. You can create your own using Agfa's Colortune software. You'll find details at www.agfahome.com. Colortune creates a profile of your scanner by comparing a scan you make of the supplied IT8 colour target with a reference file. In a way this is better than using a profile supplied by the manufacturer which, while it gives a close approximation of the characteristics of your scanner model, won't account for any of it's individual idiosyncrasies. In the absence of a profile for the monitor try Windows 98's sRGB colourspace profile. If this doesn't give good results there are other generic monitor profiles you could try. My version of Windows 98 includes profiles for a number of Epson printers including the Stylus Photo 700, but not the Stylus Color 600. You can find this and profiles for other printers at www.corel.com/support/ftpsite/pub/coreldraw/colorprofiles/. For more colour profiles go to www.pantone.com/support/printerlist.asp. It's important you choose the correct profile for the printer/paper combination you are using. A profile for plain paper will not do the job if you are using photo-quality inkjet paper.*

graduated fills and text. But aside from more saturated — not necessarily more accurate — colours, much better quality photographic images and a rather annoying tendency to resize the image to fill the page, there was little to choose between the two methods.

GhostScript managed to open Illustrator 8 files with some wickedly complicated gradient mesh blends but was seriously disorientated by one image which contained a number of quite complicated blends and graduated fills, though to be fair this file also gave my HP Laserjet 5000 PostScript mono laser rather bad indigestion.

I refuse to give up at this early stage as the prospect of cheap PostScript proofing is just too irresistible. I'm saving GhostScript as an emergency backup for those problem files where, for no apparent reason, pieces of text just disappear and the contents of clipping paths spill outside their boundaries.

For those who are short on utilities for handling PostScript files, GsView has a lot to offer. If you've ever been given an eps without a preview, all you get to look at when you place it is a grey bounding box and of course you won't be able to print it. Gsview provides an instant solution with its 'Add eps' preview command. You can convert single page PostScript files to eps, and even create pdfs from a PostScript file and vice versa [Fig 3].

◀FIG 3 PLENTY OF OPTIONS INCLUDING MULTIPAGE POSTSCRIPT AND ACROBAT PDF DOCUMENTS

The lack of colour management makes GhostScript a non-starter for serious colour proofing work so if that's your aim I'm afraid your going to have to spend some money. There are a couple of options here: Epson's StylusRIP 3.2 is an obvious choice for anyone who already owns an Epson inkjet, and the Birmy PowerRIP 5.1 is configured for Epson and Canon inkjets and has the advantage of support for PostScript Level 3 features.

PowerRIP provides custom colour calibration controls including a number of presets for Epson paper types. StylusRIP relies on you having already calibrated your system using ICC colour profiles, so you'd need to find profiles for your printer/paper.

My initial foray into low-cost PostScript colour printing has not been the success I had hoped for. Lack of colour calibration together with the uninspiring quality of output places GhostScript out of the picture, though if you're short on applications and utilities for handling PostScript and pdf files it's worth having around. My next step will be to check out Epson's StylusRIP 3.2. At £129, if it can better GhostScript it will be worth the money. Watch this space.

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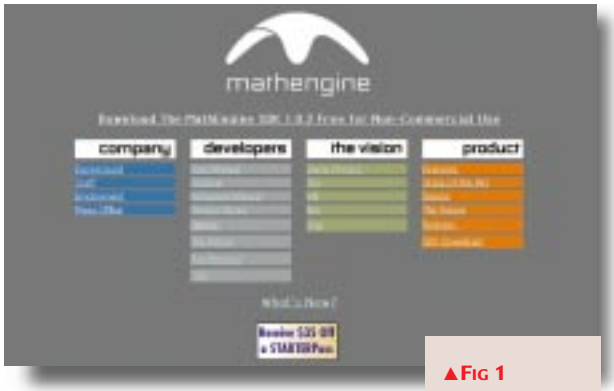
Rules of the game

A games SDK which can simulate physical dynamics? Benjamin Wooley reports.

A tiny, British-based technology company called Mathengine has announced a new piece of software developer's kit (SDK). The product, an SDK for 3D games and simulations, seems to offer something genuinely interesting which demonstrates a great deal of awareness of the force of gravity, as well as all the other physical forces which make the real world behave as it does.

As previously noted in this column, software for creating 3D scenes or virtual worlds has, until recently, been unable to take into account the most basic laws of physics. Create an animation of a rubber ball dropping onto a solid floor, for instance, and the ball is liable to fall straight through and sink into infinity. The animation software simply does not know about the physical properties the ball and floor are supposed to posess and cannot take them into account when generating the animation.

Most mainstream packages such as Ray Dream Studio, Truespace, 3D Studio MAX and Lightwave 3D now include some form of physics in their feature set. In Ray Dream, for example, one object can be given a friction setting to control its resistance to sliding over another. However, introducing physical reality to the virtual world presents two problems: one is that the results can be unpredictable — indeed, the more realistic, the less predictable — the other is that the amount of processing power needed to calculate the physical processes involved adds greatly to the rendering times.



▲ Fig 1 Mathengine's SDK is less than a 2Mb download

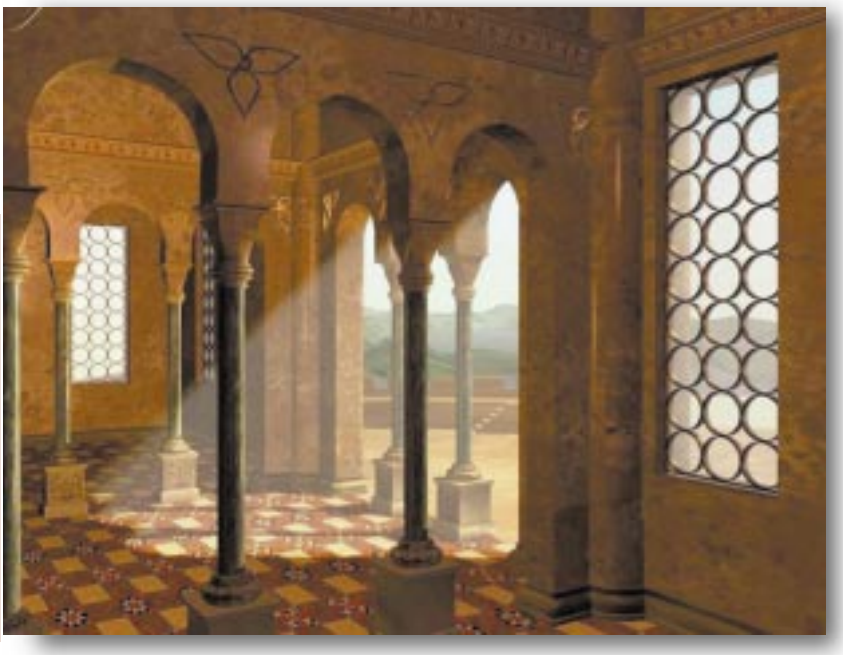
Mathengine's founders claim to have solved the latter problem. They have created a set of routines which allow quite complex physical dynamics to be simulated. Nothing special there, except that these routines are supposed to be so efficient they can calculate the dynamics for several interacting objects in real time.

Of course, you already get real-time physical dynamics in games but these are often crude and limited to a particular aspect of the game, say the collision of cars in a racing game. But after all, games programmers are not physicists.

Indeed, it is the games market that Mathengine is primarily targeting for the time being, offering its SDK to developers so they can integrate dynamics directly with the game code.

The company claims that a games programmer should be able to integrate Mathengine's 'physical framework' into a game within a few hours, complete with all the forces and interactions it specifies.

Those who are not developing games can test these claims by downloading the SDK (less than 2Mb) from the company's website at www.mathengine.com [Fig 1]. There is a selection of precompiled demo files. For example, you can play a sort of planetary billiards with a set of coloured balls scattered around black space which run using a basic DirectX/OpenGL renderer included in the package. The source code for the examples is supplied, so those who fancy dabbling in a bit of C programming can try to tweak them, but you will need a C compiler to do it. There is an extensive manual, together with programming tips and examples, and even a Workspace

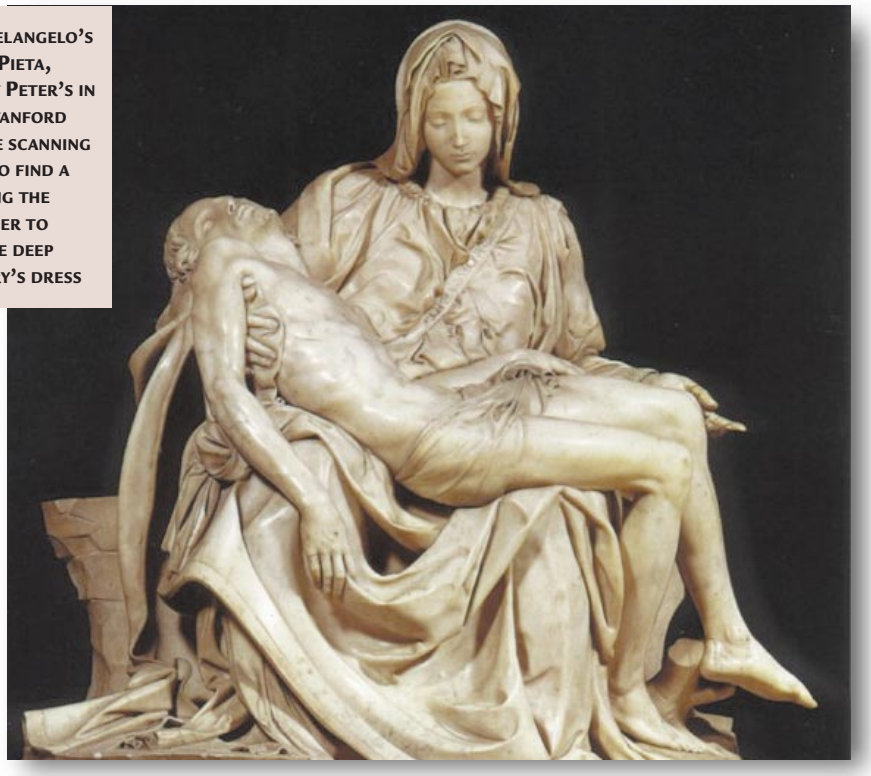


► Fig 2 A scene created by Luiz Barth using 3D Studio MAX which can be seen hanging in the www.maxhelp.com gallery. It was inspired by a Van Eyck painting (Luiz does not specify which). Photoshop was used to tweak the textures

file for users of Visual C++. You can also read a rather technical 'Physics Primer' which explains the principles of 'Rigid Body Simulation'.

The examples are quite impressive. They ran smoothly on my 300MHz Pentium II system with 64Mb and a Matrox Millenium II graphics adaptor, which is a minimal specification by today's standards. However, the graphics used in the examples are very simple and I spotted only one textured surface.

The company states that it has used simple graphics so as not to distract from the dynamics but it remains to be seen whether standard Pentium II systems will be able to cope with calculating all those interactions when the scene is as geometrically complex and highly textured as the sort you find in a game such as Tomb Raider. Also, there are a number of important features yet to be implemented, including collision detection and fluid dynamics so I will make my best effort to keep you posted as developments occur.



► FIG 4 MICHELANGELO'S MASTERPIECE, PIETA, WHICH IS IN ST PETER'S IN ROME. THE STANFORD TEAM WHO ARE SCANNING IT WILL HAVE TO FIND A WAY OF GETTING THE SCANNER'S LASER TO DELVE INTO THE DEEP FOLDS OF MARY'S DRESS

Site of the season

As part of my continuing commitment to introducing regular features to this column which appear only irregularly, here is this month's 'web site of the season'. Its address provides a good idea of what it is all about: www.maxhelp.com. Maintained by my current 3D industry pin-up, the artist and instructor Michele Bousquet, it provides a cornucopia of useful advice and links relating to 3D in general and 3D Studio MAX in particular.

I took the image shown in Fig 2 from la Bousquet's gallery. It is a scene created by Luiz Barth who has a website at www.geocities.com/SoHo/Coffeehouse/7342/ which only appears to work properly using Netscape 4.5 or above. I thought Luiz's use of atmospheric effects and the architectural detailing was particularly impressive — note the moulding around the upper parts of the wall.

◄FIG 3 THE PROTOTYPE OF THE 'RANGE' SCANNER BEING USED IN THE DIGITAL MICHELANGELO PROJECT, HERE BEING TESTED WITH AN EGYPTIAN SARCOPHAGUS

Virtual Michelangelo

Currently, one of the most exciting 3D initiatives is the Virtual Michelangelo project underway in Florence. A team at Stanford University in the US have teamed up with art historians and conservationists in Italy to create virtual versions of Michelangelo's greatest sculptures. They have developed a new type of laser scanner [Fig 3], which they use to get the basic shape, together with a jointed digitising arm and small triangulation laser scanner made by Faro Technologies and 3D Scanners 'for those hard-to-reach places'.

As you can see from the picture of one of the sculptures they intend to digitise, the sublime Pieta [Fig 4], there are lots of hard-to-reach places in Michelangelo's work. Furthermore, none of the works can be moved, so the team will have to use their ingenuity to get all the angles they need.

The team's interest arises from its pioneering work into 'range' scanning, using beams of laser light to scan large or distant objects. You can get a good idea of their progress in the field by exploring the links on the Digital Michelangelo Project website at graphics.stanford.firenze.it/projects/mich/.

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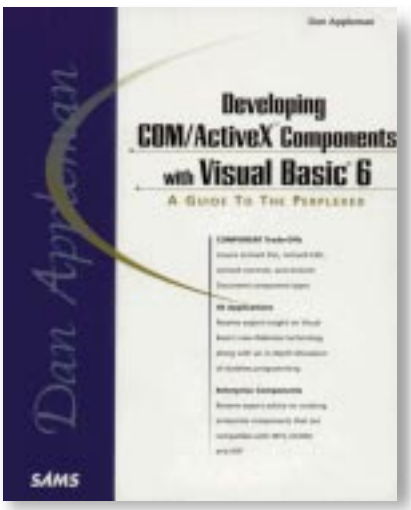
Do drop in

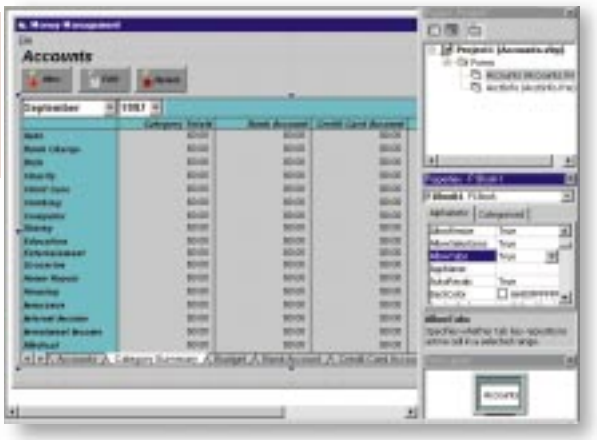
Tim Anderson has a light solution to embedding a spreadsheet.

Microsoft's Component Object Model (COM) is the underlying technology behind OLE, ActiveX, Automation, Data Access Objects and more besides. If you use Windows 95, 98 or Windows NT, you use COM. If you code in Visual Basic, you are a COM developer. There is no choice, it is deeply embedded into Windows and most of the time it works well.

There are a couple of interesting issues, though, the outcome of which will determine COM's long-term success. One is that COM development is hard once you go beyond merely using components or servers and start creating them. Visual Basic is meant to make it easy but only partly succeeds. The other issue is how well COM can make the transition from a handy way of working in Windows to being the foundation of large-scale applications which use distributed objects.

Every serious Visual Basic developer knows Dan Appleman's superb book on using the Windows API. His latest book is about this next challenge to VB programmers and is called *Developing COM/ActiveX Components with Visual Basic 6*. Topics include an explanation of COM interfaces, automation and binding, events, object lifetime, multithreading, building ActiveX controls, using collections and Microsoft Transaction Server (MTS) — a way of managing COM servers. There is even occasional humour. It is a worthwhile purchase but not as satisfying as his API volume. Web applications and MTS need more space and database issues are not covered.





▸Fig 1 For creating an application built around a spreadsheet, Formula One is hard to beat

It is an accessible book, though, and a useful supplement to the VB manuals. It also confirms the problem with VB and COM: for every ease-of-use feature, there is another one to trip you up. One example is the problem of controlling object lifetime in VB. It is all too easy to create objects that never terminate. If you want to create robust ActiveX controls or COM servers in VB, you have to learn a lot about COM itself and about how VB implements it. The benefits outweigh the cost, but do not expect an easy ride.

Drop-in spreadsheets

Embedding a spreadsheet into an application could be a smart move if you want to import or export spreadsheet data, say, or to present figures in a familiar and flexible format. One option is to use Excel as a control but if that heavyweight solution does not appeal you could try a spreadsheet control such as Tidestone's Formula One 6.0 or Farpoint's Spread 3.0.

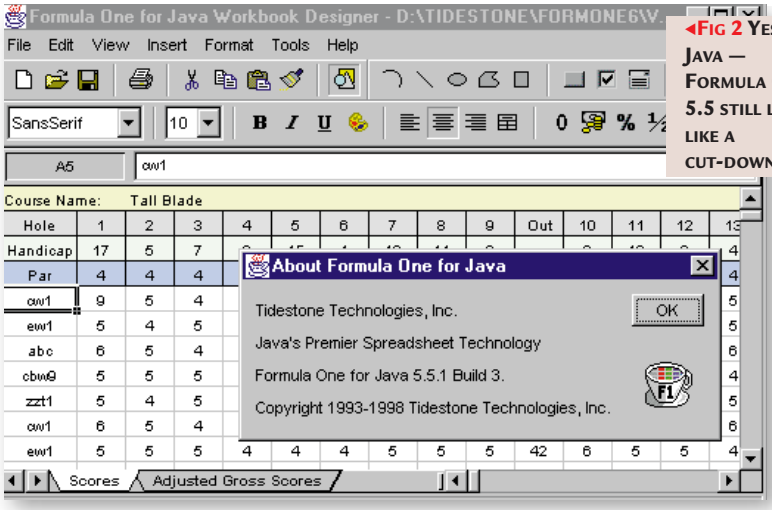
Although Formula One is well-known, Tidestone is an unfamiliar name. Formula One was first published by Visual Components, which was then acquired by Sybase. The company is now once more independent and has renamed itself Tidestone Technologies.

Formula One Professional is a bundle containing Formula One 6.0 for Windows, First Impression 6.0 for Windows, and Formula One 5.5 for Java. Two other products have been dropped: the dbComplete control could not compete against the data grids bundled with VB 6.0 and Visual Writer is now available from its original owner, DBS Software.

Formula One is an Excel-compatible spreadsheet control [Fig 1], and First Impression handles charts and graphs. Both are supplied as 32-bit ActiveX controls only. Drop a Formula One control on a VB form, right-click, and you can run the WorkBook Designer which is essentially a complete spreadsheet application that enables you to modify the embedded spreadsheet in the same way as you would normally work in Excel or Lotus 1-2-3. Formula One supports around 130 popular worksheet functions, a wide range of cell formats, drawing objects, buttons, checkboxes, drop-down lists and charts via First Impression. You can populate a spreadsheet from an ODBC database query and print preview is supported.

New features in version 6.0 include smarter recalculation, larger worksheet size (to 65,536 rows), cell merging and enhanced in-cell editing. Formula One is Excel-compatible and you can load and save spreadsheets in Excel 95 and 97 format. In my experience this works well. Formula One has the same tabbed worksheet style as Excel so multi-sheet workbooks import smoothly.

Bundled with Formula One 6.0 is a Java version [Fig 2] which offers a Formula One JavaBean. Although a little behind the ActiveX in features and



◂FIG 2 YES IT'S JAVA — FORMULA ONE 5.5 STILL LOOKS LIKE A CUT-DOWN EXCEL

compatible with Excel only up to Excel 7.0, this remains an impressive component. Much the same range of worksheet functions is supported and the user interface is almost as slick.

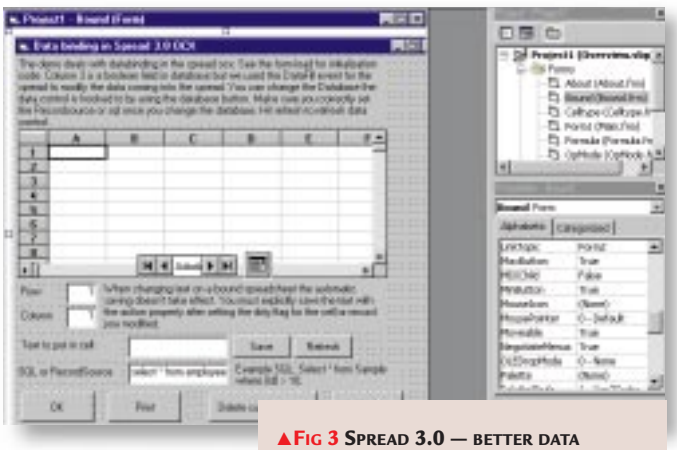
The fly in the ointment is that with effect from version 6.0, Tidestone no longer allows royalty-free deployment although version 5.0 is still available for this purpose. Otherwise, you have to obtain runtime licenses.

FarPoint Spread 3.0

No such limitation applies to FarPoint's Spread 3.0, another rather capable spreadsheet control. Although it may at first seem similar to Formula One, there are many differences. Spread 3.0 is supplied in a number of different guises. There is no Java version but there is a 16-bit VBX and DLL, a 32-bit DLL, and two ActiveX controls; one for Data Access Objects and the other for ActiveX Data Objects.

It also offers Excel compatibility, although only for the 97 version. However, when I tried to load my accounting spreadsheet it crashed both the Spread Designer and the entire Visual Basic IDE, suggesting that Formula One (which imported the same file perfectly) is the better choice in this respect. Another problem is that Spread 3.0 has no concept of workbooks and worksheets. If you import an Excel workbook, you have to specify which sheet you want.

With around only 70 worksheet functions, Spread 3.0 is a little behind Formula One, though you will probably still find the ones you need. Spread also lacks drawing objects, charts and graphs, although you can embed a picture in a cell. Nevertheless, Spread 3.0 [Fig 3] is a data-aware control. Whereas Formula One can only display the results of a query, Spread 3.0 can offer a dynamic, updatable view of your data. It also has a strong range of possibilities for cell formatting, including an owner-draw option which lifts all restrictions on what you can display in a cell. It is easy to put combo boxes, checkboxes, buttons or a popup calendar in a cell for easy data entry and a separate print preview control is supplied.



▲FIG 3 SPREAD 3.0 — BETTER DATA BINDING BUT NOT SO GOOD ON EXCEL FILES

The slicker of the two controls is Formula One as it is better for Excel support, and has an interesting migration path to Java. Spread 3.0 scores if you require data binding, royalty-free distribution, 16-bit or DLL versions. But both are products which add a huge range of features to your application at the drop of a control.

A different Outlook

I have received a pile of emails in response to the Outlook programming feature in the February column but reader Richard Deeming spotted an oversight: 'You stated that there is no accessible unique identifier for contact items in Outlook,' he writes. 'I use the EntryID property which exists for all Outlook items as the unique ID. This is a string value which is unique across all Outlook folders. It is suitable for use as a key in collections, ListView objects, TreeView objects and so on.

'In addition, the NameSpace object provides the GetItemFromID method, which takes the EntryID of the item and the StoreID of the folder it is stored in, and returns the item (if it exists). Finally, a more efficient method of testing for an invalid variable reference is to use the comparison VariableName Is Nothing, instead of VariableName.TypeName = "Nothing".'

This is excellent, although the EntryID is not quite as good as a typical primary key in a database. The reason is that it can change, for example if the item is moved to another folder. But for quick search and retrieval it is ideal. The EntryID and StoreID also provide a handy way to link to the CDO (Collaboration Data Objects) library using the GetFolder method of a CDO Session object.

Yes, you can also program Outlook through CDO or MAPI (Messaging API), giving extra features. *(For more on Outlook, see reader Ian Gordon's letter in the Question and Answer box, overleaf).*

Correction: *in February's column (page 294) three lines were omitted from Fig 1, 'Changing the MessageClass'. After the first three Set statements, you should insert this extra code:*

```
iMax = cts.Count
For iRecNo = 1 to iMax
set ct = cts(iRecNo)
```

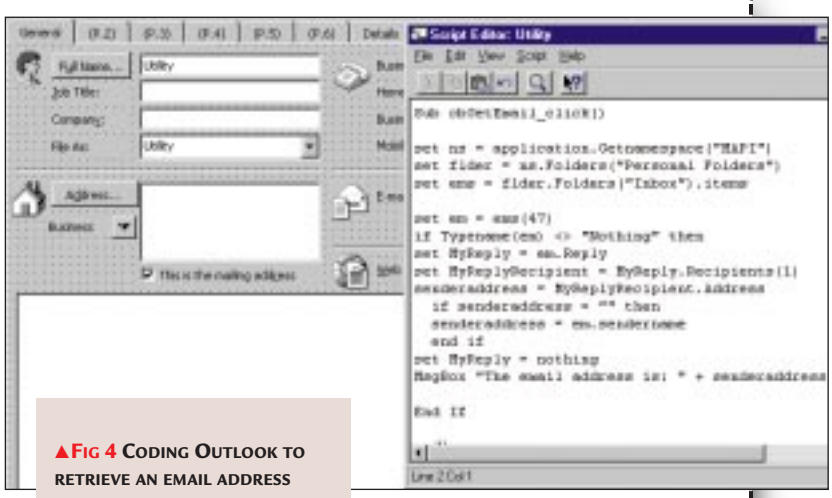
Questions & answers

Q I am working with Delphi 3 and I wish to query against date fields in Paradox tables. When I enter the SQL I have to use a date format of mm/dd/yy and not dd/mm/yy. All my dates are displayed correctly and I assume that is due to the regional settings in Windows (I'm using '98 and NT4). I have had a root around in the BDE Administrator and checked the Date settings on the Configuration tab.

KEVIN PARSONS

A *If you set the BDE's date format to dd/mm/yy, which corresponds to a MODE of 1 in the Date setting in the BDE Administrator, you can use that format in some contexts, such as in the Query By Example grid in the database desktop or with the SetRange method of a TTable but not in Local SQL which is the version used by the BDE when querying Paradox tables. Local SQL requires either mm/dd/yy or mm/dd/yyyy. It is annoying, although at least you know for certain what format you have to target.*

Applications which fail to check data formats and issue wrong dates if the user has an unexpected Control Panel setting are a liability. The worst aspect is that the first 12 days of the month produce a valid but different date depending on which format is used. You can make an application bullet-proof but it is easy to slip up.



▲FIG 4 CODING OUTLOOK TO RETRIEVE AN EMAIL ADDRESS

On our cover disc this month, there is Delphi 2 Developer from Borland. See Cover Disc Notes, starting on page18) for more information

Q Using Visual Basic 5, I want to be able to pass command line parameters to my application. The help files and Books online hasn't helped.

'DAVE'

A *Funnily enough, the Command function returns exactly what Dave wants; the command line parameters. The real issue here is why the information is hard to find. It is probably because Microsoft calls them arguments, not parameters, so searching for parameters gets you nowhere. If you are sure the answer is in there somewhere, try some lateral thinking!*

Q How can I access the sender's email address from a message? The name is easy but the address is impossible!

IAN GORDON

A *This question relates to my February column which dealt with Outlook programming and it is only nearly impossible. See Fig 4. Bizarre though it may seem, the Outlook object model does not include the email address of the sender of a message. The best way I can find using Outlook alone is shown in Fig 5. This involves pretending to reply and then inspecting the recipient of the reply. The problem is that the SenderName property holds the friendly name for the sender, not the email address — unless no friendly name is available. A better approach is to create a CDO Session object, find the message and inspect the Sender.Address property. This technique is illustrated on the web at www.slipstick.com/exchange/olforms/bulkreply.htm along with many other Outlook tips.*

• For more comment on Outlook, see also 'A Different Outlook' in the main text.

[FIG 5] Finding the email address of a message

```
Set ns = Application.GetNamespace("MAPI")
Set flder = ns.Folders("Personal Folders")
Set ems = flder.Folders("Inbox").Items
Set em = ems(1) ' or use Find method to get a specific message

If Not (em Is Nothing) Then
Set MyReply = em.Reply
Set MyReplyRecipient = MyReply.Recipients(1)
senderaddress = MyReplyRecipient.Address
  If senderaddress = "" Then
  senderaddress = em.SenderName
  End If
Set MyReply = Nothing
MsgBox "The email address is: " + senderaddress
End If
```

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Developing COM/ActiveX (Dan Appleman) £46.95 incl book and CD (£39.96 ex VAT), ISBN 1-56276-576-0 from Computer Manuals 0121 706 6000 www.computer-manuals.com

Formula One Professional £69 (£81.08 inc VAT) from Tidestone 01892 834343 www.tidestone.com. Runtime licenses from £57.50 (£67.56 inc VAT) per user

Spread 3.0 is £249 (£292.58 inc VAT), royalty-free deployment, from Contemporary Software 01344 873434 www.contemporary.co.uk

Mail model

Bob Walder looks at Exchange Server, showing how it can pick up and distribute your email.

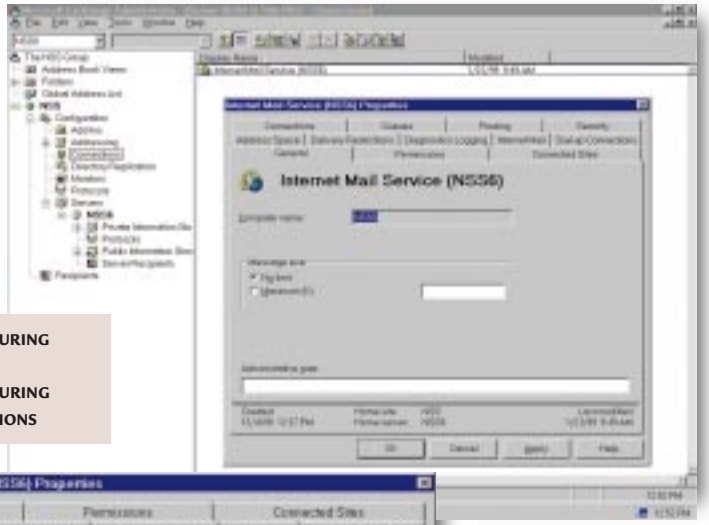
Last month, I looked at internet mail and the differences between SMTP, POP3 and IMAP4. I covered the most flexible method for an organisation to handle its email: registering a domain and using its own SMTP server. I ended by taking a look at two examples of widely available SMTP servers; NT Mail and Exchange Server.

I've said before that I will concentrate mainly on Microsoft products for this series, so my apologies to anyone with another SMTP server but a lot of the principles apply even if the details differ. There are good reasons to concentrate on Exchange apart from the fact that Microsoft's marketing clout will ensure its success whether we like it or not.

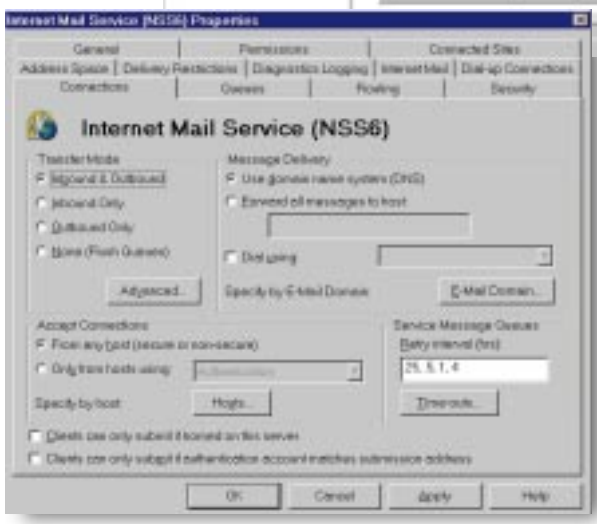
Compared with other products it is very flexible. Sure, if you need nothing more than a simple SMTP server it is overkill but most organisations will use Exchange as their internal mail server, group scheduler, bulletin board and news server, as well as for internet mail. One of the features Exchange offers, which I find extremely useful when I am out and about travelling, is the web access. This allows you to access your mailbox and process your mail using any standard web browser from anywhere on the internet. It is ideal if you are travelling without your laptop machine.

The price of flexibility, though, is complexity and Exchange is quite capable of confusing you with a whole shed-load of options that you simply do not need. Here, I will look in more detail at how to persuade it to pick up and distribute your internet mail. I will assume that you already have Exchange installed and working as an internal mail system, and that your network has a routed connection to the internet.

In order to have Exchange handle your internet mail, too, you need to install and configure an Internet Mail Connector (IMC). This comes as part of the Enterprise Edition or can be purchased as an optional extra to the Standard Edition.



►Fig 1 Configuring IMC: General
▼Fig 2 Configuring IMC: Connections



Installing and configuring the IMC is fairly simple.

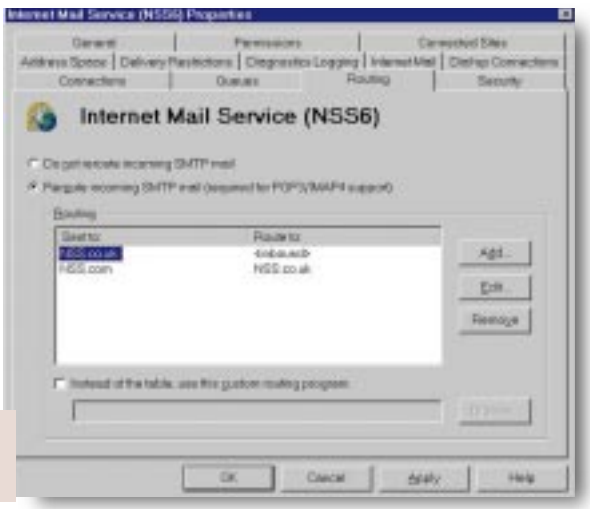
1 Log on to the server as Administrator and start the Exchange Administrator program.

2 Expand the Site container of the organisation tree and select the Connections container.

3 Select New Other from the File menu, and then select Internet Mail Service from the drop-down menu. This fires up the Internet Mail Wizard that provides a check-list of tasks to complete before installing and configuring the connector.

4 As we mentioned last month, you should make sure that you have your domain name registered and that your ISP has a Mail Exchange (MX) record in its DNS server to point to your mail server. If you have your own DNS server, the MX record should be created there.

5 Stepping through the Wizard you are asked for the name of the Exchange Server on which to install the IMC. You are also offered the option to configure it to send internet mail via a dial-up connection through your ISP using RAS (Remote Access Service). Here, however, we will assume you have a dedicated routed connection to your ISP.



►Fig 3 Configuring IMC: Routing

6 Once the IMC has been installed, you can double click on the entry in the Connections folder to see a number of configuration options [Fig 1]. Most of these can be left as the defaults.

7 The first one to check is the Internet Mail tab. Click on the Change button in the Administrators Mailbox section and select the user who should receive all mail notifications. Clicking on the Notifications button allows you to specify which types of non-delivery reports will generate notifications to the administrator.

8 Ensure that the MIME option is selected in the Message Content/ Attachments (outbound) box, and if you want to use digital signatures ensure that the Clients support S/MIME signatures option is selected.

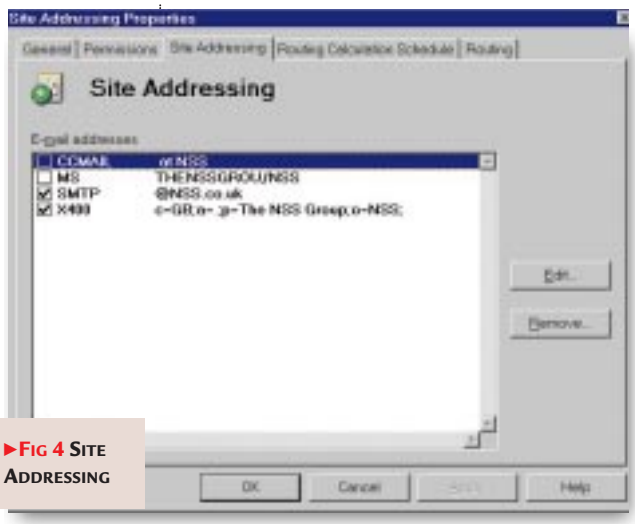
9 You may want to check the Advanced button where you can enable 'out of office responses' and 'automatic replies' to the internet if required.

10 Next, select the Connections tab [Fig 2]. Here you can set the Transfer Mode to process Inbound and Outbound messages, Inbound Only or Outbound Only. The Message Delivery option should be set to Use Domain Name System.

11 Select the Routing tab [Fig 3]. If you just want to accept inbound mail and have it distributed to Exchange mailboxes, then select the Do Not Reroute Incoming SMTP Mail option. However, if this machine is to operate as a POP3/IMAP4 server for internet mail clients you will need to select Reroute Incoming SMTP Mail. You then need to add at least one entry to the Routing box. Click on Add, enter your domain name (NSS.co.uk in our case), and click on Should Be Accepted As Inbound.

Now we have defined an IMC that will process all inbound and outbound mail, and where all inbound mail for the domain NSS.co.uk will be routed to POP3/IMAP4 mailboxes for users to collect.

☛ **Exchange now needs to know** how to route those mail messages. Bear in mind that an Exchange Server will have mailboxes set up as 'Bob Walder' or something similar, so it needs some means of translating an internet address of bwalder@NSS.co.uk in order to place the message in the correct mailbox. This is achieved via the Site Addressing facility.



▶FIG 4 SITE ADDRESSING

1 Select the Configuration container and double click on the Site Addressing option.

2 Click on the Site Addressing tab. See Fig 4.

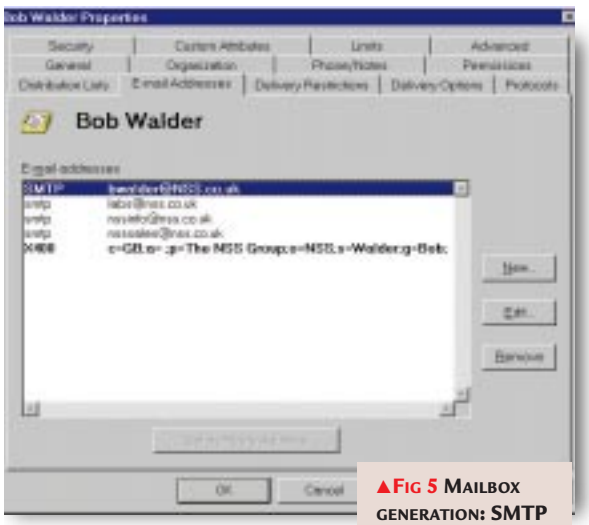
3 Ensure that the SMTP addressing option is checked. Select it and click on Edit.

4 The type is fixed as SMTP and the Address format is shown as '@NSS.co.uk'. This means that all SMTP addresses for this site will be created as 'alias@NSS.co.uk' by default, where the alias is determined by the user properties. Yours should be in the format '@domain' where domain is your registered domain name.

5 Now go to the Tools menu (from the Exchange Administrator tool bar) and select Options, then select the Auto Naming tab. This is the section that determines how mailbox display names and aliases are generated for new mailboxes (the defaults here can be overridden).

6 If you want the display name to be 'Bob Walder' select the 'First Last' option. For an alias, we use first initial followed by the surname so the 'First Initial And Last Name' option is checked. When we create a mailbox for Bob Walder, this configuration results in a display name of Bob Walder and an alias of bwalder.

If you then click on the E-Mail Addresses tab you will see that the SMTP address has been generated automatically as 'bwalder@NSS.co.uk' [Fig 5]. This is how Exchange knows where to route incoming messages destined for the NSS.co.uk domain.



▲FIG 5 MAILBOX GENERATION: SMTP ADDRESSES

Look again at Fig 5. Apart from the Auto Naming entries for SMTP and X.400 we saw in the Site Addressing section, there are a few other addresses for this user, too. These are commonly known as 'aliases' in other SMTP mail servers. They are created by clicking on New then on Internet Mail Address, then entering the address in full. In this particular case, any messages addressed to labs@NSS.co.uk will automatically be routed to the mailbox of Bob Walder.

☛ **Next month** I will tell you how to get your Outlook Web access working so you can access your email from anywhere on the internet using only a standard web browser. So, no more having to lug your laptop around with you when you travel, just to access email.

PCW CONTACTS

Bob Walder can be contacted via the PCW editorial office(address, p14) or email networks@pcw.co.uk

Quick on the upgrade

Do you need to buy a new G3 or would it be better to upgrade? Cliff Joseph compares and advises.

Whenever Apple comes out with a new range of desktop machines, owners of older models face the quandary of whether to upgrade their existing Mac or splash out on a new machine.The question's even trickier with the latest batch of G3 PowerMacs because they're not only faster than previous models, they're cheaper and they offer new features such as FireWire and USB.

USB is dead useful, no doubt about it, but it's not a good enough reason to buy a new Macintosh. FireWire, on the other hand, affords the Macintosh entirely new capabilities. Whether your work involves digital video editing, or if you just want to muck about with a DV camcorder, you should take the plunge and buy one of the new G3s.

Not everyone is interested in digital video, though. Most of Apple's core users are in the area of printing and publishing and are more interested in speeding up Photoshop than in doing fancy things with video. There are also plenty of home users who cannot afford to buy a new Mac whenever a new model is produced.

The new G3s may be fast but they don't have SCSI interfaces

For these people, upgrading their existing Mac might make good financial sense. The new G3s may be fast but they don't have SCSI interfaces, which means that you'll need to buy an adaptor to use existing SCSI peripherals like scanners and removable hard disks. Photoshop work needs a lot of RAM, too, but you won't be able to transfer RAM from a pre-G3 machine into a new G3 Power Mac, so you could find yourself having to spend some extra money on RAM. So, if all you want is to give your existing Mac a speed boost it might be cheaper to upgrade it with a new processor card than to buy an entirely new Macintosh.

Most Macs released over the past few years have their processor on a removable card which just slots onto the motherboard. This means you can easily upgrade them by removing the old card and slotting in a new one.

There are three or four companies which produce upgrade cards and competition is pretty intense, so prices are coming down all the time. As a result you can get some very fast upgrade cards for a lot less than the cost of a new G3.

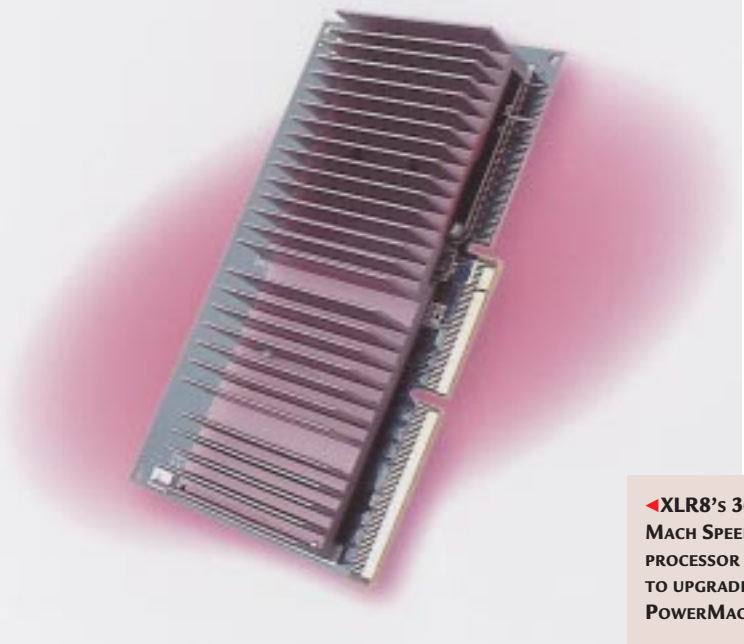
As an example, we took an old PowerMac 7600 with a 200MHz PowerPC 604 processor in it. The 7600 has 128Mb RAM (for Photoshop), an ATI Rage Pro graphics chip and a motley assortment of SCSI peripherals attached to it. We then upgraded it with a 366MHz Mach Speed G3 processor card from XLR8. This card costs £800 (ex VAT). We could have used cards from other companies like Newer Technology, Maccelerate or Sonnet, but the XLR8 cards have a useful option known as Multiple Variable Processor which allows you to fine tune the card for optimum performance.

The 366MHz upgrade card puts the PowerMac 7600 almost head-to-head with the mid-range 350MHz model in the new G3 line-up. A brand new 350MHz G3 PowerMac with 128Mb RAM and a SCSI adaptor would cost about £1,500 (ex VAT) — this is almost twice the price of the upgrade card. Of course, everything depends on the performance of the upgrade card, so the next step was to run some benchmark tests on the two systems.

▲ THE G3 POWERMAC IS A COLOURFUL BUT COSTLY ALTERNATIVE TO UPGRADING

Not surprisingly, the 366MHz upgrade card ran slightly faster than the 350MHz processor in the new G3. But processor speed is not the whole story. The Rage 128 graphics card built into the current G3 range is much faster than the older Rage Pro in the PowerMac 7600. Hard disk performance on the new G3 machine is also a bit better than on the 7600 but this won't affect performance in programs such as Photoshop too much, as long as you have enough RAM.

The combination of processor and video performance means that in overall terms the new G3 is still about 10-15 percent faster than the upgraded 7600. So, if you want all the speed you can get you're better off going for a brand new Mac. But if your budget won't stretch



◄XLR8's 366MHz Mach Speed G3 processor we used to upgrade our old PowerMac 7600

that far you'll find that a good upgrade card can give you almost the same performance as a new G3 PowerMac, at a considerably lower price. Remember, though, there are things that an upgrade card cannot give you. As well as having two FireWire ports built into it, the 350MHz PowerMac G3 also has a DVD-ROM drive. Adding these features to an older Mac would negate the cost advantages of the upgrade card.

There are also technical issues affecting older machines, which limit the speed you can get out of an upgrade card. We tried to test a 400MHz Mach Speed card in our 7600 machine but it simply wouldn't run with it installed. This is because the system bus — the circuitry connecting the main processor to the rest of the system — is limited to about 45MHz. The 400MHz card needs a bus speed of at least 50MHz and many older Macs just cannot handle this. The current range of PowerMacs all have a system bus which runs at 100MHz, so they can easily handle future generations of processor which run at speeds of 500-600MHz. And, of course, they look a lot nicer than the old, beige Macs.

Power Mac 7600 vs Power Mac G3

Benchmark Scores* (higher is better)	Processor Performance	Video Performance
Power Mac 7600 with XLR8 Mach Speed 366MHz	941	219
Power Mac G3/350	903	325

** Tests run using System Info utility from Norton Utilities for the Mac.*

Upgrade cards won't be the ideal solution for all users. The new G3s are so competitively priced that it makes sense to buy one if you can afford it. But if your budget, or your boss, simply won't stretch to a new Macintosh, you will find that an upgrade card really can give your old machine a new lease of life.

FireWire

If you are unfamiliar with FireWire, just think of it as a super-fast version of USB, or of the old serial ports that the Mac would use to connect to printers and modems. Like USB, FireWire is 'hot-swappable', which means that you can plug and unplug devices like digital cameras into the FireWire port without having to restart your Macintosh. When you plug the device in, your machine automatically detects its presence. If the device needs any special software to run, the Mac will ask you to load the software. If it is already installed then you can just plug the device in and use it straight away.

You may soon find Firewire sneaking into your front room

The great advantage of FireWire is its sheer speed. Old serial ports can handle a data transfer rate of about 230Kbits/sec, while USB ports can handle a maximum of 12Mbits/sec. But FireWire provides a maximum data transfer rate of 400Mbits/sec. That's more than 30 times faster than USB and 1,500 times faster than a conventional serial port.

That kind of speed makes FireWire an ideal method for handling digital video and a number of camera manufacturers already use it in their cameras. Apple hopes that FireWire, also known as international standard IEEE-1394, is adopted not just in the field of digital video but also in devices such as colour printers and hard disks which would benefit from the speed of the FireWire interface.

Under its IEEE-1394 name, FireWire has also been adopted as part of HAVI (home audio/video interoperability). This is a system which is being put forward by a number of consumer electronics companies as a method for networking audio and video devices such as VCRs, TVs and CD players. So, even if you don't buy a Macintosh with FireWire, you may soon find FireWire sneaking into your front room as part of your home-entertainment system.

PCW CONTACTS

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XLR Mach Speed G3/366 £940 (£800 ex VAT)

XLR8 Mach Speed G3/400 £1,032.83 (£879 ex VAT) UK distributor: Promedia 01923 266400

- *Other processor upgrade options:*

Maccelerate G3 from Gordon Harwood 01773 836781

Newer Technology MaxPower G3 from A.M. Micro 01392 426473

Sonnet Crescendo G3 from MacRapide 0181 931 1177

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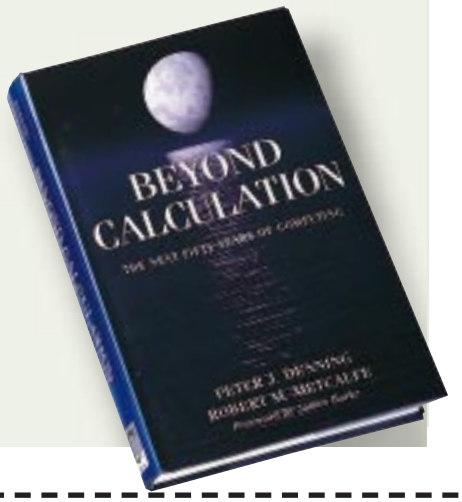

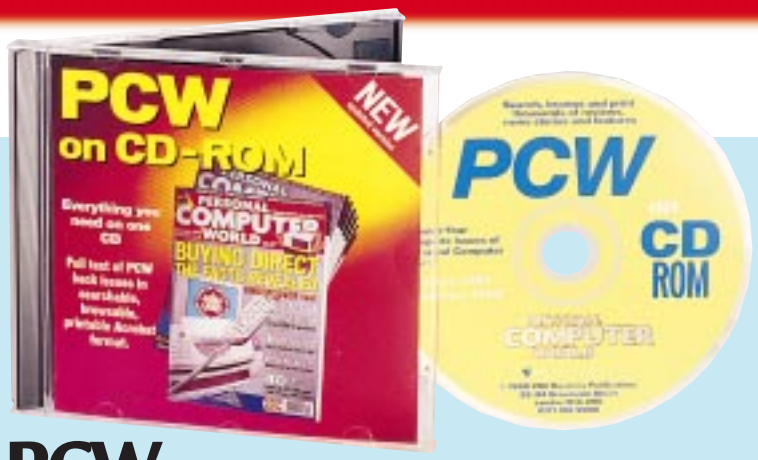

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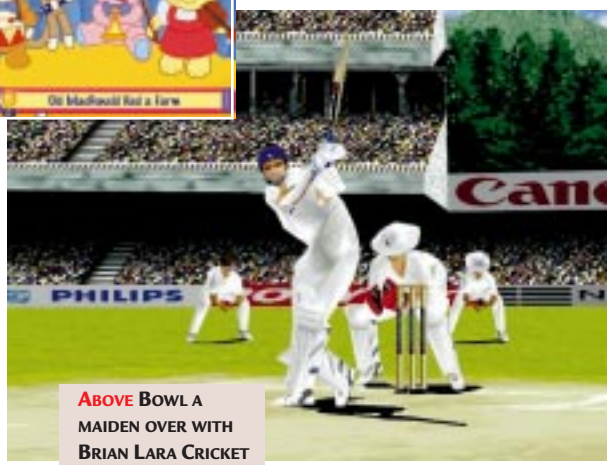
leisure lines

Screenplay this month lets you get into the swing of Microsoft's new **Golf 99**, you can get to grips with googlies in **Brian Lara Cricket**, tackle those wacky, wiggly worms in Worms - Armageddon, set your mind to a puzzling game called **Jewels of the Oracle**, steal a march on your opponents in **Thief**, and revel in a blast from the past — **Asteroids** is back, this time in 3D. In our CD-ROMs you'll see stars with **Patrick Moore's Guide to the Universe**, learn about black history with Microsoft's big hit, **Encarta Africana**, and chill out to musically animated murals with **Dancer DNA**. The Kids section paints a picture of the new IBM Crayola package, **Make a Masterpiece**, and Cendant Software takes computing to a disturbingly young age with **Jump Ahead Baby**. In our Competitions you have the chance to win an **IRISPen**, a new approach to data entry, or a copy of Dragon Systems' **Naturally Speaking** software. A Chambers dictionary is up for grabs if you complete our crossword [*see ChipChat*], and how many pots of paint would it take to paint the Titanic? It's just one of the puzzles in our **Brainteasers** section. And there's brainpower on display in Retro, as Simon Collin salutes one of the great industry eccentrics, the flawed but well-packed **Grundy NewBrain**.

▲ There's snow business like worm business: this time, it's Armageddon



Above Bowl a maiden over with Brian Lara Cricket Inset Jump Ahead Baby is designed for the very young

▲ The sublime Billie Holliday is featured in Encarta Africana

Etelka Clark, Leisure Lines Editor

etelka_clark@vnu.co.uk

Worms - Armageddon

More weird and wiggly fun with those wily worms and their wicked weapons.

Stressed out? There's nothing better after a hard day at the office than sitting down and blasting away at a few nasty little loudmouth worms. Previous versions of Worms were excellent fun, but if you're ready for something a little stronger, then you'll love Worms - Armageddon. You get several new devious weapons this time round, including Lingering Fire, a petrol bomb that burns for several rounds, and the Viking Axe, which chops an unlucky worm's life in two. You can also place your worms manually into the terrain for even greater strategic effect. Worms - Armageddon also helps you hone your fighting skills with training missions. Once you've fulfilled the training requirements, then you're ready for the regular missions. And you can still play a quick game against the computer, a friend, or a networked foe.

One of the best features is the new sound banks, which let you customise your teams with different songs, accents and catchphrases. Three of my favourites include Scouser, Wideboy and Cad (cue Leslie Phillips-style 'Oh, hel-*loooo*...'). It was hysterical to hear the worms scream 'Oi! Nutter!' or 'Eee! By 'eck, that's champion!' in response to a particularly skilful shot. You can add your own voice to annoy your competitors even further.

Worms - Armageddon is one of the best PC games around. But be warned: it's highly addictive, and Team 17 takes no responsibility for adverse effects on your work and social life.

SUSAN PEDERSON

PCW DETAILS

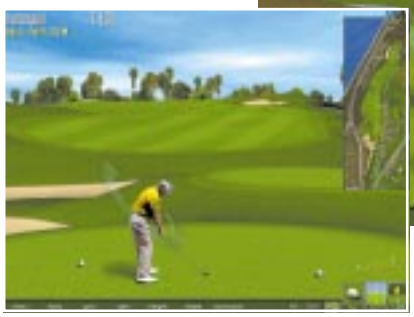
RECOMMENDED PERSONAL COMPUTER WORLD

★★★★★

Price *£39.99*
Contact *Team 17; 01924 271637*
www.team17.com
System Specification *Pentium 100MHz or faster (150MHz recommended), Windows 95/98, 32Mb RAM (64Mb recommended), 30Mb free hard-disk space, 2X CD-ROM (4X recommended).*

Microsoft Golf 99

Even the bunkers are inviting in this gorgeous game.



Golf 99 is a stunningly beautiful game. Expertly rendered courses, complete with an opening flypast of each hole, immerse you in an environment a thousand miles from the home or office PC on which you are playing. Even the sounds — singing birds, the whoosh and thwack of the club, and the gently reassuring commentary — envelop the user in a relaxing netherworld where the sun always shines and, without a drop of rain, the course is always lush and green. If you're a poor golfer, or have never played before, don't be put off. Taking a shot in Golf 99 is easy and the on-screen guides, if followed precisely (which is far from difficult) will nearly always get you to the place you would expect — namely, the fairway or the green. On the first game, by the sixth hole this reviewer was five shots below par. Not bad for a beginner!

Golf 99 has three brand new courses and incorporates the seven courses found in the 98 edition, giving you no less than 117 holes to conquer. When you've played them all one way, you can do them again, but differently. With four swing types, ten game types and myriad customisation options, you'll never play the same game twice. Having no friends is no excuse for playing on your own, either: compete over modem or LAN, or hook up with players worldwide at the MSN Gaming Zone.

NIK RAWLINSON

PCW DETAILS

RECOMMENDED PERSONAL COMPUTER WORLD

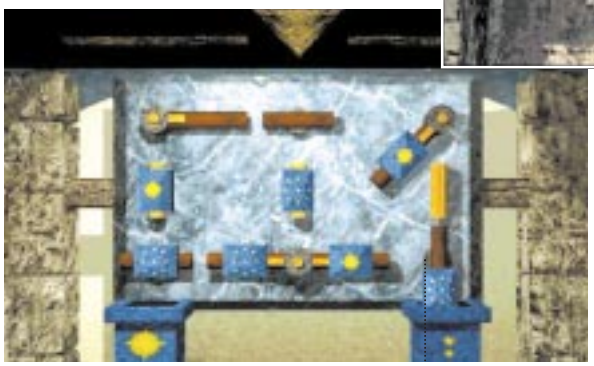
★★★★★

Price *£24.99 (£10 cashback for customers upgrading)*
Contact *Microsoft 0345 002000*
www.microsoft.com
System Specification *Pentium 90MHz processor, Windows 95/98 /NT4 Sp3+, 16-40Mb RAM, 65Mb free hard-disk space, 4X CD-ROM, 16-bit SVGA display at 800x600, mouse.*

Jewels of the Oracle

Thought provoking and atmospheric, this is a challenge for the mind.

Thousands of years before the Egyptians, there existed an enlightened civilisation upon which all others were based. It was known as the City of Nisus. Its people were cautious in admitting those whose untamed emotions and untrained minds threatened to destroy their state of Paradise, so the petitioners were required to travel through the Girsu Gates and unlock the mysteries of this realm. The Jewels of the Oracle game attempts to recreate the devices that challenged those attempting to pass through the Girsu Gates, consisting of 24 puzzles in logic, mathematics and geometry. The Oracle himself guides you through the mysteries of his dark, tomb-like world constructed around a room with a well at its centre. The well is divided into six groupings, or 'Houses', with four puzzles in each House. You have no opponents and no time limit. Your only ally is your mind. When you solve a puzzle, the Oracle releases a jewel to be returned to the Altar Room. Return all 24 jewels and you can leave the domain.



It's a very basic concept but beautifully crafted to create an intense atmosphere for all ages to enjoy. The puzzles become increasingly challenging, but with the option to pass on a puzzle and return later, you can drift away with your imagination as if enjoying a *Sunday Times* crossword. It's a refreshing change to find such inventiveness in a game that runs on such a low spec.

IAN ROBSON

PCW DETAILS

★★★

Price *£29.95*
Contact *Iona UK 0181 296 9454*
www.ionasoft.com
System Specification *Windows 98/95/3.1, 25MHz 486SX processor (66MHz 486DX/2 recommended), 8Mb RAM (16Mb RAM recommended), 2X CD-ROM drive, SoundBlaster-compatible sound card, 256 SVGA video card.*

Brian Lara Cricket

A sedate way to pass the time as you sort your leg breaks from your googlies.

Depending on your point of view, cricket is either an epic battle of mind and body or a waste of a perfectly good lawn. And previous attempts at capturing the game on the PC have lent credence towards the latter view, being slow, dull and uninvolving. Brian Lara Cricket changes all that. It's quick to set up, fast-moving and, most importantly, great fun to play. Even better is the fact that while cricketing aficionados will love the attention to detail and realistic action, those who don't know a googly from a leg break should also enjoy it. From the recreation of the grounds to the fluid movement of batsmen and bowlers alike, the level of detail is remarkable. As with the real thing, you'll need a fair degree of patience to get to grips with the subtleties of the game: my first effort left me knowing how the England team feels most of the time as I slumped to a pitiful 39 all out. Learning the key combinations required for the various shots also takes a while but, once done, you can start to concentrate on the tactics required to build big scores.

The multitude of playing options, from a full test to a fantastic feature that allows you to replay classic matches, also greatly enhance the longevity of the game. So if you're sick of the bloodletting and frantic action of most PC games and fancy something a little more sedate, you'll be bowled over by the quality of this release.

OWEN GIBSON

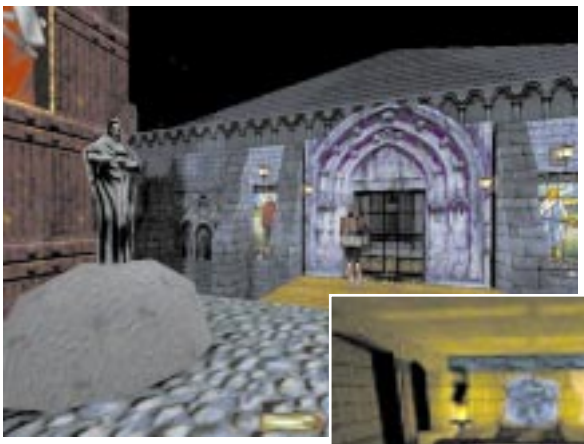
PCW DETAILS

★★★★

Price *£35*
Contact *Codemasters 01926 814132*
www.brianlara.co.uk
System Specification *Windows 95/98, Pentium 166MHz processor, 16Mb of memory, SoundBlaster-compatible sound card, 3Dfx 3D accelerator card, 70Mb free hard-disk space.*

Thief - The Dark Project

Do you have a cunning plan? Good: you'll need it in this game.



This game is unlike any first-person game on the market. While others compete on the level of carnage you can see on-screen, Thief - The Dark Project is just the opposite. In this game, stealth, secrecy and cunning are your best friends. Exposure means almost certain death. You play the role of a thief whose mission is to prevent a city from being overpowered by an evil being. To achieve this, you have to complete certain perilous missions. During these missions, shadows and darkness remain your constant companions, and as befits a thief, you spend a lot of time waiting patiently within them. There is however a 'visibility jewel' to let you know how visible you may be to your enemies. Fighting your enemies in a Quake-style shoot-out is not a great way to finish the game. Even Thief's weapons are best suited for stealth rather than frontal attack: they include a blackjack, a sword and a bow with a variety of arrows. The arrows have to be used sparingly as they are always in short supply. This again forces you to avoid confrontation whenever possible.

Another unique feature is Thief's use of sound. Sound cues are absolutely critical to finishing the game. If you make too much of a racket, your enemies will be quick to pounce on you.

In a market devoid of imaginative games, Thief stands out due to its brilliant design and gameplay.

AJITH RAM

PCW DETAILS

★★★★★

RECOMMENDED PERSONAL COMPUTER WORLD

Price *£44.99*
Contact *Eidos Interactive 0121 332 4647*
www.eidosinteractive.com
System Specification *Windows 95/98, Pentium 166 with 3D card, DirectX 6, 32Mb RAM, 8X CD-ROM.*

Asteroids

One of the best blasters just got better — and in 3D.

In 1979, possibly the most addictive arcade game known to man started chomping up 10p pieces by the bucket-load. In 1999 the legendary Asteroids has hit again, this time in 3D. Staying faithful to some of the constraints of the original format will please most nostalgia fans. You still have a static screen where you swoop across from the top of the screen only to reappear at the bottom. Highly unrealistic, but tactically a firm requirement. And thankfully 3D has been restricted to the modelling of the asteroids, as negotiating your sprightly ship as it zips through the as you rotate to avoid fragments of rock consumed in flames shooting by. There's also the opportunity to equip one of three asteroid-clearing ships with an additional unique weapon hidden in each Zone. Search for laser nets, repulser shields, shock waves, gun satellites that orbit and add to your ship's firepower, and more.

flying behemoths is troublesome enough. This updated version provides stunningly inventive graphics that provide a real dynamic feel to your frenzied efforts. However, you may not have time to admire the blue-flamed side-burners

A particular favourite is the asteroid tug that has the annoying habit of capturing asteroids only to protect them from your attacks. Shoot that sucker with venom.

This marvellous game is everything the original was, with bells and whistles added. Classy stuff.

IAN ROBSON

PCW DETAILS

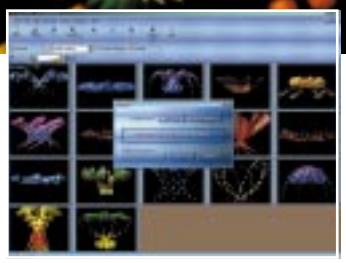
★★★★

Price *£29.99*
Contact *Activision 01895 456700*
www.activision.com
System Specification *Windows 95/98, Pentium 90 or equivalent (Pentium 133 recommended), 16Mb RAM (32Mb recommended), 2Mb SVGA video card, 70Mb free hard-disk space, 4X CD-ROM, support for 3D accelerator card with 100% Microsoft Direct3D compatible drivers.*

Dancer DNA

Gives a whole new meaning to swinging blue genes.

The demon spawn of Professor Richard Dawkins and Notting Hill Electronic Publishing, this is a graphical representation of breeding and mutating genes dancing to your chosen music. The ideal venue for this presentation would be via an LCD projector onto the walls of a club, but it will look just as good on your home monitor. Although the box states that you are supplied with 15 animations, this package is very much more than just an animator. You actually have full control over how the effects generate themselves by associating movements with particular instruments on a track, such as a menacing heavy beat or a vocal. The controls even extend to some finer tweaking of the sensitivity settings and the speed of each directional morph. The interface could do with a little loosening as it seems to target the professional, when at this price it should be taking advantage of the larger audience that can afford it.



Still, if it does all get a bit confusing, there's a selection of pre-sets that cater for a standardised selection of musical tastes.

The recommended system requirements detail quite a high specification, but if you want to take advantage of the best this program can offer, you may be looking for even more power. Running on a Pentium III with all the best options checked, reduced initial rendering to around three minutes maximum, and the results were quite impressive if only a tad out of time with the actual music.

IAN ROBSON

PCW DETAILS

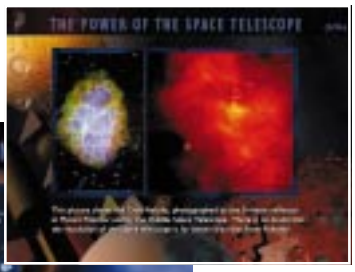
★★★★

Price *£19.99 (£17.01 ex VAT)*
Contact *Notting Hill Publishing 0171 937 6003*
www.dancerdna.co.uk
System Specification *Pentium 133MHz or equivalent (200MHz recommended), 16Mb RAM (64Mb recommended), 10Mb free hard-disk space, CD-ROM drive, 16-bit colour support (Direct3D graphics card recommended), 8-bit compatible sound card.*

Patrick Moore's Guide to the Universe

The night sky in all its glory, presented by the man who knows.

Since the advent of the multimedia CD-ROM, there has been a trend towards enlisting famous people in their marketing. This astronomy CD is endorsed by Patrick Moore, an expert on the solar system and xylophone player *extraordinnaire*. The multimedia extravaganza begins with a resounding rendition of the first movement of Wagner's *Ride of the Valkyries*. You start your study of astronomy with a brief history of the subject itself, then choose whether to listen to the commentary by Patrick Moore or just read the explanations on-screen. Most of the tour is made up of individual slides rather than flashy animations — a good thing, as the viewer is not distracted from the core subject matter. Almost all the important facets of astronomy, ranging from galaxies, constellations and our solar system, to the telescopes used to view them, are covered in some detail. For instance, if you want to learn about constellations, there is an informative section on the night sky. Using slides, the Great Bear and Orion, to name but two, are explained in detail.



No multimedia CD would be complete without its share of video clips, and Patrick Moore's Guide has its share, including great historical moments like the lunar landings and the launch of the space shuttle. These video clips are not as informative as the slide shows, however.

Patrick Moore's Guide to the Universe emphasises substance over style and is well worth a look.

AJITH RAM

PCW DETAILS

★★★★

Price *£29.99*
Contact *FastTrack Software Publishing 01923 495496*
www.fasttrack.com
System Specification *486 or higher with 8Mb of RAM. Pentium with 16Mb of RAM recommended.*

Microsoft Encarta Africana

A brilliantly presented, fascinating account of Africa's contribution to human history.

It's taken a long time to get here, but better late than never. With an authoritative editorial team led by Harvard University professor Kwame Anthony Appiah and including Henry Louis Gates, Jr, director of Harvard's W.E.B Du Bois Institute, Microsoft has released an interactive, electronic encyclopaedia documenting the human history of the (Pan) African Diaspora. Tracing its movement to the Americas, Encarta Africana looks at the cultural, economic and political impact this movement has had on American history to date. Going right back to four million B.C.E (Before Common Era), the origin of all mankind, Africana traces the great accomplishments of Man, from the ancient dynasties of Egypt and the art of Mali, to Toni Morrison's novels or LL Cool J's method of storytelling.

▲ LADY SINGS THE BLUES: BILLIE HOLLIDAY AND HARLEM ARE PART OF THIS AFRICAN EXPERIENCE

Every article is accompanied by either a picture, a virtual tour, a celebrity contributor's comments, or a sample of music. For example, listen to Lady Day (Billie Holliday) at Harlem's Apollo Theatre, or watch a video of Whoopi Goldberg illuminating the concept of 'race' as an idea rather than a reality.

The topics are accompanied by links and sidebars to related aspects and subjects, providing further information at the click of a mouse. Navigation is easy, with the program split into sections, so you can go straight to the encyclopaedia articles, the 2,500-strong archive of video presentations, audio clips and photos, or the interactive maps which allow you to visit habitats and places of interest. Go on a virtual tour to Paris, Harlem, Havana, Egypt or Brazil, and conduct your own word or phrase search with the Pin Pointer to find specific topic areas.

As a research tool, Encarta Africana proves invaluable. The Research Organiser means you can collect and order your chosen topics, while the web links encourage you to dig deeper on the issues and topics raised — perfect for essays and dissertations.

Microsoft has succeeded in bringing to our attention the massive influence Africa and its people have had on our world, specifically America. The only downfall of the program is that as it's not on DVD, you have to keep alternating the CDs to access particular media. But this is a fascinating, captivating program, with excellent graphics and beautiful presentation. It brings the truth of African and African American history alive, telling the flip-side version of history that is so often ignored. It's one of a kind, a truly essential work. Buy it.

HELEN FORTGANG

PCW DETAILS

RECOMMENDED PERSONAL COMPUTER WORLD

★★★★★

Price *£49.99 with £20 mail-in cashback until 31st December 1999. After this date, Encarta Africana will cost £69.99. (Prices include VAT)*

Contact *Microsoft Connection 0345 002000*

www.encarta.msn.com/products/africana

System Specification *486DX/66MHz, Windows 95/98 or NT 4.0; 16Mb RAM, Windows 95; 24Mb, Windows 98; 30Mb free hard-disk space. 2X CD-ROM, 256 colours, local bus video with 1Mb of VRAM, mouse, sound card with speakers or headphones.*

Crayola - Make a masterpiece

Exploding popcorn is just one feature that should be in every art package.

Approaching an art tool while not actually being in the intended age group of 5-12 years could have proved a difficult task. But I have to take my hat off to a most inspired creation. This is not just your run-of-the-mill kids' graphics package; it's a complete foundation course for your budding little Da Vinci's. You start with a blank canvas or one of over 200 idea starters. Whatever you choose, you won't be able to resist frantically dabbling with every available tool to arrive at something wonderful each time. At any point you may be surprised by what you learn as you ask your own personal tutor, Scribble, to advise you on what you're about to try out. The traditional tools are all here, from pens, chalks and paintbrushes with a special paint-mixing feature, to lines, squares and circles. But the Wacky Tools is where the fun starts. You'll find that you won't be able to pick out a favourite and you'll end up making mad collages. Worth mentioning is the multi-coloured popcorn that is placed as a seed of corn and seconds later explodes into colour. And how could I forget the food palette with its selection of goodies that you throw at your own creation.

It's an absolute wonder why these amazing tools are not available to every graphics package, professional or otherwise, as it may just lead us to having a little more fun.

IAN ROBSON

PCW DETAILS

★★★★

Price *£19.95*
Contact *IONA Software 0181 296 9454*
www.ionasoft.com
System Specification *Pentium or better, 16Mb RAM, 16-bit colour support, 10Mb free hard-disk space, Windows-compatible sound card, mouse, 4X CD-ROM drive, printer.*

Jump Ahead Baby

Visual learning for the very young, with your host, Teddy.

There is a growing market for so-called 'lapware', a group to which Jump Ahead Baby, designed for kids aged 9-24 months, belongs. Very simple, both in its graphical presentation and its content, this is the first program in the Jump Ahead series. Essentially, it serves as an introduction to interactivity with the screen and the keyboard, as well as being a visual learning tool. Suitably colourful and easy to follow, kids — sorry, babies — can familiarise themselves with shapes, colours, animals, clothing, music and various objects found within. With animated host Teddy, the user is guided through the program where they are treated to dozens of games, each with a happy introductory song or melody. There are eight different activities, such as dressing Teddy to go the beach, where basic differentiation skills are taught.

As Jump Ahead Baby is meant to be used with the parent, there are two control options. The child can be encouraged to work directly with the keyboard by pressing any key when asked to do so, or the parent can guide the experience with the mouse, in the normal point-and-click way.

As a parent you would need the patience of a saint to go through this program however many times your child may wish to. It's a cheerful production, though personally, I'd rather teach a child with 3D toys which can be picked up and thrown about.

HELEN FORTGANG

PCW DETAILS

★★

Price *£12.99 (plus £5 P&P)*
Contact *Knowledge Adventure/Cendant Software 0118 920 9100 (No URL)*
System Specification *Windows 95/3.1, 486DX2/66MHz, 2X CD-ROM, 16Mb RAM, 15Mb free hard-disk space, SVGA 256 colours, MPC-compatible sound card, mouse.*

Space oddity

Grundy's unusual NewBrain packed a lot of computer into a very small space.

At the start of the personal computer revolution, almost any manufacturer could — and did — turn its hand to a respectable computer. To prove the point, do you remember the Grundy NewBrain? Grundy was, and still is, a manufacturing company.

Launched in 1983, the NewBrain was a great little computer, if somewhat unusual. It was packed into a small cream-coloured box around the size of a decent hardback novel. A particularly unpleasant keyboard was on the top side of the case, with hard 'clicky' keys spaced calculator-style and hopeless for touch-typing.

Just above the keyboard, in the top right-hand corner, was a small smoked-plastic panel. This attracted the most attention at the time; in the high-spec versions, the NewBrain had a fluorescent 16-character display tucked behind the plastic. With just a few lines of assembler, you could flash or scroll messages on this little marvel. Much like the keyboard-based LCD of the early Apricot PCs, this was a great gizmo that had little practical value but always featured in the reviews.

What should have taken most of the review space was the internal design of the NewBrain. Open up the plastic casing and you would be faced with just about the most crowded space in PCs at the time. Although the case was less than an inch thick, there were three separate circuit boards sandwiched inside. Each connected with a wide ribbon cable that allowed them to be folded on top of each other. To stop the boards touching and electrocuting innocent users, a sheet of plastic (or sometimes paper) was carefully inserted between the boards.

▲ THE NEWBRAIN WAS A MASTERFUL EXERCISE IN HOW TO CRAM SOME COMPLEX ELECTRONICS INTO A VERY SMALL CASE

The NewBrain's designers did a great job squeezing so much into such a tiny space

The circuit boards were fantastically complex because the NewBrain was rather advanced for its age. It sported a Z80 processor running at 4MHz, although like most Z80s of the time, this could be doubled with a soldering iron and some basic rewiring of the motherboard. The base model was supplied with 16Kb of RAM but the computer could support a staggering 2Mb of RAM. If you were rich enough to be able to afford this (close to a thousand pounds) you gained extra room for clever graphics and complex programs. Like all the computers of the time, the NewBrain included a good version of Basic and could run the then standard CP/M operating system; but to do this your NewBrain would need 64Kb of RAM and this in turn was expensive.

The graphic display was one of the good points of the NewBrain. It provided a basic 80x30 text display together with images at a resolution of up to 640x250. Only black and white text and graphics were supported though, and oddly, only part of the screen area could be used for the high-resolution display.

To reach the outside world, the NewBrain was fitted with the simplest of ports: just a TV connection for the display, two serial ports, cassette-tape ports and an expansion connector. In fact, this is rather similar to the latest logic from Apple in which all ancillary devices are excluded from the basic computer and connected via a FireWire cable (for this 1983 computer, read 9600bps serial cable). An expansion box was available as an extra and included expansion ports, I/O ports and a disk drive controller.

Grundy produced three different models: the model A didn't have the little fluorescent screen on the front and was considered dull. The AD had the screen and was the most reviewed machine, while the M included a special battery pack that turned the NewBrain into a mobile computer. You would need to rely on the 16-character fluorescent readout or plug in to a TV set to read any text, but it was a nice idea.

One of the oddities of the NewBrain was that it had no on/off switch (again, rather like the Apple Macs). The power supply cord was temperamental and often reset the computer, normally when you were just about to save several hundred lines of Basic code.

I rather liked the NewBrain and still have a model AD tucked in a corner of the shed. At the time, it was promoted either as a programmer's computer with speed, graphics and memory, or as a business unit. As the former, it was fun and interesting. As the latter, it never took off. It really only won as a piece of electronic packaging: the designers did a great job squeezing so much into such a tiny space.

SIMON COLLIN

Rules of entry

These competitions are open to readers of *Personal Computer World*, except for employees (and their families) of VNU Business Publications, Image Recognition Integrated Systems (IRIS) and Dragon Systems. 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 daytime telephone number on a postcard or on the back of a sealed envelope. Mark your card(s) 'PCW/IRISPen Competition' or 'PCW/Dragon Systems Competition' and send to:
P.O. Box 191
Woking
Surrey GU21 1FT,
to arrive by Friday 23rd April 1999.

• *Please state clearly on your competition entry if you do not wish to receive promotional material from other companies.*

Win a wonderful IRISPen!

Just as the mouse reinvented the way we interface with computers, so a new innovation is set to change the way we handle data entry both in and out of the office. Developed by a company called **Image Recognition Integrated Systems (IRIS)**, the **IRISPen** is a small, lightweight, handheld scanner that is used in a similar way to a highlighter pen.

In place of the tedious and time-consuming practice of retyping extracts of existing printed matter from books, magazines and reports to create a new document, the IRISPen will do the work for you.

The IRISPen is available in three versions. In addition to scanning, the top-end Translator can provide translation to and from English into any one of four other languages (German, French, Italian, Spanish) and provides one-way translation from English to Japanese. The user simply 'drags' the pen over the text they want to scan and the information is automatically entered into their computer application, such as a word processor, spreadsheet and/or database.

The IRISPen will scan text from 8pt up to 22pt — even characters on coloured backgrounds or inverted text. The OCR software is based on IRIS's own proprietary PCR (Pen Character Recognition) technology and is bundled with the hardware.

We have four of the top-end Translator IRISPens worth £234 (inc VAT) to give to away to *PCW* readers. To enter the IRISPen competition, just answer the following question:

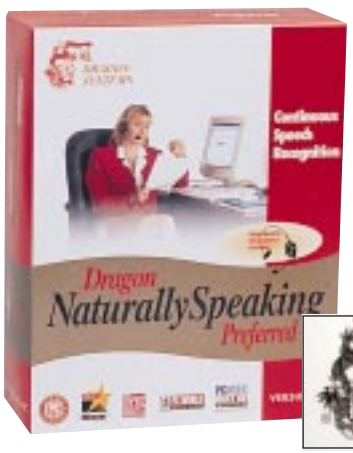
How many languages will the IRISPen translate?

A) Two **B)** Three **C)** Four

See the panel at the left of this page for details of how to enter this competition.

Win a copy of Dragon Systems' Naturally Speaking!

Dragon Systems has recently launched the latest version of its award-winning continuous speech recognition software, **Dragon Naturally Speaking**. Its recognition accuracy factor, quoted at 97 percent, remains unrivalled, but version 3.5 also boasts improved number-handling characteristics and an enhanced voice-only Windows navigation capability to deliver more efficiency at the desk. The package includes a quality, lightweight, head-mounted microphone and the software comes fully integrated into both of the two leading word processors, Microsoft Word 97 and Corel WordPerfect 8. Special features include Natural Language Commands which have been developed as part of Dragon's continuing crusade to make speech recognition a totally user-friendly experience. Natural Language Commands mean that instead of having to memorise specific pre-set phrases to edit or enhance text, users can achieve the desired result simply by saying what comes naturally.



We have six copies of the latest version of Dragon Systems' Naturally Speaking software to give away. Each package is worth £175 (inc VAT). To enter the Naturally Speaking competition, just answer the following question:

Apart from the software, what else does the Naturally Speaking package include?

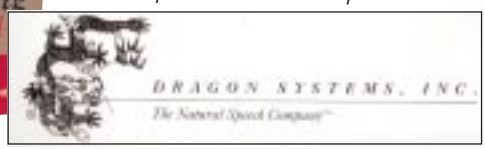
— A quality, lightweight, head-mounted...

A) Microwave

B) Toupee

C) Microphone

See the panel at the left of this page for details of how to enter this competition.



books

Silicon Gold Rush

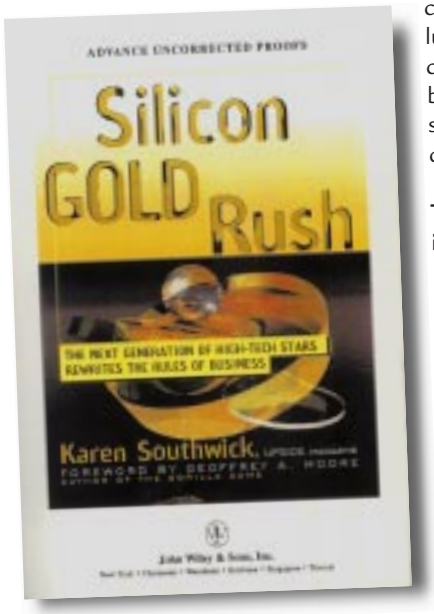
This book reflects on the similarities between the American Gold Rush in the early part of this century, to the current wealth being generated by the IT industry in California.

There is no doubt that this fast-moving area requires a different kind of business approach: failure to implement the changes can lead to a quick demise. But there are also great rewards to be reaped, as exemplified by Hewlett-Packard and Compaq. Author Karen Southwick takes a good look at this ever-changing industry, while analysing in-depth the example of a fledgling software company. The book is split into chapters that describe the life cycles companies in this arena can expect to encounter. It begins with how low-key launches have become the expensive events that now last for days. As the book progresses, it covers such topics as how to grow, how to expand into new markets while retaining the current one, and — a favourite of IT companies — buying up other companies.

PCW DETAILS

★★★★

SILICON GOLD RUSH
Author *Karen Southwick*
Publisher *John Wiley & Sons*
ISBN *0-471-24646-8*
Price *£24.95*



The final chapter, entitled 'The Party's Over', makes for particularly interesting reading. It examines the mistakes that have been made, by Novell in particular. In this case, the author shows lucidly how a large company in this business can make a small mistake that can hurt it deeply.

The entire book is based on in-depth interviews with people at twenty three technology companies, which gives the author a real — and revealing — insight into the whole Silicon Valley society. For those eager to venture into the IT industry, this book makes interesting reading. Not exactly an essential guide to starting up a new technology company, but interesting nonetheless.

DAVID LUDLOW

When Things Start to Think

If there's one subject the geek community loves, it's futurology. *When Things Start to Think* is written by the director of MIT's Media Lab and plays on the marketability of this kind of literature, with the cover proclaiming that '... this is THE guide to your future'.

This is frankly misleading. Although the book is concerned to an extent with technology development from one of the people responsible for it, it's not a catalogue of the electronic widgets we'll all be using in a few years' time. True, the first couple of chapters deal with electronic inks and computers woven into fabric, but if you're a regular reader of *Wired* magazine it will all sound very familiar; the author's MIT colleague, Nicholas Negroponte, has covered it all before. Where it does score, however, is in Gerschenfeld's lack of technology eulogisation. He discusses the implications of IT rather than atom-orientated information delivery and gives refreshing perspectives on their relative worth. He comes not only to the obvious conclusion that books are currently superior to computers as text delivery devices, but that, in some cases, they always will be. However, you may get a little perplexed and fairly bored in the latter half as the discussions veer completely away from technology and turn into a propaganda pamphlet justifying the existence of the Media Lab. Gerschenfeld spends pages and pages on its methodologies and links to industry that are completely off-topic and seem to be lifted out of an MIT corporate pamphlet. He finally gets back to the point in the last chapter, but does little more than repeat what he said in the first. *When Things Start to Think* is interesting in parts, but too disjointed and self-absorbed to make a coherent and satisfying read.

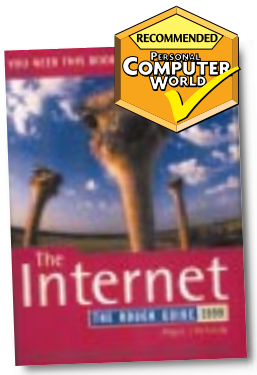
PCW DETAILS

★★★

WHEN THINGS START TO THINK
Author *Neil Gershenfeld*
Publisher *Hodder & Stoughton*
ISBN *0-340-72870-1*
Price *£17.99*

DAVID FEARON

Rough Guide to the Internet 1999



The *Rough Guide to the Internet 1999* comes in an unimposing pocket-sized format, but this doesn't mean that important information has been sacrificed. The first few chapters serve as a basic introduction to the internet. To this end, it covers what the internet is, what it can offer you, how to go about choosing an Internet Service Provider (ISP), how web pages are created, and even online gaming. This section by no means constitutes an ultimate guide to these topics, but the detail level is good enough to get you started, which after all is really the aim of the book. The middle section is an internet directory, covering web pages, newsgroups, and a round-up of useful software. This directory covers a lot of sites which are split up into categories for easy reference. The final section gives you a brief history of the internet, a guide to net language, and a glossary, and finishes with a listing of ISPs throughout the world. The author, Angus J Kennedy, manages to cover all of these subjects surprisingly well. He presents much needed information in a non-technical way that people new to this side of life will find refreshing.

PCW DETAILS

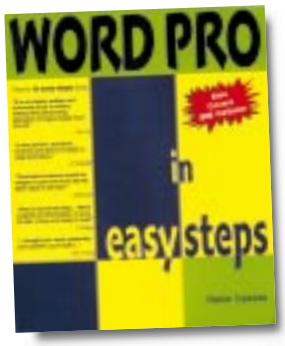
★★★★★

ROUGH GUIDE TO THE INTERNET 1999
Author *Angus J Kennedy*
Publisher *Rough Guide*
ISBN *1-85828-343-4*
Price *£5.00*

But it's not just the novices who will value this book: the directory sections are bound to contain information that everybody is interested in. At only a fiver, you really can't go wrong.

DAVID LUDLOW

Word Pro in Easy Steps



It seems that for every piece of software released on the PC, there is a third-party book teaching you how to use it. Word Pro from Lotus is no exception, as *Word Pro in Easy Steps* is written specifically for it. The book begins with an introductory section that covers the basics of the program from starting it up to explaining the on-screen display — toolbars, menus and the title bar. It moves on to its real purpose of explaining how to use Word Pro. The following chapters begin with simple starter features that allow you to create, save documents, and use the basic tools to do so. As the book progresses you are introduced to more complex features, such as in-depth text formatting and creating your own text styles. Throughout the book, screenshots illustrate what the book is saying, helping you to understand the text better. There's also some appealing clipart that prompts you on things you should remember or be warned of.

PCW DETAILS

★★★

WORD PRO IN EASY STEPS
Author *Stephen Copestake*
Publisher *Computer Step*
ISBN *1-84078-041-X*
Price *£8.99*

As a quick and easy guide to using Word Pro, this book does the job well. It is not, however, the ultimate guide by any means. It proudly announces on the front that it covers IBM ViaVoice, too. This it does — in just nine pages of mostly screenshots. If you desperately need a guide to using Word Pro, then *Easy Steps* is easy enough to read and not bad value at £8.99. If you want more in-depth material, look elsewhere.

DAVID LUDLOW

TOP 10 books

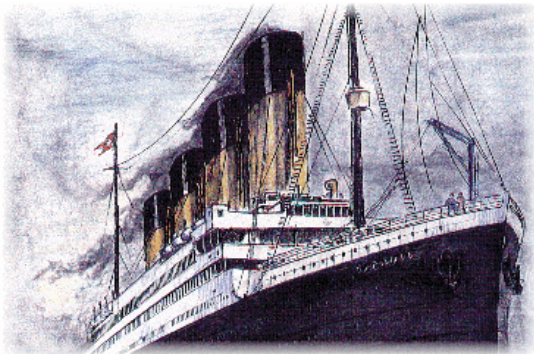
1. **The Internet: Rough Guide 1999**
   Rough Guides
   £5.00
2. **Perl in a Nutshell**
   O'Reilly
   £16.95
3. **Flash 3 Creative Web Animation**
   Macromedia Press
   £22.99
4. **Web Design in a Nutshell**
   O'Reilly
   £16.95
5. **Effective C++ (CD-ROM)**
   Addison-Wesley
   £19.99
6. **Effective COM**
   Addison-Wesley
   £29.99
7. **Unified Modelling Language User Guide**
   Addison-Wesley
   £35.99
8. **Dreamweaver 1.2 for Windows & Mac Visual Quickstart Guide**
   Peachpit Press
   £13.99
9. **Exam Cram Windows NT Server 4**
   Certification Insider
   £22.00
10. **UML in a Nutshell**
    O'Reilly
    £14.95

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

brainteasers

Quickie

I made a model of the Titanic and used a whole pot of paint to paint it. My brother made the same model, only his was twice as big. How many pots of paint will he need to paint his?



This Month's (May) Prize Puzzle

A logical problem this month which can be solved by computer or just plain brainpower.

At our school recently, one of the parents donated a sum of money to provide new books for the children in the junior class. Since Maths books, English books and Science books were all needed, Mrs Topper, the headmistress, asked three other staff members which books the school should buy.

☛ Mr Adams said that the money would buy exactly 2 Maths books, 3 English books and 3 Science books.

☛ Miss Brown thought that 4 Maths books, 3 English books and 2 Science books would exactly use up all the money.

☛ Miss Crane suggested 4 Maths books, 4 English books and 3 Science books would be a good way of using all the money.

Only two of the above suggestions were actually correct.

Mrs Topper realised that buying books all of the same type would also exactly use up the money available — this was only possible with one of the book types — so she went ahead and spent the money in this way, buying 15 of them.

All the Maths books were the same price, likewise all the English books and all the Science books.

☛ Which type of book did Mrs Topper buy?

Answers on a postcard or the back of a sealed envelope, to:
PCW Prize Puzzle - May 1999
P.O. Box 99
Harrogate
N. Yorks HG2 0XJ
to arrive not later than Friday 21st May 1999.

We will also accept solutions by email. Send the solution only (no explanatory notes or program listings etc) and your address, to jj.clessa@btinternet.com

Winners

Because of the cock-up I made of the November problem last year, we have two winners this month.

Incidentally, there has been an excellent response via email, but please don't ask me to reply individually, especially to letters saying 'Did you get my entire email?' Also, please include your name and address — I can't send prizes to an email address!

☛ **Winner of February 1999 Prize Puzzle**

164 entries for this one, 120 of these by email. The winning card was the 104th, one of the email entries, and came from Mr Andrew Rossett of Stoke-on-Trent. Congratulations, Mr Rossett, your prize follows shortly.

The winning solution was that there were 5,764,795 coins, and the general solution to this type of problem, where there are N pirates, is that the least number of coins is:

$$1 - N + N^{(N+1)}$$

☛ **Winner of re-issued November 1998 Prize Puzzle**

There were almost 100 entrants despite the confusion surrounding this problem — and 56 of these were emailed. The correct solution was that the happy couples are:

Dave and Mary
Colin and Kath
Alf and Nell
Bob and Liz

The winning card, chosen at random from the heap, came from Mr Chris Bolton of Plymouth. Congratulations, Mr Bolton, your prize will be on its way shortly.

Meanwhile, to all the also-rans, keep trying, it could be your turn next.

JJ Clessa

PCW Prize Crossword: This month's crossword is on the ChipChat page at the back of the magazine.

Clessa Quickie Puzzles

Have you ever failed dismally on one of JJ Clessa's Quickies? For those of you who enjoy our Quickie problems and perhaps would like to get the solutions too, JJ Clessa will shortly be publishing two books of Quickie Puzzles — 125 puzzles in each book — which will comprise almost all the puzzles that have appeared in *Personal Computer World*'s Leisure Lines section since its inception nearly twenty years ago. The books will be titled *The Little Red Book of Quickie Puzzles* and *The Little Blue Book of Quickie Puzzles*.

Each book will eventually be available in book shops for about £2.75, but there will be an early opportunity for *PCW* readers to obtain the books at a specially reduced price. Watch this space for further details.

DIRECT BUYERS WORLD

Contents

CREDIT CARD PROTECTION

Always pay by credit card when ordering goods valued in excess of £100, thereby ensuring maximum protection in the event that an advertiser ceases to trade prior to such goods being actually received.

All the best buys are here

Sometimes you just want to know the names of the best products, when they were reviewed, how much they cost and where you can get them. That's where our no-nonsense buyer's guide comes in. Over the following five pages we've picked out the outstanding PCs, peripherals and software packages that we can recommend without hesitation. To make it even easier, we've included the current manufacturer's contact number and price (including VAT), as well as details of when and where we reviewed the product. For the full review, why not check out *PCW* on CD-ROM? Updated quarterly, *PCW* on CD-ROM contains the full editorial from the past 24 issues, in searchable Adobe Acrobat format — it even comes with a copy of Acrobat for viewing, searching and printing. Each CD costs just £9.95 including postage and packing, or £8.96 for subscribers. **Call 01795 414870** to order your copy or turn to ***PCW* Reader Offers** [p286] for further details. If you can't wait for the next quarterly CD, try out our **Faxback service** (p577) which provides 24-hour access to your favourite features and reviews.

GORDON LAING
Editor

Personal Computer World Buyer's Charter

Anthony George, our Customer Services Manager, is here to help you if things go wrong, if you have an enquiry or complaint about a supplier advertising in this magazine, or have encountered problems as a result of goods purchased. Write to him with details of the complaint, together with your full contact details, and he will endeavour to assist you.

Anthony George
Customer Relations Department
VNU Business Publications
VNU House, 32 - 34 Broadwick Street
London W1A 2HG

MOPS — Buyers Charter

When you order goods as a *private* individual reader from a UK supplier's advertisement in *Personal Computer World* and pay by post in advance of delivery to that Mail Order Advertiser who subsequently ceases to trade and goes into Liquidation or Bankruptcy prior to delivery of such goods, you may, under the 'Buyers Charter', qualify for compensation, providing:

1. You have not received the goods or had your money returned.
2. You have followed the *Personal Computer World* guidelines when placing your order.
3. Have taken all reasonable steps to effect delivery or refund.
4. You have retained irrefutable proof of purchase, for verification purposes:

a) A copy of the original advertisement from which the goods were ordered.
b) Comprehensive proof of payment.

GUIDELINES

Claims must be submitted so as to arrive 'NOT EARLIER THAN TWENTY EIGHT DAYS AND NOT LATER THAN THREE MONTHS' from the official on-sale date of the magazine. Claims must be submitted to the Customer Services Manager IN WRITING, summarising the situation and lodged strictly within the time schedule stated. *Claims received outside this period will not qualify for consideration for compensation under the 'Buyers Charter'.*

Once a supplier who has advertised in this magazine has become subject to either Liquidation or Bankruptcy proceedings and upon completion of all winding-up procedures, Personal Computer World guarantees to expeditiously process those *private* individual readers' claims made and submitted, in accordance with those procedures outlined, up to the following limits.

a) £2,000 in respect of any claim submitted by one Private Individual Reader.
b) £100,000 in respect of all advertisers so affected in any one year.

These sums define the Publishers maximum liability under the scheme, and any additional payments above and beyond these thresholds will be entirely at the Publisher's discretion.

As soon as legal confirmation that a state of liquidation or bankruptcy exists, the processing of claims will immediately commence. If, however, assets are available and the receiver/liquidator appointed confirms that an eventual payment will be made by way of a dividend, all claims under the 'Buyers Charter' will be subject to re-processing and will take into account any shortfall which may then exist.

Payments under the scheme will also take into consideration the obligations and liabilities of other interested parties such as credit card and/or insurance organisations etc.

EXCEPTIONS

This guarantee only applies to advance postal payments made by *private individuals in direct response for goods itemised/illustrated in display advertisements*. It does not cover goods ordered from advertising Inserts or Cards, classified advertisements or MicroMart, or Catalogues obtained from, or supplied by, any advertiser regardless. *Similarly, protection does not exist in relation to purchases made as a result of reviews and/or editorial comment.*

The 'Buyer's Charter' is designed to safeguard the *PRIVATE individual reader*. It does not provide protection to any companies, societies, organisations, unincorporated bodies or any other commercially orientated outlet of any description. Neither is cover provided for orders placed from, or to, any overseas suppliers or for goods purchased for resale.

CAVEAT EMPTOR

Readers are reminded that the Mail Order Protection Scheme was solely implemented to provide protection to the private individual when goods are ordered 'Off the Page' and paid for by post. *It was not designed for, nor will it offer any protection, in the event whereby goods are purchased via the Internet.*

DISCLAIMERS

Readers are reminded that the opinions expressed, and the results published in connection with reviews and/or laboratory test reports carried out on computing systems and/or related items are confined to, and are representative of, only those goods as supplied *and should not be construed as a recommendation to purchase*. Whilst every precaution is taken to ensure that reliability and good business practices prevail, the Publisher cannot be held responsible for the overall trading activities of any supplier referred to, or advertising within, this publication.

best buys

Desktop PCs

Due to the fast moving nature of the PC industry, we can only recommend particular PCs in the month we have seen them. Prices change almost weekly as component prices from third-party suppliers fluctuate according to availability. So, for this month's best PC buy, for instance, look at the group test on p134.
It always pays to take a little care when buying a PC, or in fact any hardware or software. For *PCW*s guide to buying direct see p569. And don't forget to use the *PCW* order form.
Obviously, everyone's ideal PC will have a different mix of components, with gamers needing a very good 3D graphics card, probably a 3D sound card and excellent speakers, and business users will need a good monitor and plenty of RAM.

Entry-level PCs

Budget-conscious buyers might consider going for a non-Intel processor, such as an AMD. However, be aware that if you choose a Socket 7 chip you might find it hard to upgrade in future. Similarly, if you go for a Slot 1 processor, make sure you specify a motherboard with a BX chipset which will allow for greater upgrading options in the future. We would recommend the following specification:

- **AMD K6-2 350 or Intel Celeron 366 processor**
- **32Mb RAM**
- **4Gb hard drive**
- **Graphics card with 4Mb video RAM**
- **15in monitor**
- **CD-ROM drive**

You can expect to pay between **£499 and £599 (ex VAT)** for this configuration, with either a sound card and speakers or a modem. However if you have a little extra cash, take a look at our PC group test this month (p134), which features Celeron 400 PCs for £799 inc VAT.

Mid-range PCs

In the mid-range, around **£1,000 (ex VAT)** will get you a good all-round machine. The introduction of PIII has turned PII into a mid-range processor, both on price and performance. However, the stunning result of the K6-III, and its low price, make it worth serious consideration. For a full review of K6-III see p79.
Look for a minimum of:

- **Intel PII or AMD K6-III 400MHz processor**
- **64Mb RAM**
- **8Gb hard disk**
- **Good 3D graphics card with 8Mb video RAM**
- **17in monitor**
- **CD-ROM drive**
- **Sound card, speakers, 56K modem**

Most of all, look for a machine that is easy to upgrade, so specify plenty of slots and no on-board chips on a good motherboard, and lots of free bays in the case.

High-end PCs

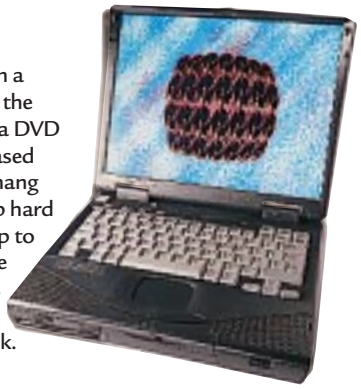
If you are after a state-of-the-art machine, be prepared to spend around **£1,800 (ex VAT).** What you require at this price will be specific to your needs, depending on how you intend to use the machine. However, as a basic specification we would want:

- **PIII 500**
- **128Mb 100MHz RAM**
- **16Gb hard drive**
- **Good 3D graphics card with 16Mb video RAM**
- **19in monitor**
- **DVD drive**
- **Sound card, speakers, 56K modem**
- **Bundled office suite**

To see how PIII shapes up against PII, see next month's group test.

High-end notebook

Compaq **Armada 7800**

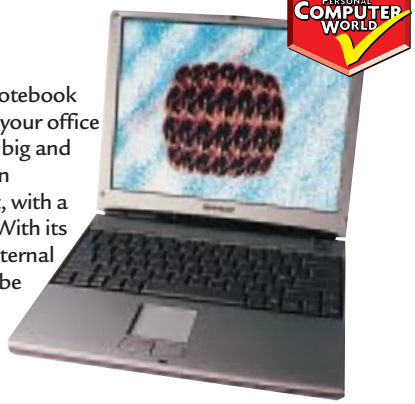


With everything you could need in a replacement to your desktop PC, the Armada 7800 even incorporates a DVD drive for movies-on-the-move. Based around a 300MHz PII it doesn't hang around and benefits from an 8Gb hard drive and 64Mb memory. With up to five hours' battery life it should be able to keep going longer than its users, and the power adapter is integrated — goodbye power brick.
➠ *PCW March '99, p79*

Price *£3878.68* **Contact** *Compaq 0181 332 3000*
Also Recommended *Panasonic Toughbook CF-71* **Price** *£2701.32* **Contact** *Panasonic 0800 444220* • *IBM ThinkPad 770* **Price** *£3795.25* **Contact** *IBM 0870 601 0136 (both PCW March '99)*

Mid-range notebook

Sharp **PC-A150**

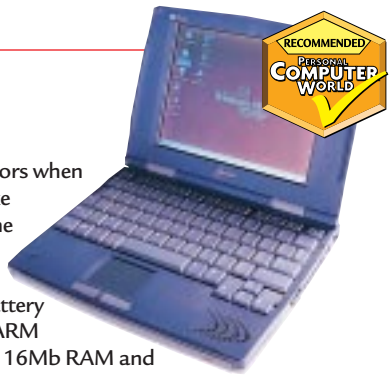


Light and portable, this notebook has enough power to run your office apps, and a screen that is big and good enough to be used in presentations. It is robust, with a magnesium alloy casing. With its excellent keyboard and external floppy drive it could even be used as a desktop replacement.
➠ *PCW March '99, p183*

Price *£2,109.13* **Contact** *Sharp 0800 262958*
Also Recommended *AJP 1100M* **Price** *£1,350.08* **Contact** *AJP 0181 208 9744* • *Sony Vaio 505* **Price** *£2301.83* **Contact** *Sony 0870 2402408 (both PCW March '99)*

PDA

Hewlett-Packard **Jornada 820e**



Fed up with ever-faster processors when all you need is a machine to take notes and check your email? The Jornada could be the answer to your prayers. You can work for a full day without fear of the battery dying and with an Intel StrongARM processor running at 190MHz, 16Mb RAM and an integrated 56K modem, it has everything you need when on the move. And its 8.2in STN screen with a resolution of 640x480 is large enough to see exactly what you're doing.
➠ *PCW February '99, p120*

Price *£849* **Contact** *HP 0990 474747* **Also Recommended** *Psion Series 5* **Price** *£429.99* **Contact** *Psion 0990 143050* • *3Com PalmPilot Pro* **Price** *£229* **Contact** *3Com 0800 225252 (both PCW May '98)*

Colour inkjet

Hewlett-Packard
DeskJet 895CXi

For all-round excellence you can't do better than the HP 895CXi. The quality of its output for both text and graphics is impressive given the swift speed at which they are produced. Even its 'econofast' mode could be used for vital documents, saving both time and ink. It takes a huge range of papers and replacing ink cartridges is a breeze.

PCW February '99, p151

Price *£292.58* **Contact** *HP 0990 474747* **Also Recommended** *Epson Stylus Color 740* **Price** *£272.60* **Contact** *0800 220546* • *Epson Stylus Color 850* **Price** *£318.43* **Contact** *0800 220546 (both PCW February '99)*

Colour photo printer

Lexmark
Photo JetPrinter 5770

For dedicated digital photographers, this printer is ideal, with a 1200x1200dpi maximum resolution and a slot each for direct access to CompactFlash and SmartMedia cards. There's no separate black cartridge bundled, although any standard black Lexmark cartridge will fit.

PCW April '99, p86

Price *£349* **Contact** *Lexmark 01628 481500*
Also Recommended *Epson Stylus Photo 700* **Price** *£273*
Contact *Epson 01442 261144 (PCW September '98)*

Budget laser printer

Kyocera
FS-600

This personal 6ppm laser printer easily beats all other laser printers in its class. Its speed is impressive, printing out a steady six pages per minute no matter what the paper coverage, and the quality of its output is second to none, both for graphics and text. It is easily upgradable, taking an impressive 36Mb of RAM. It has a PostScript option and there is even an ethernet port that comes as standard.

PCW February '99, p199

Price *£299* **Contact** *Kyocera 0118 923 0660*
Also Recommended *Panasonic KX-P6300* **Price** *£257.32*
Contact *Panasonic 01344 853081 (PCW February '99)*

Business laser printer

Lexmark
Optra K1220

It is rare that you find a printer which is both good value and produces exceptional-quality output, yet the Optra K1220 is just such a laser printer. With a rated speed of 12ppm it produces text in good time, but most of all its outstanding quality, both for text and graphics, puts it second to none amongst laser printers.

PCW February '99, p201

Price *£722.63* **Contact** *Lexmark 01628 481500* **Also Recommended** *QMS DeskLaser 1600P* **Price** *£816* **Contact** *QMS 01784 445555* • *HP LaserJet 4000TN* **Price** *£1,316* **Contact** *HP 0990 474747 (both PCW February '99)*

Multifunction device

Hewlett-Packard
LaserJet 3100

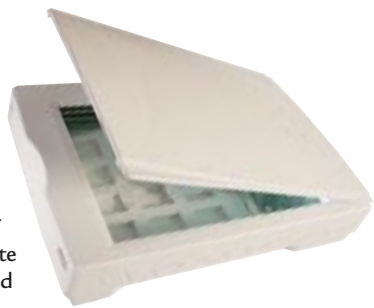
Good laser print quality from this quiet machine. It's intelligent enough to detect a document dropped into its feeder and it will launch an idiot-proof menu for scanning, copying and emailing. Fast, accurate OCR and 2Mb memory for incoming faxes when the paper supply is exhausted, make the 3100 an ideal multifunction device.

PCW June '98, p83

Price *£629* **Contact** *HP 0990 474747*
Also Recommended *Canon MultiPASS MPC20* **Price** *£370.13*
Contact *Canon 0181 773 3173 (PCW January '98)*

Flatbed scanner

Umax
Astra 610P



Once again, the Umax Astra 610P parallel-port scanner has won our budget flatbed scanner group test, boasting an unbeatable combination of performance and value. Note that our three recommended scanners require enhanced parallel ports found only on modern PCs, so users wanting top performance, or those with older systems, should stick to SCSI.

PCW September '98, p229

Price *£69.33 Contact Umax 01344 871329* **Also Recommended** *Agfa SnapScan 310P* **Price** *£116.50* **Contact** *Agfa 0181 231 4200* • *Microtek Phantom 330CX* **Price** *£75.95* **Contact** *Microtek 01908 317797 (PCW Sept'98)*

best buys

Digital camera

Canon
Powershot Pro70

This good-looking camera takes amazingly good, natural-looking pictures and has enough features to keep any SLR user happy. Its dual Compact Flash slots make for extended periods without having to download, while its 1536x1024 pixel resolution will give you superb prints.

PCW May '99, p199

Price £999 **Contact** Canon 0121 666 6262 **Also Recommended** Ricoh RDC-4200 **Price** £499 **Contact** Johnson's Photopia 01782 753355 • Olympus C-900 Zoom **Price** £649.99 **Contact** Olympus 0171 253 0513 (both PCW May '99)

Monitor

CTX
PR710T

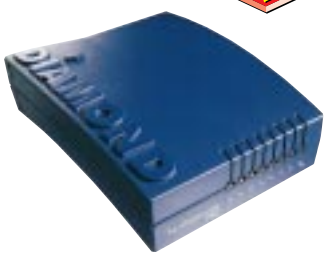
Not only does the PR710T look gorgeous, its performance is stunning. It sports a genuine Sony Trinitron tube, which is always a good sign. Power regulation, resolution, colour alignment and colour purity are all of the highest order, leading to a display that you can see is special straight away.

PCW April '99, p182

Price £363.08 **Contact** CTX 01923 810800
Also Recommended ADI MicroScan GT56 **Price** £351.33 **Contact** ADI 0181 236 0801 (PCW April '99)

Modem

Diamond
SupraExpress 56e Pro



With ever-shifting goalposts, it makes sense to go for a modem which supports all the current standards, as well as simultaneous voice and data. Combine this with a roaring speed, superb ease of use and a low price, and you have the best-value modem around.

PCW December '98, p211

Price £75 **Contact** Diamond Multimedia 0118 944 4401
Also Recommended Zoom FaxModem 56Kx **Price** £89 **Contact** SCS Data Communications 01494 748904 (PCW December '98)

Removable storage

Sony
HiFD

With the same form factor disks as a 3.5in drive, this could replace your floppy but crams a whopping 200Mb onto each disk. Early units will be parallel-only affairs, but will soon be joined by internal ATAPI and PC Card versions. It's a little slow but easy to use.

PCW March '99, p91

Price £149 **Contact** Sony 01932 816660
Also Recommended Iomega Jaz 2Gb **Price** £270 **Contact** Iomega 0800 973194 • Imation SuperDisk 120 **Price** £105 **Contact** Imation 01344 402200 (both PCW, August '98)

Sound card

Creative Labs
Sound Blaster Live!

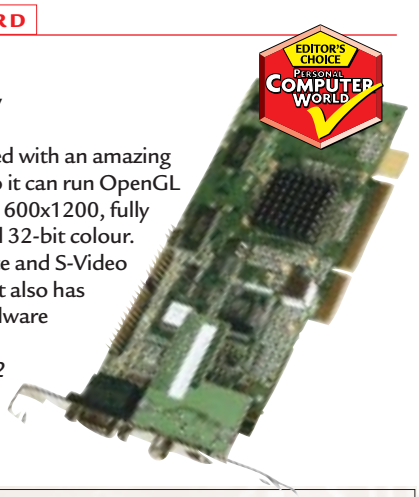
SoundBlaster cards have long been the best choice for non-professional users. The SoundBlaster Live! ups the ante, providing near-professional quality sound at a bargain price. And, it comes with an impressive bundle of dedicated digital I/O daughtercard, speakers, subwoofer and games.

PCW December '98, p92

Price £149 **Contact** Creative Labs 01189 344744
Also Recommended Terratec EWS64 S **Price** £149.23 **Contact** Terratec 01600 772111 (PCW July '98)

Graphics card

ATi
Rage Fury



The Rage Fury is fitted with an amazing 32Mb of SDRAM, so it can run OpenGL accelerated apps at 1600x1200, fully Z-buffered and in full 32-bit colour. Fitted with composite and S-Video TV-out connectors, it also has integrated DVD hardware decoding.

PCW May 99, p82

Price £159 **Contact** ATIi 01628 533115 **Also Recommended** Voodoo3 3000 **Price** £175 **Contact** 3Dfx Interactive 0171 544 6812 (PCW May '99) • Diamond Viper 550 **Price** £150 **Contact** Diamond Multimedia 0118 944 4400 (PCW November '98)

Accounting

Intuit
Quickbooks 6

Touted as the easiest accounting package for small businesses, QuickBooks has a long history and a large user base. Version 6 is the first 32-bit incarnation. It even monitors company performance and sounds the alarm should you fall behind.

PCW March 99, p92

Price *£199 (Pro version)* **Contact** *Intuit 0800 585058* **Also Recommended** *MYOB* **Price** *£229.13* **Contact** *Bestware 01752 201901 • TAS Books* **Price** *£116.33* **Contact** *Megatech 01372 727274 (both PCW, June '98)*

Personal Finance

Microsoft
Money Financial Suite 99

Microsoft Money Financial Suite 99 is our choice for personal finance. It offers online banking and updating facilities, as well as Sage compatibility, all at a bargain price.

PCW February '99, p80

Price *£49.99* **Contact** *Microsoft 0345 002000*
Also Recommended *Quicken 98* **Price** *£39.99* **Contact** *Intuit 0181 990 5500 (PCW June '98)*

Database

Microsoft
Access 97

This industry-standard database application is also the best. With its wizards, infamous Office Assistants and standard Windows interface, Access 97 is relatively easy for the novice. And its powerful relational features and VBA integration make it suitable for developers, too.

PCW November '98, p220

Price *£299* **Contact** *Microsoft 0345 002000*
Also Recommended *FileMaker Pro 4* **Price** *£169*
Contact *FileMaker 0845 603 9100 (PCW November '98)*

DTP

Serif
PagePlus 5

Inexpensive, easy-to-use and surprisingly well equipped, PagePlus 5 offers extremely capable desktop publishing. Those wanting the choice of professional publishers will have to fork out more for Quark XPress 4x.

PCW June '98, p132

Price *£99.95* **Contact** *Serif 0800 376 7070*
Also Recommended *Quark XPress 4* **Price** *£1,169*
Contact *Quark 01483 454397 (PCW June '98)*

Image Editing

Ulead
PhotoExpress 2.0

Ulead has succeeded in removing the frustration factor often involved in getting to grips with digital pictures. PhotoExpress 2.0 is a pleasure to use, with a great, clearly structured interface and fast, in-depth tools. It has pre-set editing modes for the novice and custom adjustments for each editing function, so the power user will be kept happy, too.

PCW January '99, p202

Price *£34.95* **Contact** *BIT 01420 83811* **Also Recommended** *Adobe PhotoDeluxe 3* **Price** *£45.83* **Contact** *Adobe 0181 606 4001 • Paint Shop Pro 5* **Price** *£69.95* **Contact** *Digital Workshop 01295 258335 (both PCW January '99)*

Drawing

Corel
CorelDraw 8

Not one of Corel's classic years, but this is still the Windows drawing package to own. Version 8 of this giant suite boasts better drawing and new interactive tools. Artists on a budget should check out Micrografx Windows Draw 6.

PCW October '98, p203

Price *£464.13* **Contact** *Corel 0800 581028* **Also Recommended** *Adobe Illustrator* **Price** *£351.32* **Contact** *Adobe 0181 606 4000 • Freehand* **Price** *£327.82* **Contact** *Macromedia 01344 458600 (both PCW October '98)*

Information Managers

Starfish **Sidekick 98**

The best personal information manager boasts wide customisation abilities as its greatest strength. For heavyweight contact management, you need look no further than Goldmine 4 (*see the details panel, below*).

PCW August '98, p204

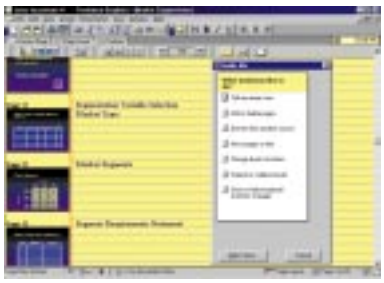
Price £39.99 **Contact** Starfish 0181 875 4455
Also Recommended Goldmine 4 **Price** £229 **Contact** AVG 0171 335 2222 (PCW August '98)

Presentation Graphics

Lotus **Freelance 97**

This is our choice for electronic presentations. For you, it may also come down to which office suite you own or are considering, but as part of Microsoft Office 97, PowerPoint won't let you down.

PCW March '98, p200



Price £49.35 **Contact** Lotus 01784 445808
Also Recommended MS PowerPoint 97 **Price** £325.47
Contact Microsoft 0345 002000 (PCW March '98)

Remote Access

Traveling Software **LapLink Tech**

The high-end version of this extremely versatile product, LapLink Tech, has all the features of the standard version but also lets you print from the host machine onto a remote printer, or vice versa, and talk to whoever is using the host machine. It includes anti-virus and hard-disk cloning utilities.

PCW December '98, p233

Price £169.95 **Contact** Traveling Software 01344 383232
Also Recommended Symantec pcAnywhere **Price** £75.08
Contact Symantec 0171 616 5600 (PCW December '98)

Web Design

Macromedia **Dreamweaver 2**

An attractive and easy to use interface make this great for those looking for something with a little more power. Good table handling, and extensive formatting options on a single, centralised property inspector, make it a joy to use.

PCW April '99, p103

Price £229 **Contact** Computers Unlimited 0181 358 5857
Also Recommended Adobe PageMill 3.0 **Price** £92.83
Contact Adobe 0181 606 4000 (PCW March '99)

Programming Tool

Inprise **Delphi 4**

Delphi is not a cross-platform product, but does let you build browser-independent web applications. It reaches all the way from RAD business applications to fast graphics using DirectX. It beats Visual C++ on ease of use, and Visual Basic on performance.

PCW April '99, p198

Price from £92 to £1845 **Contact** Inprise 0118 932 0022
Also Recommended Symantec Visual Cafe **Price** £217 or £580
Contact Symantec 0181 317 7777 (PCW April '99)

Anti-Virus

Norton **AntiVirus 4.0**

Norton AntiVirus 4.0 is our choice for protecting your PC. It offers the best combination of features, ease of use and performance. Its virus detection rate is first class and there are free online updates for the life of the product.

PCW April '98, p124

Price £49 **Contact** Symantec 0171 616 5600
Also Recommended Dr Solomon's HomeGuard **Price** £29
Contact Dr Solomon's 01296 318700 (PCW April '98)

Faxback Service

Missed a feature or a review? Try our 24-hour faxback service.

Updated every month, our easy-to-use Faxback service gives you instant access to a complete range of product reviews, features and workshops via your fax machine.
To use the service, simply follow the instructions below.
Calls are charged at 50p per minute at all times, with an average duration of four minutes.
Our service is available 24 hours a day, 365 days a year.
(The faxback service is not available outside the UK).

1 From the choices below, select the article(s) you wish to receive. Note the number of pages in the article.
2 Using the handset on your fax machine, dial 0660 600632. If you do not have a handset, press the fax machine's On Hook or Telephone button, then enter 0660 600632 on the keypad.
3 There will be a vocal introduction to the Faxback service which will ask you to enter the code of the article(s) you require. The voice will then ask you to press the Start / Send button on your fax machine.
4 The article(s) you have requested will then come through your fax machine.

IMPORTANT INFORMATION

For the faxback service to work correctly, you must be referring to the current issue of *Personal Computer World* and have your machine set to use tone dialling (you may need to switch your machine from 'pulse' to 'tone').

If you have any problems with the *Personal Computer World* faxback service, please call 0171 412 3795. This helpline is open from 9:00am to 5:30pm Monday to Friday and calls are charged at the standard rate.

Faxback Table

PCs and Notebooks	Issue	Pages	Code
450MHz PCs	November-98	11	2004
Undercover PCs group test	December-98	20	2005
Xeon server round-up	December-98	4	2006
NT Workstations and Windows 2000 preview	March-99	11	2007
Notebooks (budget, high-end & ultra slim)	March-99	9	2008
Pentium III PCs	April-99	5	2009
Hardware Group Tests	**Issue**	**Pages**	**Code**
PDAs and handhelds	May-98	14	2103
Sound cards	July-98	11	2104
Removable storage	August-98	5	2105
Budget flatbed scanners	September-98	9	2107
Digital cameras	October-98	12	2108
3D graphics cards	November-98	12	2109
Communications hardware	December-98	11	2110
Digital video	January-99	13	2111
Laser printers	February-99	12	2112
Colour inkjets	February-99	8	2113
USB & 1394	March-99	7	2114
Monitors (17in, 19in and flatpanels)	April-99	11	2115
Software Group Tests	**Issue**	**Pages**	**Code**
Presentation tools	March-98	9	2202

PCW Faxback number: 0660 600632

Faxback Table (cont'd)

Anti-virus	April-98	9	2204
Accounting and personal finance	June-98	11	2205
Desktop publishing	June-98	12	2206
Information / contact managers	August-98	10	2207
Utilities	September-98	8	2208
Speech recognition	October-98	5	2209
Drawing (illustrative and technical)	October-98	11	2210
Databases	November-98	10	2211
Communications	December-98	10	2212
Image editing (budget)	January-99	11	2213
Image editing (high end)	February-99	8	2214
Web authoring tools	March-99	12	2215
Java and visual programming tools	April-99	8	2216
Hands On Workshops	**Issue**	**Pages**	**Code**
Client/server databases part 1	April-98	3	2305
Client/server databases part 2	May-98	3	2306
Client/server databases part 3	June-98	4	2307
Client/server databases part 4	July-98	4	2308
Client/server databases part 5	August-98	4	2309
Colour management	September-98	4	2310
Instant messaging	November-98	3	2311
Notebook tips	November-98	3	2312
Linux part 1	January-99	3	2313
Linux part 2	February-99	3	2314
Linux part 3	March-99	3	2315
Web site construction part 1	March-99	3	2316
Javascript	April-99	3	2317
Remote access	April-99	3	2318
Year 2000 solutions part 1 - hardware	April-99	1	2319
Small Business Workshops	**Issue**	**Pages**	**Code**
Choosing the right comms	August-98	5	2401
Building a small network	September-98	5	2402
E-commerce for small business	October-98	5	2403
Building your own web server	November-98	6	2404
Marketing your web site	December-98	4	2405
The euro and your business	January-99	4	2406
Hubs and network starter kits	February-99	4	2407
Firewalls and net protection	March-99	3	2408
IT training for your small business	April-99	4	2409
General Features	**Issue**	**Pages**	**Code**
PCs for home entertainment	March-98	5	2504
Education and IT	March-98	4	2505
Virtual museums	April-98	4	2506
PCW 20th Anniversary Special	May-98	36	2507
Computers against crime	August-98	3	2511
PCW service & reliability survey	October-98	12	2513
Wireless technology	December-98	5	2518

PCW Faxback number: 0660 600632

PERSONAL COMPUTER WORLD

Order form

Use this form when you order by phone, fax or post.

SUPPLIER'S DETAILS

COMPANY .....

SALESPERSON'S NAME .....

ADDRESS .....

.....

.....

..... POSTCODE .....

DATE OF TELEPHONE ORDER ..... / ..... / ..... TIME .....

CUSTOMER DETAILS

NAME .....

COMPANY .....

ADDRESS .....

.....

.....

..... POSTCODE .....

DATE OF TELEPHONE ORDER ..... / ..... / .....

ORDERED BY: ❑ TELEPHONE ❑ FAX ❑ POST

ORDER REFERENCE NUMBER (IF QUOTED) .....

DISPATCH REFERENCE NUMBER .....

ADVERT APPEARED IN PCW:

ISSUE DATE ..... **PAGE** .....

QUANTITY	DETAILS OF ORDER	UNIT COST £	TOTAL £

SUB-TOTAL _____

DISCOUNT _____

CARRIAGE _____

SURCHARGES _____

VAT _____

TOTAL _____

METHOD OF PAYMENT

❑ PERSONAL CHEQUE ❑ PURCHASE ORDER ❑ CREDIT CARD

❑ C.O.D ❑ DEBIT CARD ❑ OTHER (SPECIFY) .....

CARD COMPANY .....

ISSUE NUMBER (debit cards only) .....

START DATE ..... / ..... / ..... EXPIRY DATE ..... / ..... / .....

CARD NUMBER (below) ..... / ..... / ..... / .....

SIGNED .....

DATE ...../...../.....

DAYTIME TELEPHONE NUMBER .....

DELIVERY ADDRESS .....

.....

..... **POSTCODE** .....

AGREED DELIVERY DATE ..... / ..... / .....

PCW Purchasing Guidelines

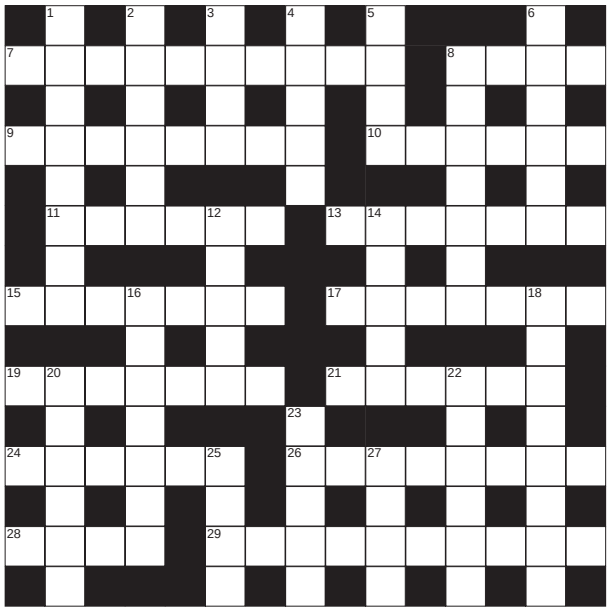
There are several steps you can take to make sure the buying process is smooth and trouble free.

☛ **When you phone a supplier, make a note of name of person you are speaking to**. Note down any claims they make for the product you are interested in, or any specifications they mention. If you aren't sure if what they are offering is right for the task, then ask. Check what is included: for example, when buying a printer, are all cables and cartridges bundled in? Before you place an order for a PC, insist on being faxed or emailed a full specification, detailing all components and peripherals. Also make sure you get a warranty that suits your needs. If you need swift repairs, consider paying extra for an eight-hour repair service. Also make sure you understand what service you can expect to receive, including who pays for couriers if your machine has to be returned for repair.

☛ **When you place your order, use a credit card**. The Consumer Protection Act ensures that credit card purchases between £100 and £15,000 are covered. Check the address to which the goods will be sent. Often, if you buy with a credit card you can only receive the goods at the address on the card. If you are buying over the internet, make sure you are using a secure server, sometimes denoted by the prefix 'https'.

☛ **Set a delivery date, so you have some come-back if the goods are not delivered on time**. When the goods arrive, check the packaging before you sign for the goods, to guard against damage in transit.

May crossword

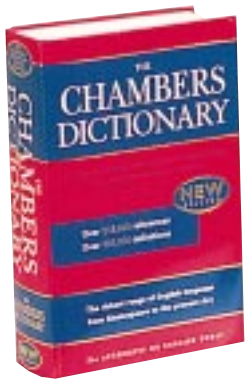


ACROSS

7 Making use of music, video and so on (10)
8 Place for rescued files (4)
9 Small floppy (8)
10 & 24 Graphics for preventing monitor burn (6, 6)
11 Someone experimenting with alpha and beta versions (6)
13 Number with nothing after the decimal point (7)
15 DOS 'give me a command' lines (7)
17 The C of CPU (7)
19 The O of OCR (7)
21 Device for picking up radio and TV signals (6)
24 (See 10 across)
26 Permanently present in the main memory (8)
28 Program's faults or defects (4)
29 Non-traditional AI way of representing thought (5, 5)

DOWN

1 More twee (8)
2 Fence posts (6)
3 Leave out (4)
4 Snake (5)
5 Low voice (4)
6 Hinder (6)
8 Most gloomy (7)
12 Surplus (5)
14 Female relative (5)
16 Damsels (7)
18 Ocean (8)
20 Epidemic (6)
22 Not alfresco (6)
23 Mad (5)
25 Use a sieve (4)
27 Utters (4)



Trying to find the right words? There are millions of them in the new *Chambers Dictionary*. Each month, one lucky *PCW* Prize Crossword entrant wins a copy. This time, it could be you. Send your completed crossword to 'PCW May Prize Crossword', VNU House, 32-34 Broadwick Street, London W1A 2HG, to arrive not later than Friday 23rd April, 1999.

• *Please state clearly on your entry if you do not wish to receive promotional material from other companies.*

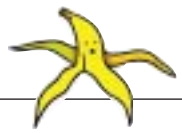
April Solutions

ACROSS

7 Audio 8 Bits 9 Read 11 Archie
12 Firewall 13 Demo 15 URL 16 Zeros
19 Uniform 20 Started 23 Files 25 EXE
26 Spam 28 Protocol 30 Master
32 HTML 33 Unix 34 Beeps

DOWN

1 Purr 2 Fight off 3 Pitfall 4 Usurp
5 Browse 6 Pail 10 Require 14 Ennui
17 Opera 18 Streams 21 Resisted
22 Declaim 24 Extols 27 Scrum
29 Rate 31 Espy



On p127 of the Pentium III feature in the April issue of *PCW*, under the banner Evesham Vale Platinum, we incorrectly stated that the **Evesham Vale Platinum TNT Live!** had a 9.1Gb hard drive. The drive was, in fact, 12.7Gb. We also stated that the 4.8-speed DVD-ROM drive was a double-speed drive and omitted to mention that the machine included a 56K modem and a set of Creative Labs PC Works FourPoint-Surround speakers. In light of these facts we are pleased to increase our **Value For Money** rating awarded to this PC from three stars to ★★★★.

next month

PII *vs* PIII:

The release of Intel's PIII leaves many of us wondering whether we should invest in one, or if we should check out what the PII has to offer. Our group test does the leg work for you.

Office 2000:

It's here at last! The latest Microsoft software reviewed (*...even our office cat is up for it!*).

Graphics Cards:

Want to know the latest and greatest graphics cards about? Read our round-up.

Plus: DTP and storage.